	TP SOUTHERN ODISHA DISTRIBUTION LIMITED, BERHAMPUR		
	TECHNICAL SPECIFICATION		
Doc. Title	<b>Specification for B&amp;S type of Hardware fitting 70KN &amp; 90KN</b>		
Doc. No	ENG-HV-025	Eff. Date: 01/03/2021	
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Prepared by:	Reviewed by:	Approved By:	Issued By:

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Initiator		HOG (ENGINEERING)	
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### 1. SCOPE

The Specification covers the design, manufacture, testing (preferably at manufacturer's works before supply) and delivery of the combined unit of Cross ArmStrap bolted type Tension Clamp including loading, unloading anywhere in TPSODL Site/store. The combined units offered shall be complete with all components which are necessary (excepting disc insulator) or usual for their effective performance and easy maintenance and inter changeability at site. Such parts shall be deemed to be within the scope of contract.

### 2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref. IS	Description
IS 5300	Specification for Guy Insulator
IS 2486 ( Part 1 ) :1993	Specification for metal fittings of insulators for overhead power lines with nominal voltage greater than 1000 V.
IS 2486 (Part 2) :1989 IS : 2486 ( Part III ) -1989	Specification for Insulator fittings for overhead power lines with nominal voltage greater than 1000 V.
IS 4759 : 1996	Specification for hot-dip zinc coatings on structural steel and other allied products.
IS 2629:1985	Recommended practice for Hot Dip Galvanizing of Iron & Steel .
IS : 6745 - 1872	Determination of mass of zinc coating on zinc coated iron and steel articles.
IS : 2633 - 1986	Method for testing uniformity of coating on zinc coated.
IS:1573 - 1986	Specification for electroplated coatings of zinc on iron and steel.

### 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following climatic conditions,


- |  |                                     |
|--|-------------------------------------|
| 1. Maximum altitude above sea level  | 1,000m                              |
| 2. Maximum ambient air temperature   | 50°C                                |
| 3. Maximum daily average ambient air temperature   | 35°C                                |
| 4. Minimum ambient air temperature   | 0°C                                 |
| 5. Maximum relative humidity   | 95%                                 |
| 6. Average number of thunderstorm days per annum (isokeraunic level)                           | 70                                  |
| 7. Average number of rainy days per annum  | 120                                 |
| 8. Average annual rainfall   | 150cm                               |
| 9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of | 0.3g                                |
| 10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of  | 0.15g                               |
| (g being acceleration due to gravity)  |                                     |
| 11. Wind velocity:   | 300 km/hr, 200 km/hr and 160 km/hr. |

Environmentally, some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas.

Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

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#### 4. GENERAL TECHNICAL REQUIREMENTS

##### GUARANTEED TECHNICAL PARTICULARS FOR H/W FITTINGS (B&S) 70KN/90 KN

Sl.No	Description	Specified	70KN (3 Bolted)	90KN (4 Bolted)
1.	Manufacturer Name & Address	To be specified by Bidder		
2	Suitable for conductor size	AAAC-80Sqmm, 100sqmm	AAAC-80Sqmm, 100sqmm, 148sqmm	
2A.	Standard Specification to which Hard ware Fittings shall confirm.	IS: 2486 (Part-I,II &II)/1989 is-1573, IS-2653,IS-2062,IS-209,IS-2121		
3	Ultimate strength	7000 Kg/9000 Kg(min.)	70KN	90KN
4.	Dimensions in accordance with	IS: 2486(Part-II)		
5	Material used and reference to Standard:			
i)	Cross arm Strap	G.I Mild steel asper IS:1570	UTS-70KN	UTS-90KN
ii)	Ball Eye	Forged Steel IS:2004	UTS- 70KN	UTS- 90KN
iii)	Socket Eye	Malleable CastIron IS:2108/1962	UTS-70KN	UTS-90KN
iv)	Bolted type tensionclamp & its keeper	Aluminum AlloyLM-6, IS: 617	95% of UTS of relevant conductor	95% of UTS of relevant conductor
6.	Galvanized conform to hardware fitting	IS 2633, IS: 4759-1996 & IS: 6747		
7.	Mass of Zinc coating gm/mtrsqr	Hardware -610, fastener- 305		
8.	Tolerance in dimension if any	+ 5%		
9	Manufacturing process of Tensionclamp	Gravity Die casting		
10	Material of securitypin & clip used	Stainless steel		

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9.	Manufacturer trademark to be embossed on the sets	Specified by the Bidder		
10.	Specific drawing to be enclosed.	Enclosed		
<b>NB.</b>	All ferrous fittings and the parts other than those of stainless steel, shall be galvanized.			

## 5. GENERAL REQUIREMENTS

- a. Hardware Fittings with ultimate tensile strength of 70 KN/90 KN should be used for AAC/ACSR Raccoon/Dog/Wolf conductors.
- b. The Fittings shall be free from defects, corrosion protected and shall meet the requirements of Galvanizing Test etc. as per IS.
- c. All forging and casting shall be of good finish and free from flaws and other defects. The edges of the fittings such as the tongue, clevis and holes shall be rounded.
- d. All parts of different fittings which provide the interconnection shall be made such that sufficient clearance is provided at the connection point to ensure free movement. All tongue and clevis connection shall be free in this manner but care shall be taken that too much clearance for the tongue & clevis is avoided.
- e. Spring washer should be electro galvanized- Coating thickness as per IS: 1573-1986. U bolt, Hexagonal Bolt, Nut, Plain Washer and all other ferrous parts shall be Hot Dip Galvanized. In case of Hot Dip Galvanization, minimum Value of Mass of zinc coating should be 610 g/m<sup>2</sup>. The split pin to be used on the cotter pin shall be of Humpback type & shall be made of Stainless Steel conforming to IS: 5522-1992 with a minimum hardness of 160 HV.

## 6. MARKING

The unit shall be appropriately marked as "PROPERTY OF TPSODL", BERHAMPUR and with the name of the vendor and year & month of manufacturing at suitable location.

## 7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All components shall also be type tested as per the relevant standards.


The following shall constitute the Type Test for Tension Clamps

The following shall constitute the Type Test for Tension Clamps

### TYPE TESTS

1. Visual Examination
2. Verification of dimensions
3. Mechanical Test (Slip Strength Test)
4. Ultimate Tensile Strength Test

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5. Chemical Composition Test

6. Galvanizing/Electroplating Test (for ferrous parts)

The following shall constitute type test on tension hardware fittings except Clamp:

1. Visual Examination
2. Verification of dimensions
3. Mechanical Test
4. Galvanizing Test
5. Chemical Composition Test

#### ACCEPTANCE TESTS

The following shall constitute acceptance test for Clamps:

1. Visual Examination
2. Verification of dimensions
3. Mechanical Test (Slip Strength Test)
4. Ultimate Tensile Strength Test
5. Galvanizing Test (for ferrous parts)
6. Chemical Composition Test

#### 8. TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates of the individual component for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI/ERDA as per the relevant standards and for hot dip galvanization test, type test to be done in NABL accredited lab. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPSODL.


#### 9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPSODL's representatives at all times when the work is in progress. Inspection by the TPSODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPSODL.

Following documents shall be sent along with material

- a) Test reports
- b) MDCC issued by TPSODL
- c) Invoice in duplicate

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- d) Packing list
- e) Drawings & catalogue
- f) Guarantee / Warrantee card
- g) Delivery Challan
- h) Other Documents (as applicable).

#### 10. INSPECTION AFTER RECEIPT AT STORES

The material received at TPSODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.

#### 11. GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.

Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

#### 12. PACKING

Supplier shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport and be packed in such a manner so as to protect the equipment from damage in transit. The material used for packing shall be environmentally friendly.

#### 13. TENDER SAMPLE

Bidder shall submit the sample of material with the offer.

#### 14. QUALITY CONTROL

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.


#### 15. MINIMUM TESTING FACILITIES

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

#### 16. MANUFACTURING ACTIVITIES

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

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#### 17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

#### 18. DRAWINGS AND DOCUMENTS

Following documents shall be prepared based on TPSODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the approval of the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy of all the drawing, GTP, test certificates shall be submitted after the final approval of the same to the purchaser.

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates.		√	√
4	Installation Instructions		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√
7	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.


**Instruction Manuals:** Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of nicely bound manual (in English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

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## 19. GUARANTEED TECHNICAL PARTICULARS

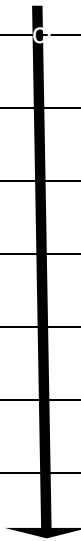
### GUARANTEED TECHNICAL PARTICULARS FOR 33 KV H/W FITTINGS (B&S) 70KN/90 KN:

Sl.No.	Description	Requirements
1.	Manufacturer Name &Address	 TO BE FURNISHED BY BIDDER
2.	Standard Specification to which Hard ware Fittings shall confirm.	
3	Ultimate strength	
4.	Dimensions in accordance with	
5	Material used and reference to Standard:	
i)	Cross arm Strap	
ii)	Ball Eye	
iii)	Socket Eye	
iv)	Bolted type tension clamp & its keeper	
6.	Galvanized conform to	
7.	Weight of Fittings	
8.	Tolerance in dimension if any	
9.	Manufacturer trade mark to be embossed on the sets	
10.	Specific drawing to be enclosed.	
<b>NB.</b>		
Sl.No.	Description	Bidders Offer
1.	Manufacturer Name & Address	TO BE FURNISHED BY BIDDER
2.	Standard Specification to which Hard ware Fittings shall confirm.	
3	Ultimate strength	
4.	Dimensions in accordance with	
5.	Material used and reference to Standard:	
i)	Cross arm Strap	
ii)	Ball Eye	

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iii)	Socket Eye	
iv)	Bolted type tension clamp & its keeper	
6.	Galvanized conform to	
7.	Weight of Fittings	
8.	Tolerance in dimension if any	
9.	Manufacturer trade mark to be embossed on the sets	
10.	Specific drawing to be enclosed.	
N.B	All ferrous fittings and the parts other than those of stainless steel, shall be galvanized.	

20.

**SCHEDULE OF DEVIATIONS  
(TO BE ENCLOSED WITH TECHNICAL BID)**

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:


S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviation apart from those detailed above.

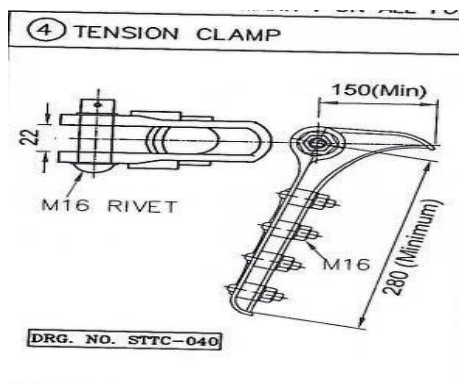
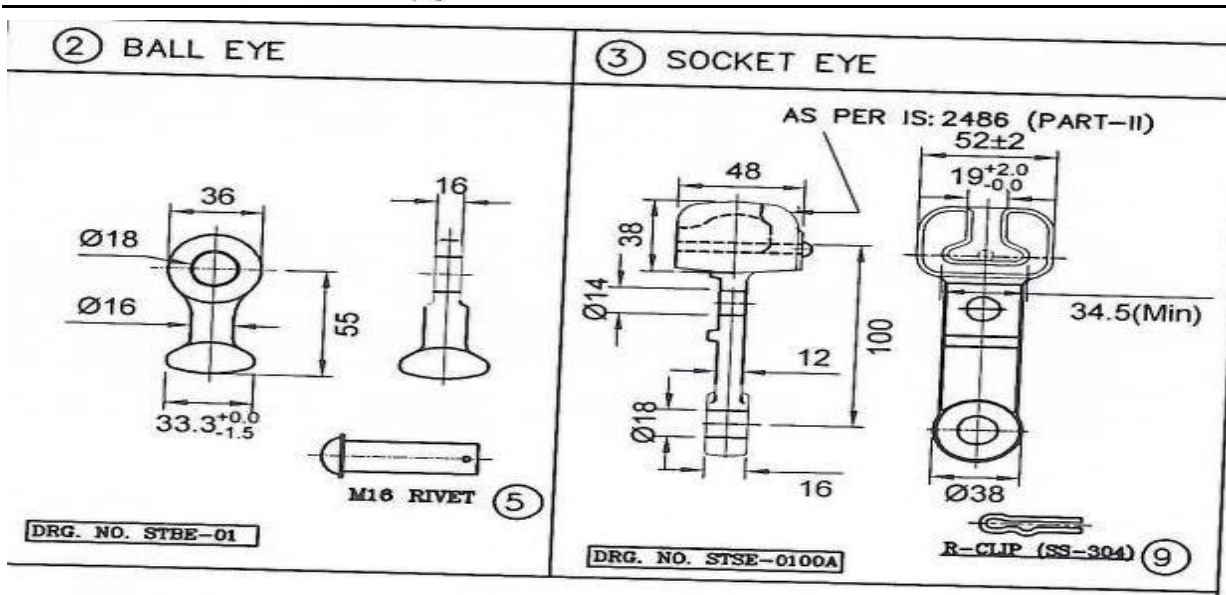
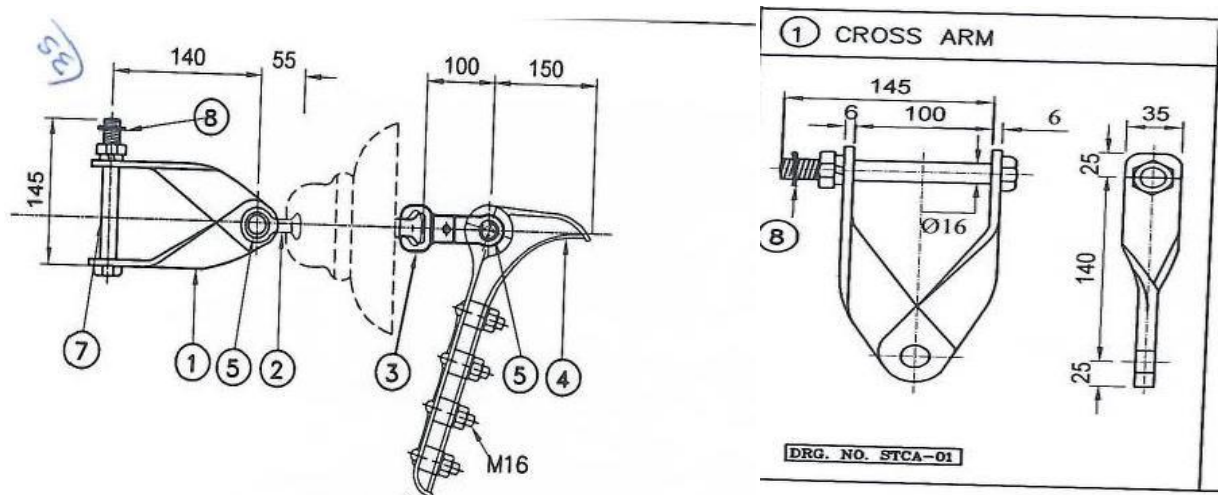
Seal of the Company:

Signature:  
Designation:

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## Hardware fitting 90KN 4Bolted



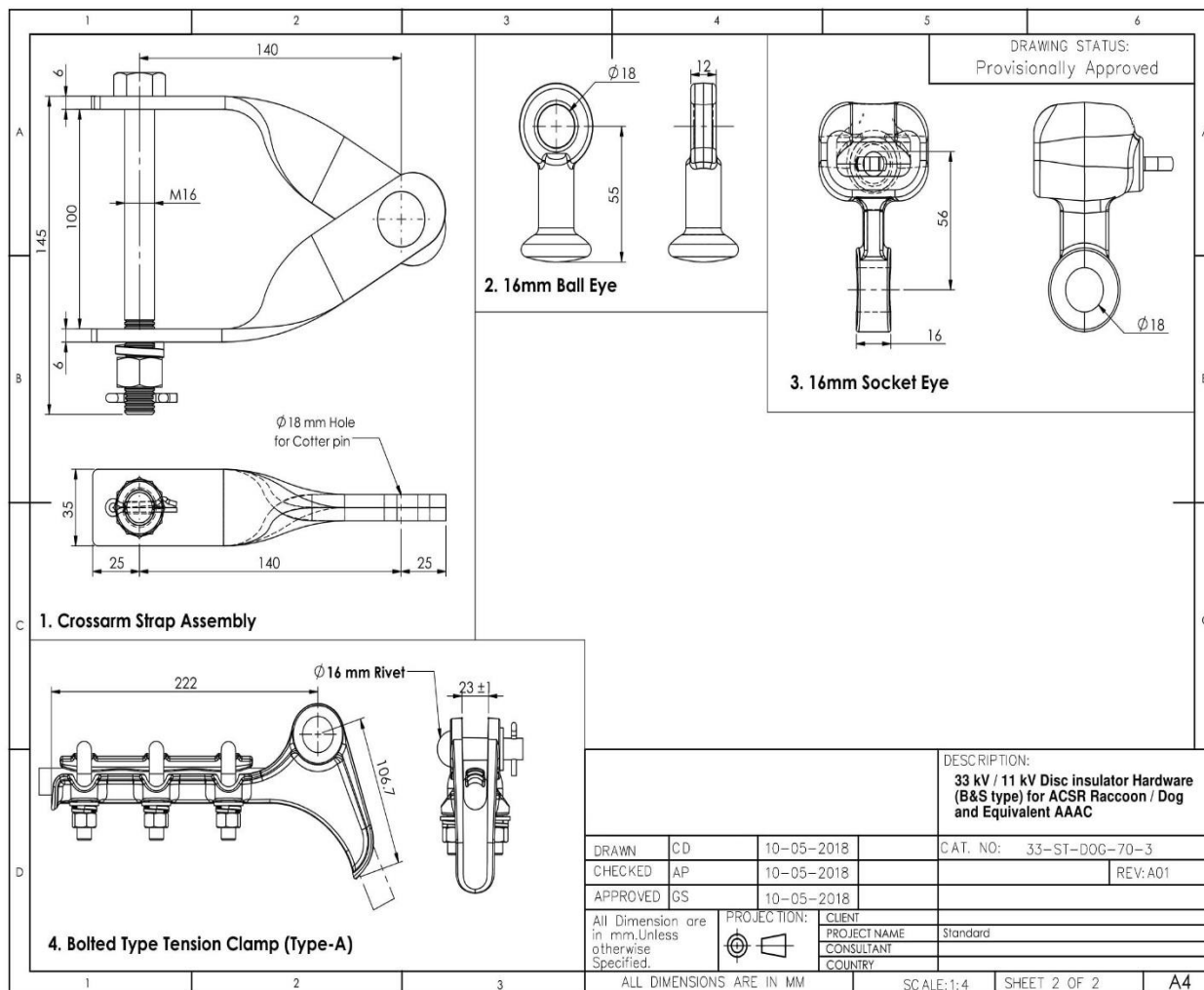
### \* TECHNICAL DATA \*

1. U.T.S. OF HARDWARE FITTING : 90 KN
2. MECHANICAL STRENGTH OF TENSION CLAMP : 90 KN
3. SLIP STRENGTH OF TENSION CLAMP : 95% UTS OF CONDUCTOR
4. BALL & SOCKET DESIGNATION : 16 mm AS PER I.S.: 2486, PART-II.
5. SPECN. TO WHICH H/W FITTING CONFORM - I.S.: 2486, PART-I.
6. ALL FERROUS PARTS (EXCEPT SPRING WASHER) SHALL BE HOT DIP GALVANISED CONFORMING TO I.S.: 2633 AND SPRING WASHER ELECTRO GALVANISED CONFORMING TO IS:1573, SERVICE COND. (Hardware:610gm/ sq mtr. & Fastner:305gm/sq mtr.)

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### Hardware fitting 70KN 3Bolted



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