



भारत सरकार रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
मानकनगर लखनऊ - 226011
Government of India - Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar, Lucknow - 226011

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File No: RDSO-TIOLKO(OHE)/33/2020 -Part(1)

Date : As signed

To,
Principal Chief Electrical Engineer,
Address: As per attached list.

Sub.: Revised Maintenance Instruction No. TI/MI/0059-Rev.3 for Provision of Anti-bird disc & Packing saddle with Catenary Suspension clamp.

Ref. (i) This office letter No. RDSO-TIOLKO (OHE)/33/2020-Part (I) dtd. 06.11.2024.
(ii) SWR letter No. SWR/EL/T-601/RDSO/22(E-157939) dtd. 05.03.2025.

Vide reference (i) above; RDSO issued the Maintenance Instruction No. TI/MI/0059-Rev.2 regarding the provision of Anti-bird discs & Packing saddles (RI No. 1174), along with Catenary Suspension clamps (RI No. 1161) to all ZRs.

2. SBC division of SWR vide reference (ii) has reported certain observations on SMI No. TI/MI/0059-Rev.2 related to Fire Retardant grade of the Anti-bird discs material.

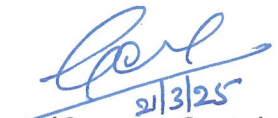
3. In Rev.2 of SMI, polycarbonate material flammability grade of 5VA as per UL-94 was given. Considering the observations, the flammability rating of polycarbonate material in Revised Maintenance Instruction No. TI/MI/0059-Rev.3 have been changed and as per revised SMI, Polycarbonate material of Flammability Rating V-2 or higher rating upto 5VA as per UL-94 can be used for Anti-bird disc manufacturing.

4. Copy of Revised Special Maintenance Instruction No. TI/MI/0059-Rev.3 for Provision of Anti-bird disc & Packing saddle (RI No. 1174) with Catenary Suspension clamp (RI No.1161) is enclosed herewith.

5. Type Tests & Acceptance Tests for Anti Bird Disc and Silicon-O Ring have been included in para 4.1(h) of SMI.

6. Prototype test may be done by RDSO on case-to-case basis as required by Zonal Railways. However, the Acceptance tests shall be done by Zonal Railway/Inspecting agency.

This is issued with the approval of competent authority.


(Gaurang Gupta)
Director/(TI-II)
[For Director General(TI)]

Encl: As above

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भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय Ministry of Railways

निर्देश संख्या. टी आईएम/ आई /0059 रिवि. 3

MAINTENANCE INSTRUCTION No. TI/MI/0059
Rev.3

एंटी-बर्ड डिस्क और कैटेनरी सस्पेंशन क्लैंप (आरआई
नंबर 1161) के साथ पैकिंग सैडल (आरआई नंबर 1174)
के प्रावधान के लिए रखरखाव निर्देश

MAINTENANCE INSTRUCTIONS FOR PROVISION OF ANTI-BIRD DISC & PACKING
SADDLE (RI NO. 1174) WITH CATENARY SUSPENSION CLAMP (RI NO.1161)
(March, 2025)

		हस्ताक्षर/Signature
अनुमोदित Approved by	प्रधान कार्यकारी निदेशक (कर्षण संस्थापन) Principal Executive Director (TI)	
अनुशंसित Recommended by	कार्यकारी निदेशक (कर्षण संस्थापन) Executive Director (TI)	

जारी कर्ता/ ISSUED BY:

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TRACTION INSTALLATION DIRECTORATE,
अनुसंधान अभिकल्प और मानक संगठन
RESEARCH DESIGNS & STANDARDS ORGANISATION,
मानक नगर, लखनऊ- 226011
MANAK NAGAR, LUCKNOW-226011

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	Prepared By	Checked By	Issued by
Signature & Date		AMIT KUMAR Digitally signed by AMIT KUMAR Date: 2025.03.20 19:48:47 +05'30'	
Designation	JE/ TI	ADE/ TI-2	DIRECTOR/ TI-2

Amendment History

Revision Number	SMI NO	Total pages	Date of Issue	Reasons for Amendment/ Revision
0	TI/MI/0059	05	20.01.2020	Railways were reporting flashing and breakage/parting of insulator due to bird fault.
1	TI/MI/0059 (Revision 1)	06	04.01.2024	Revised for correction in drawing Nos. of Anti Bird Disc and inclusion of tolerance on Anti Bird Disc.
2	TI/MI/0059 (Revision 2)	09	05.09.2024	Considering failure of Anti Bird Disc material reported by Zonal Railways, material of Anti Bird Disc has been revised from Acrylic to Polycarbonate.
3.	TI/MI/0059 (Revision 3)	10	21.03.25	FR rating of Anti-bird material changed from 5VA to V-2 or higher rating as per UL-94.

INDEX

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4.	INSTRUCTIONS	04&05
5.	AGENCY FOR IMPLEMENTATION	05
6.	MAINTENANCE OF RECORDS	05
ANNEXURE- I	Photographs of Anti Bird Disc arrangement is attached	06&07
ANNEXURE- II	Catenary Suspension clamp, Drawing No. RE/33/P/1160 (Rev. K)	08
ANNEXURE- III (A)	Drawing of Anti bird disc, Drawing. No. TI/DRG/OHE/ABD/RDSO/00000/19/0 Rev.2 (Sh.-1)	09
ANNEXURE- III (B)	Drawing of Anti bird disc, Drawing. No. TI/DRG/OHE/ABD/RDSO/00000/19/0 Rev.2 (Sh.-2)	10

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Signature & Date	<i>Premod</i> 20.03.25	AMIT KUMAR Digitally signed by AMIT KUMAR Date: 2025.03.20 19:50:29 +05'30'	<i>GP</i> 20.3.25
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MAINTENANCE INSTRUCTION No. TI/MI/0059 Rev.3**Revised Maintenance Instruction for Provision of Anti-bird disc & Packing saddle (RI No. 1174) with Catenary Suspension clamp (RI No.1161)****1. TITLE:**

- (i) Provision of Anti-bird disc for prevention of bird fault in composite and porcelain insulator (Stay tube Insulator, Bracket tube insulator and 9 ton insulator).
- (ii) Provision of Packing saddle (RI No. 1174) with Catenary Suspension clamp (RI No.1161) are given in modified drawing of suspension clamp (drawing No. RE/33/P/1160 Rev. K) to prevent Catenary Strand Melting/Parting.

2. BACKGROUND:

- (i) Railways are reporting flashing and breakage/parting of Insulator, due to bird fault. In bird prone areas, insulator failure and in-turn traffic disruption may take place. This problem takes place due to perching of the bird on the insulator resulting into short circuit between live part and earth.
- (ii) Zonal Railways are reporting melting/parting of Catenary strand inside the Catenary suspension clamp due to frequent tripping and passing of fault current through the poor connection of catenary and suspension clamp. During earth fault, the fault current passes from catenary wire to suspension clamp and further to the bracket/stay tube.

3. OBJECTIVE:

- (i) It is proposed to provide anti-bird disc on ST, BT & 9-ton Insulator at bird prone locations to prevent shorting of live part and earth by bird. This anti-bird disc will also act as deterrent for bird to perch on the insulator due to spikes provided on the outer periphery of the disc.
- (ii) Provision of Packing saddle to reduce the concentrated force on Catenary wire below 'U' bolt to prevent melting/cutting of the Catenary strand inside the suspension clamp.

4. INSTRUCTIONS:

- 4.1 (a)** Anti bird disc shall be provided on insulator end fitting of 25 kV side of composite and porcelain insulators (ST, BT & 9 ton) with suitable size of silicon O ring to avoid bird fault.
- (b)** If there is less space between first shed of Porcelain stay insulator and metal cap, Disc may be provided on Mast side. Zonal Railway should keep record of locations & monitor the efficacy of this arrangement on mast side and submit feedback to RDSO.
- (c)** The disc shall be provided on metal cap of composite insulator and in between first shed and metal cap with suitable size of silicon O ring in porcelain insulator.

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Signature & Date	<i>Permod</i> 20.03.25	AMIT KUMAR Digitally signed by AMIT KUMAR Date: 2025.03.20 19:51:00 +05'30'	<i>[Signature]</i>
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- (d) Silicon O rubber shall be made of High temperature Vulcanizing (HTV) type Silicon Rubber having Silicon polymer content by weight 30% minimum as per clause no. 4.2.16 of RDSO specification No. TI/SPC/OHE/INSCOM/1072, Rev.02 or latest.
- (e) The details of Anti Bird Disc are available in the drawing of Anti bird disc Drg. No.TI/ DRG/OHE/ABD/RDSO/00000/19/0 Rev.2 (sh-1 & sh-2) attached as Annexure- III(A) & III(B). The Diameter (D) of Anti Bird Disc & Distance (L) may be finalized by the Zonal Railways as per the design of the Installed Insulators.
- (f) Material of Anti Bird Disc should be Polycarbonate material as per:
- The Clause no. 4.0, Table 1, Group 01, PC Class 2 of latest ASTM D3935-21
 - Flammability rating of V-2 or higher as per UL-94, wherein, material are classified among fire rating HB (least flame retardant) to 5VA (highest flame retardant).

Following additional properties of Polycarbonate material are given in below Table.

1.	General Properties		
	Resilient, Easy to Handle, Impact resistant, good dimensional stability, good electrical insulation, UV Resistant, Fire retardant material, Good optical clarity, Chemical resistant		
2.	Dielectric Strength Minimum	ASTM D149	15kV/mm
3.	Flammability Rating	UL94	V-2 or higher rating
4.	Izod Impact Test	ASTM D 256	640J/m, min
5.	Specific Gravity	ASTM D792	1.19 – 1.22

- (g) Each Anti Bird Disc shall be engraved the name of manufacturer/logo and year of manufacturing in size of 6 mm figures. The same shall not wiped out during the life of the Anti-bird disc. Photographs of Anti Bird Disc arrangement are attached as Annexure-I.
- (h) The test protocol and inspection & certification should be as per details given below:

Test for Anti Bird Disc

Sr. No.	Test Description	Test Standard	Required Value	Type test	Acceptance test	Routine test
1	Visual Examination	SMI-0059 Rev-3	As per RDSO approved drawing	Yes	Yes	Yes
2	Dimension	SMI-0059 Rev-3	As per RDSO approved drawing	Yes	Yes	Yes
3	Specific Gravity	ASTM D 792	1.19 – 1.22	Yes	Yes	No
4	Tensile Yield Strength	ASTM D 638	55 MPa, minimum	Yes	No	No
5	Izod Impact Test	ASTM D 256	640J/m, minimum	Yes	No	No
6	Flammability Test	UL-94	V2 or Higher Rating	Yes	Yes	No
7	Dielectric Strength Test	ASTM D 149	15kV/mm	Yes	No	No

Signature & Date	Prepared By 20.03.25	Checked By AMIT KUMAR	Issued by [Signature]
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Test for Silicon-O Ring

Sr. No.	Test Description	Test Standard	Required Value	Type test	Acceptance test	Routine test
1	Visual Examination	SMI-0059 Rev-3	As per RDSO approved drg	Yes	Yes	Yes
2	Dimensions	SMI-0059 Rev-3	As per RDSO approved drg.	Yes	Yes	Yes
3	Specific Gravity	ASTM D 792	1.52 – 1.58	Yes	Yes	No
4	Silicone Content	ASTME 1131-2020	30%(Min)	Yes	Yes	No

(i) The lot size for Anti-bird disc and Silicon-O ring shall be 1000 Nos. (Maximum) for testing of minimum three samples per lot. Samples shall be selected randomly from the lot. Sampling size for verification of dimension shall be done as per IS: 2500-1.

(j) Manufacturer shall do dimension verification and visual examination as Routine Test on every sample of Anti-bird disc and Silicon-O ring. The manufacturer shall maintain the record of all tests i.e., Type/Acceptance/Routine tests.

(k) The type tests shall be carried out in accordance with the relevant procedure laid down in governing standard, from any Government lab/ NABL accredited laboratory having the relevant testing facility. Acceptance tests shall be carried out in-house through calibrated testing equipment only.

(l) Firm shall maintain the record of raw materials alongwith relevant Test Certificates. In case of use of inferior raw material/providing false information, necessary administrative action shall be taken against firm as per extant rules.

4.2 Zonal Railways should carry out Inspection and installation of prototype before placing bulk order for manufacturing.

4.3 Packing saddle (RI No. 1174) with Catenary Suspension clamp (RI No.1161) as given in modified drawing of suspension clamp (drawing no. RE/33/P/1160 Rev. K or latest attached as Annexure-II) should be provided at all locations.

5. AGENCY FOR IMPLEMENTATION:

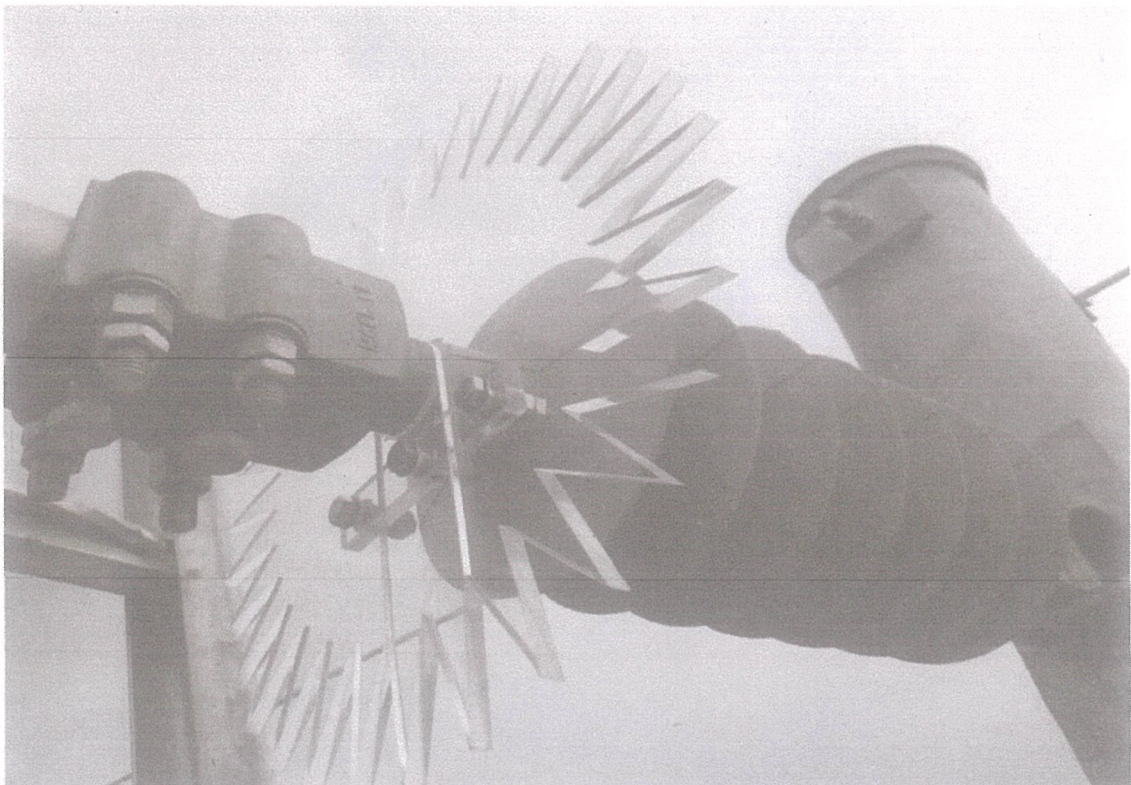
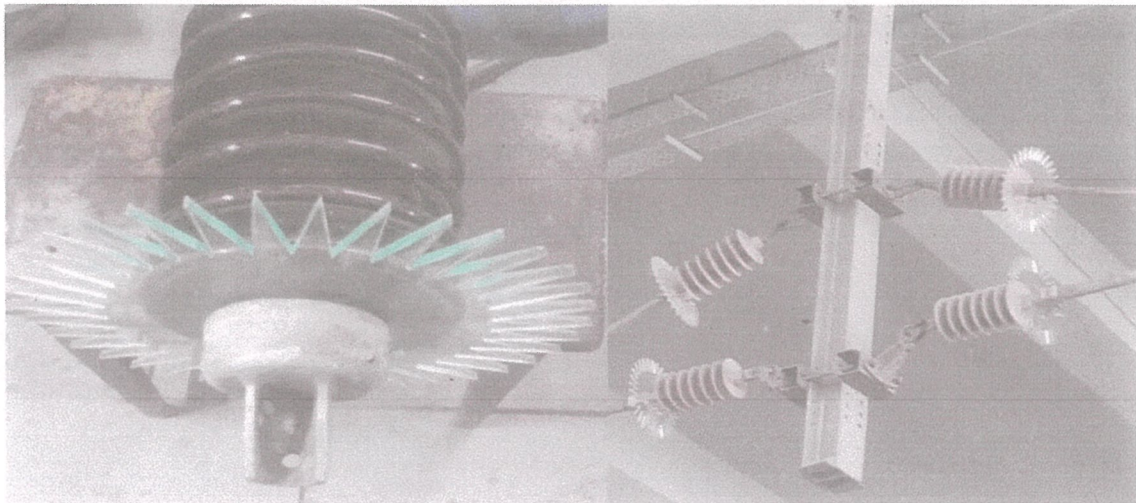
Anti-bird disc arrangements will be provided on identified Bird/tripping Prone Locations / Sections as approved by PCEE.

6. MAINTENANCE OF RECORDS:

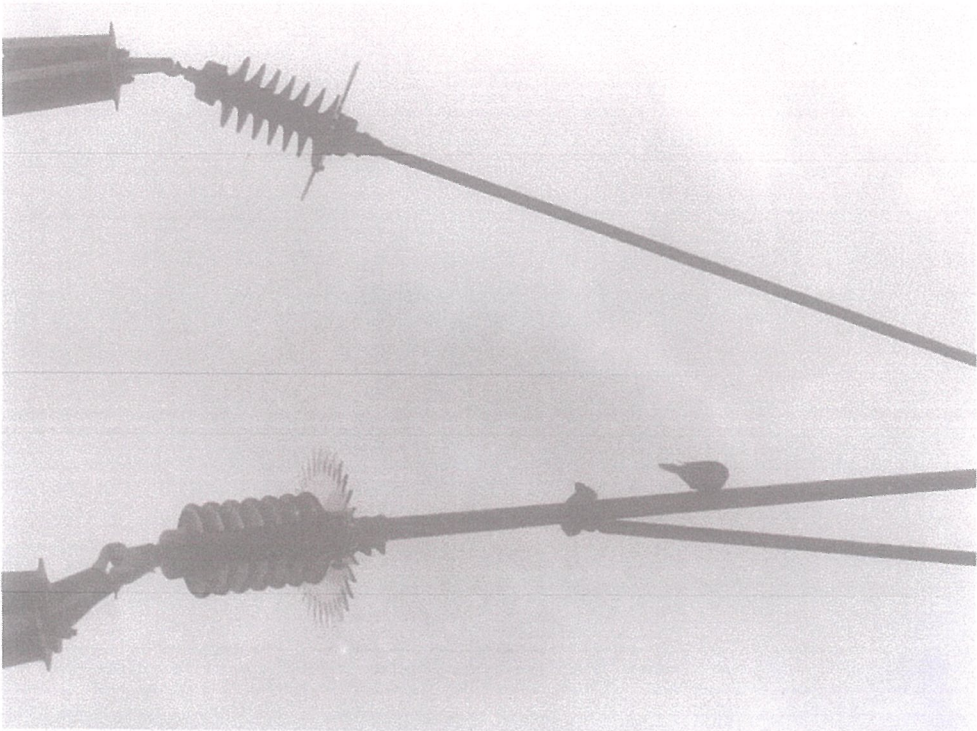
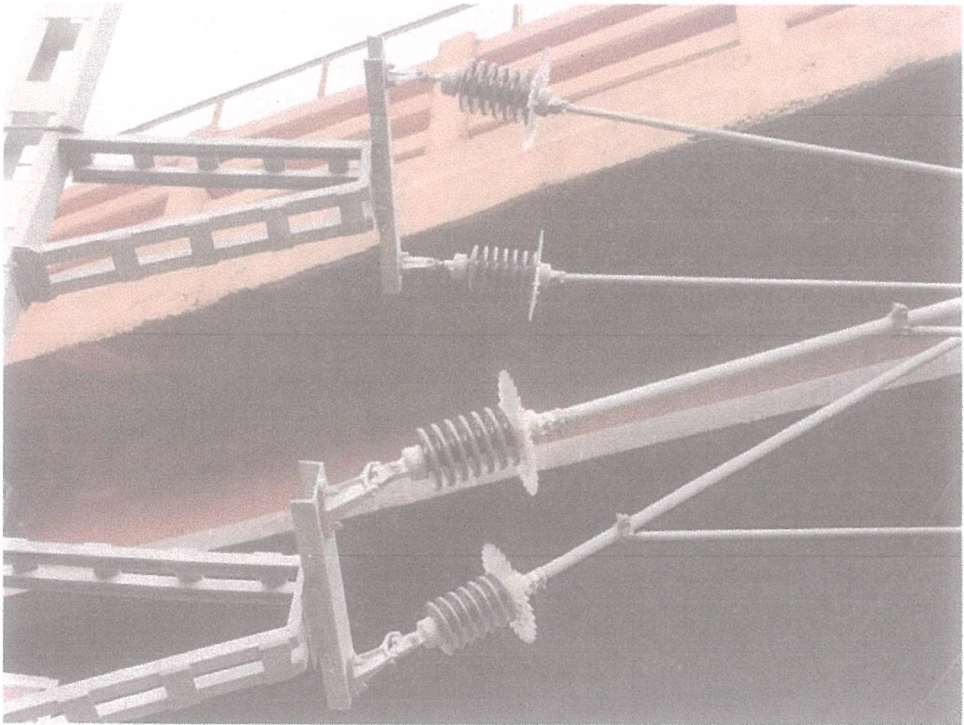
Railways are advised to keep record of the locations where Anti-bird disc arrangement and packing saddle have been provided to know the efficacy of the proposed system. It is also advised to send feedback on the same every six months regarding the effectiveness of the proposed system.

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Signature & Date	<i>Penned</i> 20.03.25	AMIT KUMAR Digitally signed by AMIT KUMAR Date: 2025.02.20 19:52:13 +05'30'	<i>[Signature]</i>
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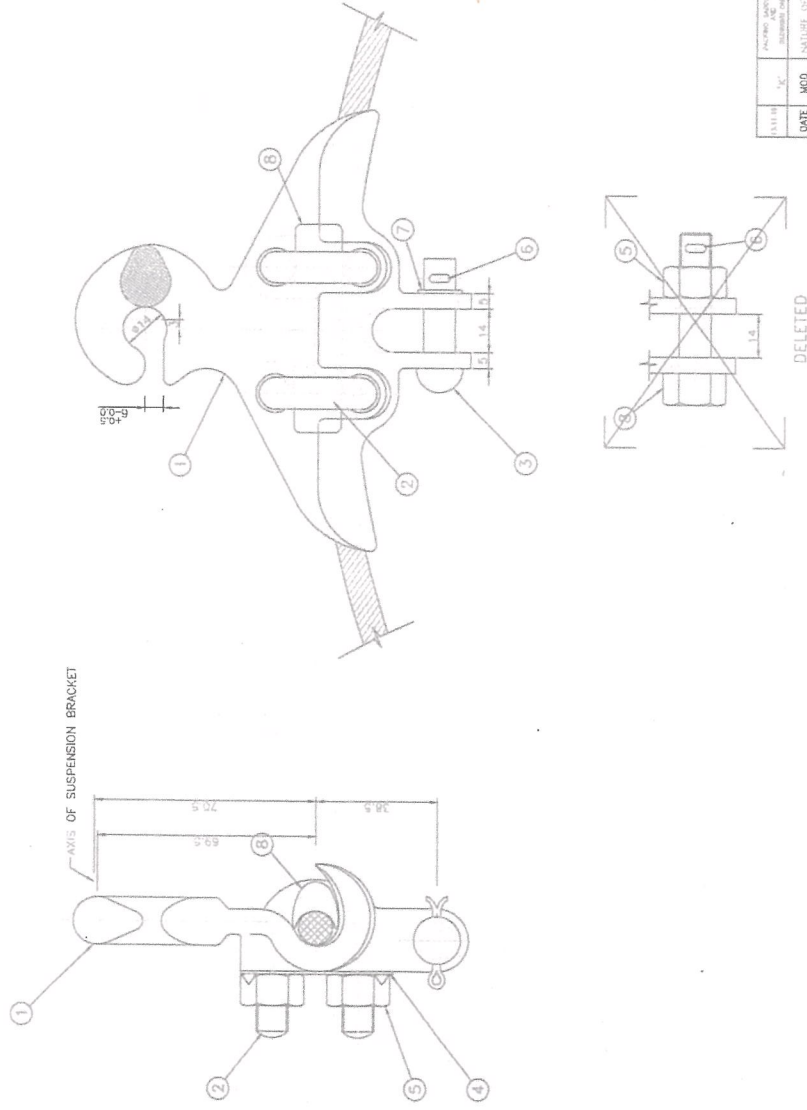
Annexure-I of TI/MI/0059 – Rev.3

Photographs of arrangements of Anti-Bird Disc and Insulator

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Signature & Date	<i>Pranav</i> 20.03.25	AMIT KUMAR Digitally signed by AMIT KUMAR Date: 2025.03.20 15:53:08 +05'30'	<i>Gpe</i>
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Designation	JE/ TI	ADE/ TI-2	DIRECTOR/ TI-2



REF. No.	DESCRIPTION	PART No.	MATERIAL	SPECIFICATION	Approx. WEIGHT (kg)	No.OFF
1	SUSPENSION CLAMP BODY	1161	ALUMINIUM BRONZE	IS:3091	1	
2	'U' BOLT ø10mm	1162-S	STAINLESS STEEL	ETI/OHE/'18	2	
3	PIN ø10mm/35mm	161-S	"	"	1	
4	SUSPENSION CLAMP LOCK PLATE	1163	ANNEALED COPPER	IS:1897	2	
5	NUT	10N	STAINLESS STEEL	ETI/OHE/'18	4	
6	SPLIT PIN 2.5x20mm		ANNEALED COPPER	IS:549	1	
7	PUNCHED WASHER M2		PHOSPHOR BRONZE	ETI/OHE/'18	1	
8	PACKING SADDLE	1174	HALF HARC COPPER	IS:1897	1	

NOTES: -

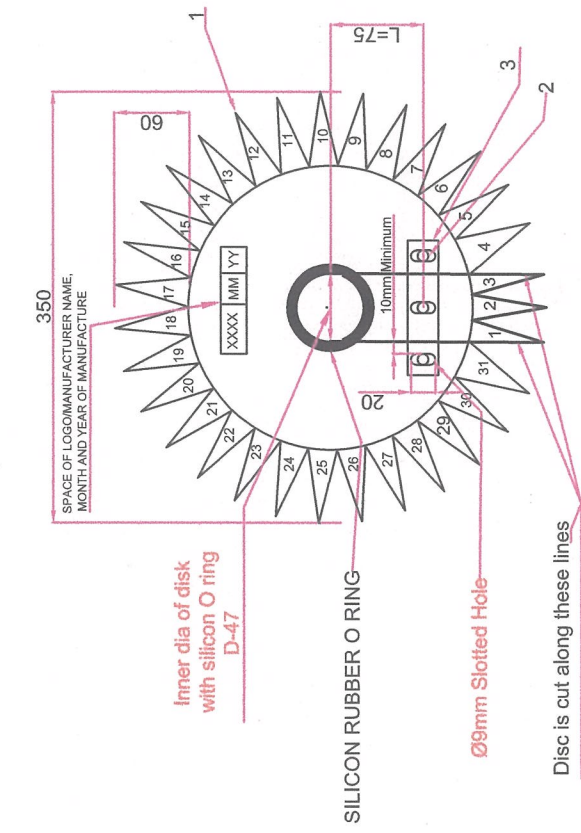
1. ALL DIMENSIONS IN mm.
2. TO BE USED FOR SUSPENSION OF:-
CATENARY(65)($\phi 10.5\text{mm}$).

[illegible]

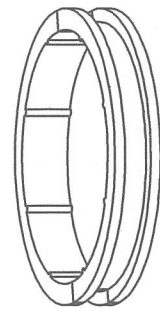
REF.	DESCRIPTION	MATERIAL SPECIFICATION	NO. OFF
1	ANTI-BIRD DISC	ASTM D3935-21	1
2	NUTS & BOLT LENGTH 35mm	T/SPC/OHE/FASTENERS/0120 A4-50 OR SUPERIOR GRADE	3/3
3	ANTI-BIRD DISC PLATE	ASTM D3935-21	1
4	SPRING WASHER	T/SPC/OHE/FASTENERS/0120	3/3
5	SILICON O RING	T/SPC/OHE/INSCOM/1072	1

NOTE-

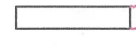
1. ALL THE DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. TOLERANCE OF $\pm 1.0\text{mm}$ IS PERMISSIBLE ON ALL DIMENSIONS UNLESS OTHERWISE SHOWN.
3. THE MATERIAL SHALL BE OF POLYCARBONATE OF GROUP 01 OF CLASS 2 AS PER ASTM D 3935-21 OF FIRE RETARDANT RATING UL 94-V2 OR HIGHER
4. ALL THE FASTENERS SHALL BE OF STAINLESS STEEL AND SHALL CONFORM TO GRADE A4-50 OR SUPERIOR GRADE
5. THE TOLERANCE ON DISK THICKNESS SHOULD BE $\pm 5\%$.
6. DIAMETER (D) OF ANTI BIRD DISC AND DISTANCE (L) MAY BE FINALIZED BY THE ZONE RAILWAYS AS PER DESIGN OF THE INSTALLED INSULATOR.



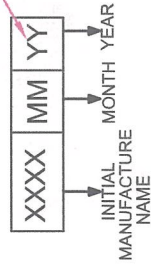
THICKNESS OF DISC=8MM



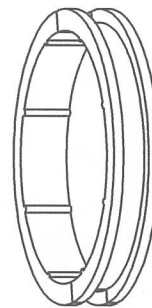
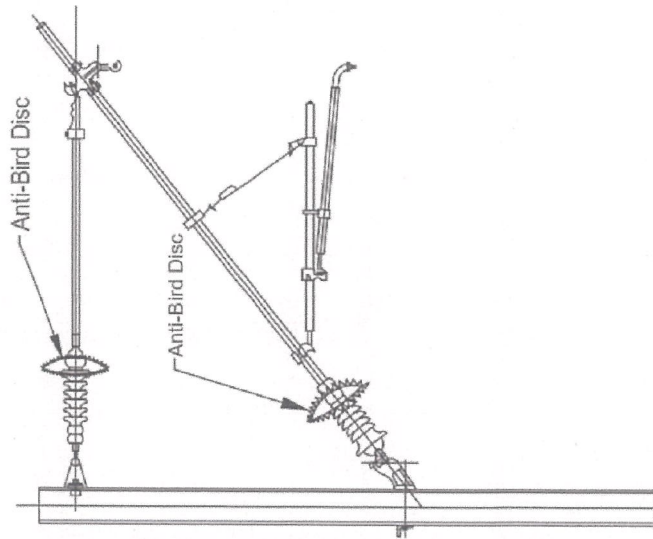
SILICON RUBBER O RING
Thickness of O Ring - (4 ± 1) mm



ALL FONT SIZE
IN 6MM

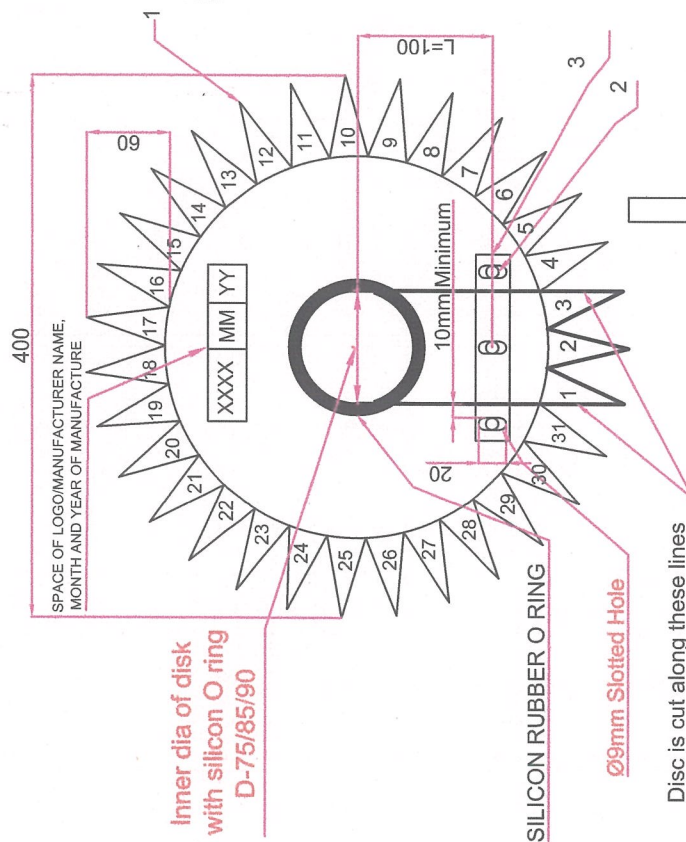


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ANTI - BIRD DISC (FOR COMPOSITE ST. BT, 9 - TON INSULATORS)		DT-2	SD- Bhardwaj Chaudhary 20.01.20
REF.: T/DRG/OHE/ABDR/DSO/000001/90	SIGNATURE	NAME	R. D. S. O.
DATE: 20-03-2025	INITIAL: [Signature]	DR: [Signature]	T/DRG/OHE/ABDR/DSO/000001/90
MOD: Rev-2	NATURE OF MODE: 1. Fitting of Anti Bird material changed from SVA to V2 or Higher	CK: [Signature]	Rev-2
05-11-2024	Rev-1: 1. Material of Anti Bird Disc changed. 2. Notes modified. 3. Splices Removable. 4. Anti-Bird Disc Size. 5. Anti-Bird Disc. 6. Anti-Bird Disc.	SD: [Signature]	SCALE: NTS
		JD: [Signature]	DATE SCALE: 1/2
		TI-2: [Signature]	
		CK: [Signature]	



SILICON RUBBER O RING

Thickness of O Ring - (4 ± 1) mm



Inner dia of disk with silicon O ring D-75/85/90

SILICON RUBBER O RING

Ø9mm Slotted Hole

Disc is cut along these lines

THICKNESS OF DISC=8MM

8

ALL FONT SIZE IN 6MM

XXXX	MM	YY
INITIAL MANUFACTURE NAME	MONTH	YEAR

REF.	DESCRIPTION	MATERIAL SPECIFICATION	NO. OFF
1	ANTI-BIRD DISC	ASTM D3935-21	1
2	NUT/SS BOLT LENGTH 35mm A4-50 OR SUPERIOR GRADE	TI/SPC/OHE/FASTNERS/0120	3/3
3	ANTI-BIRD DISC PLATE	ASTM D3935-21	1
4	SPRING WASHER	TI/SPC/OHE/FASTNERS/0120	3/3
5	SILICON O RING	TI/SPC/OHE/INSCOM/1072	1

NOTE-

1. ALL THE DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. TOLERANCE OF ± 1.0 mm IS PERMISSIBLE ON ALL DIMENSIONS UNLESS OTHERWISE SHOWN.
3. THE MATERIAL SHALL BE OF POLYCARBONATE OF GROUP 01 OF CLASS 2 AS PER ASTM D 3935-21 OF FIRE RETARDANT RATING UL 94-V2 OR HIGHER
4. ALL THE FASTENERS SHALL BE OF STAINLESS STEEL AND SHALL CONFORM TO GRADE A4-50 OR SUPERIOR GRADE
5. THE TOLERANCE ON DISK THICKNESS SHOULD BE $\pm 5\%$.
6. DIAMETER (D) OF ANTI BIRD DISC AND DISTANCE (L) MAY BE FINALIZED BY THE ZONE RAILWAYS AS PER DESIGN OF THE INSTALLED INSULATOR.

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ANTI - BIRD DISC (FOR PORCELAIN ST. BT. 9 - TON INSULATORS)		DT-2	-SD- Bhardwaj Chaudhary 20.01.20
*REF.: TI/DRG/OHE/ABDRDSO/00000019/0	TITLE	NAME	R. D. S. O.
DATE	MOD	NATURE OF MOD	INITIAL
2003-2021	Rev. 2	FR rating of Anti bird material changed from SVA to V2 or higher	DR CK
05-11-2024	Rev. 1	Material of Anti Bird Disc changed.	SD CK
		2. Notes modified.	JD CK
		4. Oval Shape Hole	TI-2 CK
		Only On Disk	
		SCALE	NTS
		Rev. 2	Sh
		2/2	