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Title

Technical requirements Insulators and accessories

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1 General

1.1 Scope

These requirements cover the general demands of E.ON Elnät Sverige AB in respect of post insulator, insulator assemblies and insulator accessories. The requirements applies to the design voltage 52-145 kV, rated frequency 50 Hz for indoor or outdoor designs.

The requirement does not apply to EBR designs that have a 52 kV design voltage.

These requirements are a translation from the Swedish requirements D10-0015649. If the content of this document differs from the Swedish version, the Swedish requirements shall prevail.

For insulators also refer to:

NUT-091021-017 Technical specification for Glass insulators

NUT-091021-018 Technical specification for Composite Longrod-Insulators

For splices refer to:

D10-0015656 Teknisk bestämmelse Utförande av skarvar

D10-0015658 Teknisk bestämmelse Skruvade klämmor

1.2 Standards

Post insulators, insulator assemblies and accessories must be designed, manufactured and tested in accordance with the most recent edition of applicable standards.

In the event of disparities between this document and the relevant standard, these Technical Regulations shall apply.

2 Changes relative to previous issue

Appendix 3 is updated.

Changes from the previous issue are marked with a vertical line in the right-hand margin.

3 Electrical and mechanical requirements

For overhead lines insulators, the requirements according to SS-EN 50341 shall apply.

For all insulators in a station including insulators located from the tension pole in to the station, the requirements of SS 61936-1 shall apply.

3.1 Suspended and dead-end insulator assemblies

3.1.1 Attachment of suspension and tension insulators

Suspension and tension insulators must be attached to supporting structural parts with suspension linkage made according to DIN 48066-

1 and with drainage link made according to DIN 48066-2. Connection bolts must be provided with nuts and scissors according to DIN 48073 Form S. See Appendix 1.

No other types of connectors, type smooth bolt, self-locking nuts etc, may occur in E.ON's regional wires.

3.1.2 Fitting components

Fitting components shall be designed using hot-dip galvanized steel and withstand a minimum of 40 kA for one second. This generally applies for all voltages from 40 kV – 130 kV.

Material thickness shall be at least 10 mm.

A permitted short-time withstand current of 70 A/mm^2 applies for mechanically loaded steel fittings included in insulator assemblies. While 80 A/mm^2 applies for arcing horns.

3.1.3 Suspension clamps

Suspension clamps for FeAl and Al-alloyed conductors shall be of the type AGS with a 22 mm bolt.

A 20 mm bolt is permitted for conductors with a cross section of 234-329 mm^2 .

For existing conductors with areas smaller than 234 mm^2 , a 16 mm bolt can be used.

3.1.4 Tension clamps

Wedged tension clamps shall always be used. Bolted tension clamps shall be used in stations where there is loose stress in the conductor.

The fixing bolt diameter should be 22 mm for lines with a range of 241 mm^2 . For conductors up to 241 mm^2 a 19 mm bolt is allowed.

3.1.5 Tension insulators

Tension insulators should be made with glass insulators or composite insulators. Splicing of conductors using parallel clamps shall be carried out on the strain relieved side of the tension clamp and must not be done on the tensioned conductor. The spacing between the clamp's strain relieved side and the first parallel clamp shall be at least 1.0 metre.

All connecting bolts shall have a diameter of 22 mm.

Regardless of glass or composite, insulators must be constructed in principle according to sketches.

50 kV assemblies shall be designed in principle according to Sketch 1, Appendix 2.

130 kV assemblies shall be designed in principle according to Sketch 2, Appendix 3.

Parts according to the sketches 1 and 2 can be replaced by equivalent parts from another manufacturer.

3.1.6 Suspension insulators

Suspension insulators should be made with glass insulators or composite insulators.

50 kV suspension insulators shall be designed in principle according to Sketch 3, Appendix 4.

130 kV assemblies shall be designed in principle according to Sketch 4, Appendix 5.

Parts according to the sketches 3 and 4 can be replaced by equivalent parts from another manufacturer.

All connecting bolts shall have a diameter of 22 mm.

3.1.7 Arcing horn

Arcing horns shall withstand 40 kA for 1 second.

Insulator assemblies in lines built for class A shall always be equipped with arcing horns.

Tension insulators in the span, with loose stress in the conductor, from the tension pole into the switchgear must always be fitted with arc wires. This means that all spans that pass over a station fence should have arcing horns in the insulator chain. Other tension chains in a station do not need arcing horns.

Arcing horns shall be of the fork ring type or one-way ring type.

The tips of the arcing horn shall be directed upwards in the tension insulator and in suspension insulator mounted in the angle supports. In tangent supports with suspension assemblies, the tips at the outer phases shall point out from the support.

Arcing horns shall be mounted using double bolts with at least 12 mm bolts. Nuts shall be locked with locking strips or double punch marks.

3.2 Post insulators

Post insulators shall be of a composite type with a casing and shields of silicon rubber.

Post insulators type Line Post shall be equipped with rocker clamps on top where the line shall be equipped with a protective winding.

3.3 Transposition insulators

3.3.1 General

It must be ensured that the free conductor length between the dead-end clamp's strain relieved side and the first parallel clamp shall be at least 1.0 metre for the installation of dead-end clamps on the transposition insulators.

The transposition insulators can be designed using different materials in the insulating part according to this requirements.

3.3.2 Insulation

SS-EN 50341 applies for insulation between phases.

3.3.3 Fitting components

See 3.1.2 Fitting components.

3.3.4 Arcing horn

For dimensioning see 3.1.7 Arcing horn.

The transposition insulators shall be equipped with rotating clevis links so it is possible to turn the insulator assembly in relation to the tension clamp so that the tips of the arcing horn point straight upwards.

4 Appendix

Appendix 1 -	Bolts with nuts and split pin in accordance with DIN 48073	
Appendix 2 -	Sketch 1	50 kV dead-end insulator assembly
Appendix 3 -	Sketch 2	130 kV dead-end insulator assembly
Appendix 4 -	Sketch 3	50 kV suspension insulator assembly
Appendix 5 -	Sketch 4	130 kV suspension insulator assemb

DK 621.828.5 : 621.315.17.022 DEUTSCHE NORMEN Februar 1975

Verbindungsbolzen

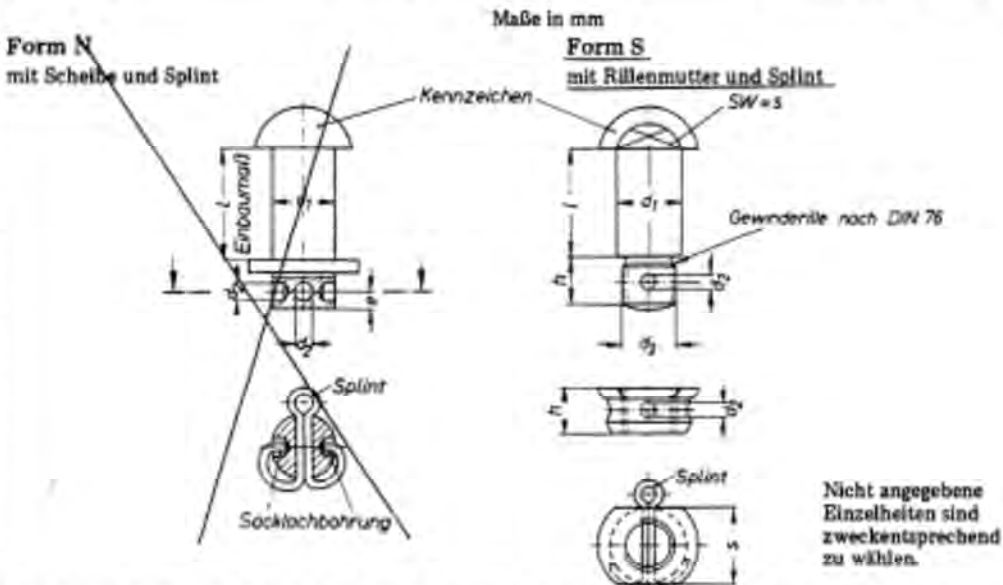
DIN 48 073

Connecting bolts for overhead power lines

Bilaga till
EE-9202 m 023

Zusammenhang mit dem von der International Electrotechnical Commission (IEC) herausgegebenen Arbeitsergebnis des Unterkomitees 36 B, siehe Erläuterungen.

Verbindungsbolzen dieser Norm sind vorzugsweise für Freileitungen und Schaltanlagen über 1 kV bestimmt



Nicht angegebene Einzelheiten sind zweckentsprechend zu wählen.

Bezeichnung eines Verbindungsbolzens Form S von $d_1 = 13$ mm Durchmesser (Kurzzeichen S 13), $l = 32$ mm Länge und der Festigkeitsklasse 8.8:

Bolzen S 13 x 32 DIN 48 073 - 8.8

Kurzzeichen	d_1 zul. Abw.	l +2 0	d_2	d_3	s +2 0	h ± 2	Schlüsselweite s	Scheibe ... DIN 1441	Splint ... DIN 94-Cu
N 13 S 13	13 +0,3 -0,6	25, 32, 40, 46	5 ¹⁾	—	5	—	—	15	4 x 25
			5	M12	—	14	19	—	
N 19 S 19	19 +0,3 -0,6	34, 38, 43, 48, 52 60, 105, 125, 145, 165, 185, 205, 225	6	—	6	—	—	21	5 x 45
			6	M16 x 1,5	—	16	24	—	4 x 40
N 22 S 22	22 +0,5 -0,3	34, 38, 43, 48, 52, 57, 60, 66	6	—	6	—	—	23	5 x 45
			5	M18 x 1,5	—	16	27	—	4 x 40
N 25 S 25	25 +0,3 -0,6	48, 65, 110, 130, 150, 170, 190, 210, 230, 250, 270, 290, 310, 330	6	—	6	—	—	26	5 x 50
				M22 x 1,5	—	16	32	—	
N 28 S 28	28 +0,4 -0,6	43, 48, 52, 57, 75, 83, 215, 235, 255, 275, 295, 315, 335	6	—	8	—	—	29	5 x 50
				M24 x 2	—	20	36	—	
N 32 S 32	32 +0,5 -0,6	43, 48, 52, 57, 83, 215, 235, 255, 275, 295, 315, 335	6	—	8	—	—	33	5 x 71
				M27 x 2	—	20	41	—	

1) Sacklochbohrungen entfallen

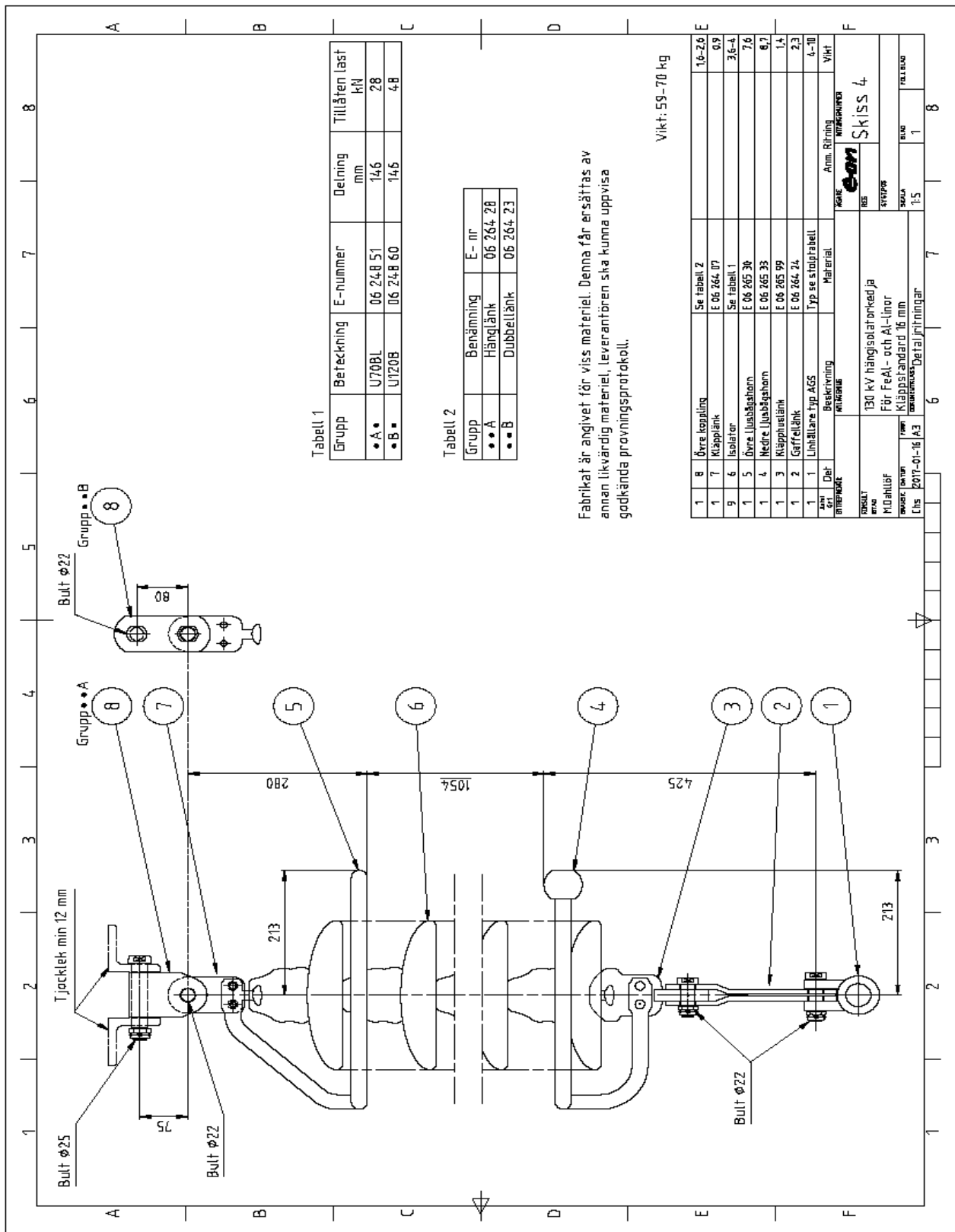
Fortsetzung Seite 2
Erläuterungen Seite 2

Deutsche Elektrotechnische Kommission · Fachnormenausschuß Elektrotechnik im DNA gemeinsam mit Vorschriftenausschuß des VDE

Fr 1. Ausgabe: 2, 6, 2, 3, 6, 8

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Neu aufgenommen Bolzenmaß 25 bis
Bolzenmaß 24 gezeichnet, Beschriftung
ändert, Laugen u. geändert, Titel geordnet
und Inhalt vollständig überarbeitet.



Tabell 1

Grupp	Beteckning	E-nummer	Delning mm	Tillåten last kN
• A	U708L	06 248 51	146	28
• B	U120B	06 248 60	146	48

Tabell 2

Grupp	Benämning	E-nr
• A	Hänglänk	06 264 28
• B	Dubbellänk	06 264 23

Fabrikat är angivet för viss materiel. Denna får ersättas av annan likvärdig materiel, leverantören ska kunna uppvisa godkända provningsprotokoll.

Vikt: 59-70 kg

1	8	Övre koppling	Se tabell 2	16-26	E
1	7	Kläpplänk	E 06 264 07	09	
9	6	Isolator	Se tabell 1	36-4	
1	5	Övre ljusbågshorn	E 06 265 30	76	
1	4	Nedre ljusbågshorn	E 06 265 33	67	
1	3	Kläppslänk	E 06 265 99	14	
1	2	Gaffellänk	E 06 264 24	23	
1	1	Linhälare typ ACS	Typ se stötblatt	4-10	
MATERIAL		Material			
BESKRIVNING		Material			
MÄTTNING					
ANM. RITNING					
MÄTTNINGAR					
TITEL		130 kV hängslatorkedja	06		
FÖRFATTARE		M Dahlöf	STYCKE		
REVISOR			SKALA	1:5	1
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