Invitation to Bid No.:

Specification No. : R-564/2547

C Material, equipment, and specifications for STRAIN AND SUSPENSION HARDWARE

C1 General material and packing instructions

Additional to the general instructions, the following shall be observed :

1a Scope

These specifications cover strain and suspension hardware, i.e., strain clamps, dead end clamps, suspension clamps, and clamp fittings, for overhead line construction.

1b Standard

The hardware shall be in accordance with the latest TIS, VDE Regulations, and DIN; or equivalent, unless otherwise specified in these specifications.

1c Principal requirement

The normal fittings shall be socket-eye, or clevis-eye and pin which is provided with brass or stainless steel split pin or other auxiliary devices against loosening of the pin. The minimum opening of clevis shall be 17.5 mm; and pin diameter shall be 16 mm .

The eye portion of the strain clamp, for hook of coffing hoist, shall have minimum size of 24 mm x 34 mm .

The clamps shall be suitable for use on ACSR and/or Al conductor according to DIN 48204 and 48201, respectively, or equivalent, and equipped with bolts provided with spring washers or other safety devices. The body and keeper of clamps shall be made of aluminium alloy.

The ultimate strength and the slip strength of the clamp shall not be less than those figures specified in the Table 1 "Ultimate Strength and Slip Strength of Strain, Dead End, and Suspension Clamps" (see Page 4 of 6).

II

The clamps shall be marked as follows :

1. Manufacturer's name or trade-mark.
2. Conductor types and sizes for which they are designed.

All ferrous materials shall be galvanized after manufacturing. Method of galvanizing and thickness of coating shall be according to the attached Table "THICKNESS OF ZINC COATING".

Free samples shall be supplied on request. The samples will not be returned.

1d <u>Packing</u>

Each item offered should be packed in suitable packages in sets of 10, 20, 50, or that specified in the Table 2 "Packing Details for Strain and Suspension Hardware" (see Page 6 of 6). The gross weight of each package should not exceed 40 kg .

If there are several packages, the number of package shall be stamped on each package or each tag, as follows :

package number / total number of packages .

C2 Material and packing data to be given by bidder

2a For each item offered, the following details shall be submitted with the bid :

Catalogue number.
Description of materials used for the component parts (body, keeper, bolt, nut, washer, pin, split pin, etc.).
Surface finishing of the component parts.
Zinc coating in g/m^2 or μm (1 μm = 0.001 mm).
Conductor sizes for which the clamps are designed (nominal cross-sectional area in mm^2 and diameter in mm).
Material of conductors for which the clamps can be used.
Minimum ultimate strength in kgf .
Minimum slip strength in kgf .
Weight in kg/set.

2b It shall be specified if the conductor requires to be protected by armour tape before clamping.

2c For each item offered, a detail drawing with dimensions in mm shall be submitted with the bid.

2d Packing details

Packing method.
Number of sets in each package.
Dimensions of each package in cm .
Gross weight of each package in kg (should not exceed 40 kg).
Net weight of each package in kg .
Number of packages.

If several packages are contained in one big case, further details are required :

Number of packages in each case.
Dimensions of each case in cm .
Gross weight of each case in kg .
Number of cases.

Table 1

Ultimate Strength and Slip Strength of Strain, Dead End, and Suspension Clamps

CLAMP designed for the following conductor sizes nominal cross-sectional area	mm^2	Ultimate Strength not less than kgf	Slip Strength not less than kgf
Al	35	700	500
Al	50	900	700
Al	70	1,400	900
Al	95	1,900	1,300
Al	120	2,300	1,700
Al	185	3,600	2,500
Al	240	4,600	3,000
Al	400	5,000, 8,200	3,500
Al	625	11,000	8,000
ACSR	35/6	1,500	800
ACSR	50/8	2,000	1,000
ACSR	70/12	3,200	1,600
ACSR	95/15	4,200	2,500
ACSR	120/20	6,000	3,000
ACSR	185/30	9,000	4,000

Note :

1. The U-bolts shall be tightened to the following torque levels :
   (1) For 12 mm (1/2") bolt diameter, 5.0 kgf-m .
   (2) For 14 mm (9/16") bolt diameter, 6.0 kgf-m .
   (3) For 16 mm (5/8") bolt diameter, 8.0 kgf-m .
2. The eye portion strength on the straight clevis to eye portion pull shall not be less than the above figures in Column 3 .

3. The specimen shall be installed in the position as shown in Fig. 1 or 2 below :

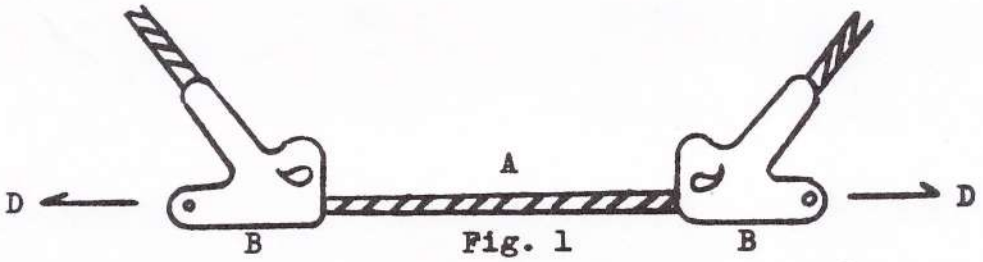


Fig. 1

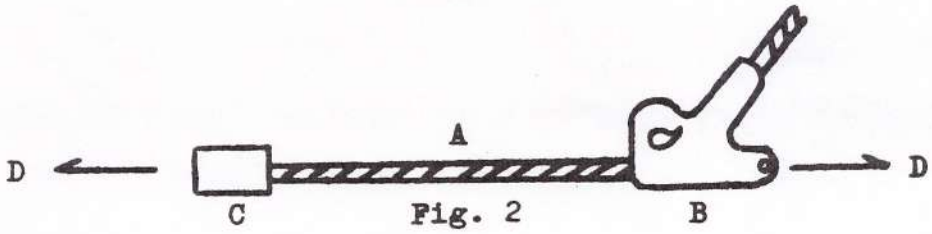


Fig. 2

A : Conductor for which the clamp is designed, in case of slip strength test.
Steel wire rope or steel stranded wire, in case of ultimate strength test.

B : Test specimen of the clamp.

C : Chuck.

D : Tensile load direction.

Table 2

Packing Details for Strain and Suspension Hardware

PEA Material No.	Quantity Per Package	Packing Method
(1030110000), (1030110001) 03110000, 03110001, 03110002, 03110004, (1030110002), (1030110004)	20	Sack

COPY

Invitation to Bid No. :

Specification No. : R-564/2547

C3 Schedule of detailed requirement

Item	PEA Material No.	Quantity	Description
1	03110000 (1030110000)		Clamp, strain, straight type, for : Al conductor 35-70 mm^2 (diameter 7.5-10.5 mm). ACSR conductor 35/6-50/8 mm^2 (diameter 8.1-9.6 mm). Ultimate strength not less than 2,000 kgf.
2	03110001 (1030110001)		Ditto as Item 1, but Al conductor 95 mm^2 (diameter 12.5 mm). ACSR conductor 70/12 mm^2 (diameter 11.7 mm). Ultimate strength not less than 3,200 kgf.
3	03110002 (1030110002)		Ditto as Item 1, but Al conductor 120 mm^2 (diameter 14.0 mm). ACSR conductor 95/15 mm^2 (diameter 13.6 mm). Ultimate strength not less than 4,200 kgf.
4	03110004 (1030110004)		Ditto as Item 1, but Al conductor 185 mm^2 (diameter 17.5 mm). Ultimate strength not less than 3,600 kgf.
5	03110005 (1030110005)		Ditto as Item 1, but Al conductor 240 mm^2 (diameter 20.2 mm). Ultimate strength not less than 4,600 kgf.
6	03110006 (1030110006)		Clamp, strain, for : Al conductor 400 mm^2 (diameter 26.0 mm). Ultimate strength not less than 8,200 kgf.
7	03110007 (1030110007)		Ditto as Item 6, but ACSR conductor 120/20-185/30 mm^2 (diameter 15.5-19.0 mm). Ultimate strength not less than 9,000 kgf.
8	03110300 (1030110300)		Ditto as Item 6, but Steel stranded wire 50 mm^2 (diameter 9.0 mm) . Ultimate strength not less than 4,000 kgf.

Invitation to Bid No.:

Specification No.: R-564/2547

C3 Schedule of detailed requirement

Item	PEA Material No.	Quantity	Description
9	03110103 (1030110103)		Clamp, strain, with clamping keeper, for : Al conductor 400 mm^2 (diameter 26.0 mm). Ultimate strength not less than 8,200 kgf.
10	03110105 (1030110105)		Ditto as Item 9, but ACSR conductor 380/50 mm^2 (diameter 27.0 mm). Ultimate strength not less than 13,000 kgf.
11	03120000 (1030120000)		Clamp, suspension, for : Al conductor 185 mm^2 (diameter 17.5 mm). Ultimate strength not less than 3,600 kgf.
12	03120002 (1030120002)		Clamp, suspension, for Al conductor 400 mm^2 (diameter 26.0 mm) protected by preformed armor rod, clamping range between 40.0 mm to 42.0 mm. Ultimate strength not less than 8,200 kgf.

Invitation to Bid No.

Specification No. : R-564/2547

C4 Price schedule

Manufacturer

Trade-mark :

Country of Origin:

Bidder :

Bid No. :

Date :

COPY

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	03110000 (1030110000)		Clamp, strain, straight type, for Al conductor 35-70 mm^2 and ACSR conductor 35/6-50/8 mm^2. Ultimate strength ..... kgf.			
2	03110001 (1030110001)		Ditto as Item 1, but Al conductor 95 mm^2 and ACSR conductor 70/12 mm^2. Ultimate strength ..... kgf.			
3	03110002 (1030110002)		Ditto as Item 1, but Al conductor 120 mm^2 and ACSR conductor 95/15 mm^2. Ultimate strength ..... kgf.			
4	03110004 (1030110004)		Ditto as Item 1, but Al conductor 185 mm^2. Ultimate strength ..... kgf.			
5	03110005 (1030110005)		Ditto as Item 1, but Al conductor 240 mm^2. Ultimate strength ..... kgf.			
6	03110006 (1030110006)		Clamp, strain, for Al conductor 400 mm^2 Ultimate strength ..... kgf.			

Invitation to Bid No.

Specification No. : R-564/2547

C4 Price schedule

Manufacturer :

Trade-mark :

Country of Origin:

Bidder :

Bid No. :

Date :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
7	03110007 (1030110007)		Ditto as Item 6, but ACSR conductor 120/20-185/30 mm^2. Ultimate strength ..... kgf.			
8	03110300 (1030110300)		Ditto as Item 6, but Steel stranded wire 50 mm^2. Ultimate strength ..... kgf.			
9	03110103 (1030110103)		Clamp, strain, with clamping keeper, for Al conductor 400 mm^2. Ultimate strength ..... kgf.			
10	03110105 (1030110105)		Ditto as Item 9, but ACSR conductor 380/50 mm^2. Ultimate strength ..... kgf.			
11	03120000 (1030120000)		Clamp, suspension, for Al conductor 185 mm^2. Ultimate strength ..... kgf.			
12	03120002 (1030120002)		Clamp, suspension, for Al conductor 400 mm^2 protected by preformed armor rod, clamping range ..... . Ultimate strength ..... kgf.			

TABLE THICKNESS OF ZINC CC ING

STEEL CATEGORY/MATERIAL	STEEL THICKNESS RANGE (mm)	MINIMUM AVERAGE COATING THICKNESS (μm)
FASTENERS :		
- BOLT, PIN, NUT, LOCK NUT :		
- UP TO M 10	-	43
- OVER M 10	-	53
- WASHER, LOCKWASHER	< 4.76	43
	4.76 - 6.35	53
- ANCHOR ROD	-	80
CASTINGS :		
- SOCKET EYE, SOCKET CLEVIS, STRAIN CLAMP, etc.,	-	86
FORGED ARTICLES :		
- BALL HOOK, Y CLEVIS BALL, BALL CLEVIS, BALL EYE, CLEVIS EYE, ANCHOR SHACKLES, etc.,	-	56
STRUCTURAL SHAPE :		
- STEEL CHANNEL, STEEL ANGLE, CROSSARM STEEL, BAYONET, GROUND ROD, etc.,	< 1.6	45
	< 3.2	65
	3.2 - 6.4	85
	> 6.4	100
STRIP :		
- BRACE, GUY THIMBLE, GUY GUARD, RACK, CLEVIS, STEEL BRACKET, PLATE STEEL, SPACER PLATE, etc.,	< 1.6	45
	< 3.2	65
	< 4.8	75
	4.8 - 6.4	85
	> 6.4	100
PIPE :		
	≥ 3.2	75

NOTE : THICKNESS OF COATING OF SPECIMENS SHALL BE MEASURED WITH A MAGNETIC MEASURING INSTRUMENT " MICROTEST " OR " ELECTROMAGNETIC COATING THICKNESS GAUGE "

Form No. 93-0/2.96

ภาคผนวก (Addendum)

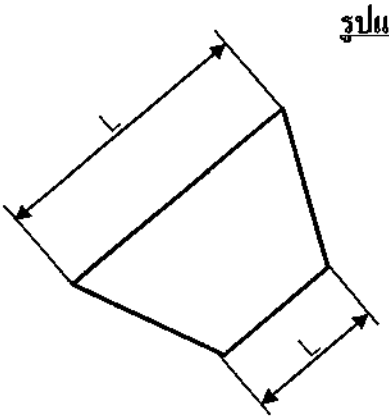
ที่	รายละเอียด	ค่าความคลาดเคลื่อน (มิลลิเมตร)		สัญลักษณ์	รูปที่
1	ระยะความยาวรวม (ขอบเหล็ก ถึง ขอบเหล็ก)	+ 5	- 3	L	(1)
2	ระยะจากจุดศูนย์กลางรู Slot ถึง ขอบเหล็ก	+ 5	- 3	A	(2)
	ระยะจากจุดศูนย์กลางรูกลม ถึง ขอบเหล็ก				
3	ระยะจากจุดศูนย์กลางรู Slot ถึง จุดศูนย์กลางรู Slot	+ 2	- 2	X1	(3)
4	ระยะจากจุดศูนย์กลางรูกลม ถึง จุดศูนย์กลางรูกลม	+ 1	- 1	X2	(4)
	ระยะจากจุดศูนย์กลางรูกลม ถึง จุดศูนย์กลางรู Slot				
5	ขนาดเส้นผ่านศูนย์กลางรูกลม 10 มิลลิเมตร ถึง 24 มิลลิเมตร	+ 1	- 1	DØ	(5)
	ขนาดรู Slot	+ 1	- 1	d1, d2	
6	ระยะเกลียวถึงปลาย Bolt	+ 8	- 0	B	(6)

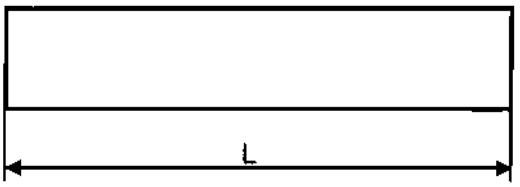
หมายเหตุ :

1. **ภาคผนวกนี้จะไม่นำไปใช้ ในกรณีดังต่อไปนี้**
   1.1 มีการกำหนดค่าความคลาดเคลื่อนในข้อกำหนดทางเทคนิคแล้ว
   1.2 ข้อกำหนดทางเทคนิคได้อ้างอิงถึงมาตรฐานอุตสาหกรรม (มอก.) ต่างๆ ซึ่งมีการกำหนดค่าความคลาดเคลื่อนในมาตรฐานอุตสาหกรรม (มอก.) ดังกล่าวแล้ว
2. รูปแสดงตัวอย่าง และสัญลักษณ์ ให้ดูที่ Page 2 of 2
3. สำหรับการตรวจรับฮาร์ดแวร์ที่ต้องมีการประกอบใช้งานร่วมกับฮาร์ดแวร์อื่นๆ เช่น เหล็กประกับ, คอนเหล็ก เป็นต้น PEA ขอสงวนสิทธิ์ในการทดลองประกอบใช้งานร่วมกับฮาร์ดแวร์ดังกล่าว ในการตรวจรับด้วย

TSD PEA

รูปแสดงตัวอย่าง และสัญลักษณ์





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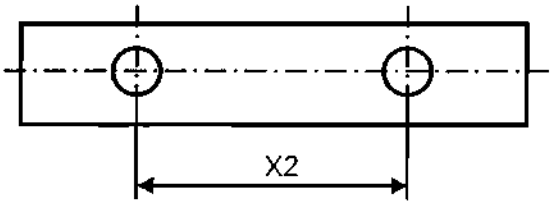

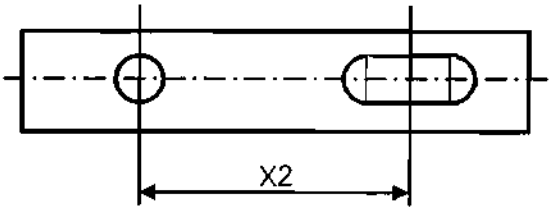

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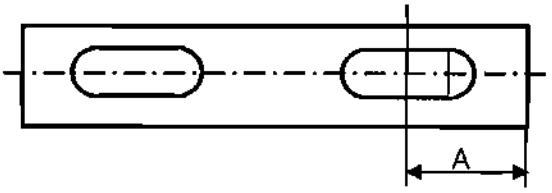

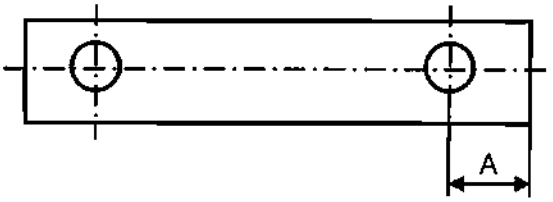

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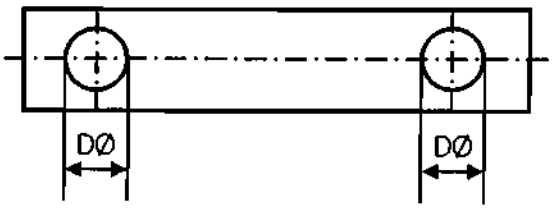

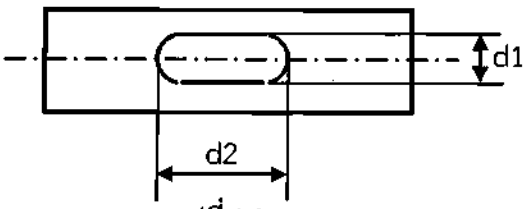

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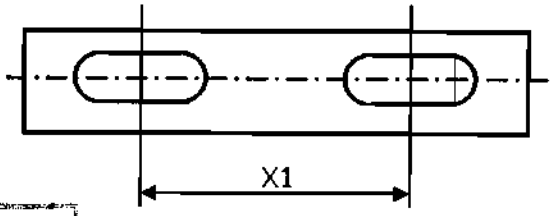

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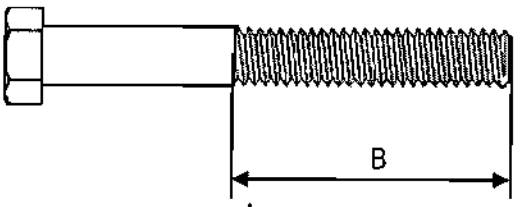

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