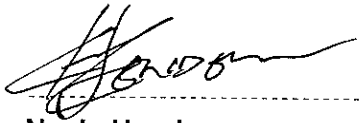
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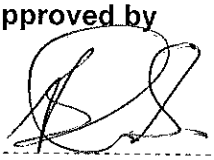


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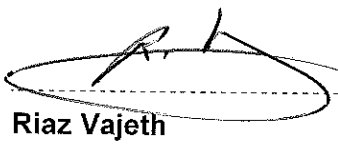


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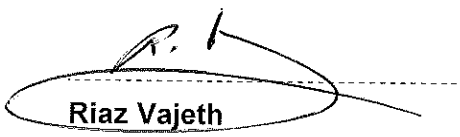


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1. Introduction

This specification has been prepared on behalf of the SCOT Technical Steering Committee for hardware. It has been approved by the committee for use by Eskom Distribution as a performance specification when purchasing helically formed line hardware for low and medium-voltage overhead power lines.

2. Supporting clauses

2.1 Scope

This document specifies the minimum requirements and acceptance tests for the following helically formed hardware to be used on MV and LV overhead lines:

- Top groove tie
- Side groove tie
- Dead end
- Guy strain termination
- Armour rod
- One part line splice
- Three part line splice
- Pole top stay make off
- Arcing horn
- Road crossing tie broken conductor

Specific requirements specific to dead ends are also included in the specification.

2.1.1 Purpose

None

2.1.2 Applicability

None

2.2 Normative/informative references

2.2.1 Normative

Parties using this document shall apply the most recent edition of the documents listed below:

[1] BS EN 10244-2:2001 Steel wire and wire products – Non-ferrous metallic coatings on steel wire – Part 2: Zinc or zinc alloy coatings.

[2] ENATS 43-15: Insulator binds and equivalent helical fittings for overhead lines.

[3] ENATS 43-92: Overhead Line Fittings

[4] SANS 61089:1991 Round wire concentric lay overhead electrical stranded conductors

[5] NRS 018-2: Fittings and connectors for low-voltage overhead power lines using aerial bundled conductor.

[6] DSP 34-1191: Medium voltage reticulation section 0: General information and requirements for overhead lines up to 33kV

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[7] DSP 34-1193: Heavy conductors: Information and requirements for overhead lines up to 22kV with conductors larger than hare and up to kingbird conductor

[8] DSP 34-1657: Specification for conventional stay planting, percussion stay and rock anchor installations and compaction testing.

[9] DSP 34-377: Phase conductor for distribution lines

[10] DSP 34-1213: Zinc coated earth conductor, guy and stay wire for transmission lines.

[11] DSP 34-510: Insulators for new and refurbished lines.

[12] DISASAAM2: Distribution standard Part 3 - Section 1: LV overhead reticulation.

[13] DSP 34-1193: Distribution standard - Part 4: Section 1: MV overhead reticulation.

[14] DSP 34-1890: Distribution Standard Part 4: Medium voltage reticulation Section 4: 33kV overhead reticulation for conductors up to Hare/Oak

[15] DSP 34-453: MV reticulation / 19 kV Single Wire Earth Return (SWER) overhead reticulation

[16] DSP 34-1643: Fittings for bare neutral aerial bundled conductor

[17] DSP 34-1045: Particular requirements for strain, suspension and pole fittings for 4 mm2 and 10 mm2 concentric service cable.

[18] DSP 34-1803: Aerial Bundled conductor with un-insulated (bare) neutral

[19] DSP 34-1677: Outdoor post and long-rod insulators, for new and refurbished power lines up to 33 kV

[20] DSP 34-329: COLOUR CODING FOR HARDWARE TO BE USED ON DIFFERENT CONDUCTORS.

[21] DST 32-319: Rev 0, Determination of conductor ratings in Eskom

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
arcing horn	Helically formed fitting designed and installed in such a way that it protects the loop of a dead-end against power frequency flashover damage.
dead end	Helically formed fitting for the strain termination of bare conductors.
guy strain termination	Helically formed strain fittings for termination of stay wire to stay components.
homogeneous conductor	Conductor in which all the strands making up the conductor are of the same material e.g. AAC and AAAC
non-homogeneous conductor	Conductor in which the strands making up the conductor are not of the same material e.g. ACSR.
non-tension joint	Helically formed fitting for jointing or repairing conductors which are not normally tensioned e.g. jumpers and tee-offs.
one part line splice	Helically formed fitting designed for the repair or jointing of *homogeneous* conductors normally under full tension.
pole top stay make off	Helically formed fitting designed to enable the stay/guy to be strained at the wood-pole top.

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Definition	Description
road crossing tie	Helically formed fitting which secures and gives additional protection to conductors supported by intermediate structures at road crossing. This differs from 3.1 and 3.2 in that in must perform the duty of an armour rod and tie combined.
side groove tie	Helically formed fitting which secures and protects conductors in the side groove of post insulators with an F-neck design to Eskom specification DSP 34-510.
three part line splice	Helically formed fitting designed for the repair or jointing of *non-homogeneous* conductors normally under full top groove tie: Helically formed fitting which secures and protects conductors in the top groove of post insulators with an F-neck design to Eskom specification DSP 34-510 tension.
vibration damper	Helically formed fitting designed to subdue high frequency vibrations on bare conductors.

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
AAAC	All Aluminium Alloy Conductor
AAC	All Aluminium Conductor
ABC	Aerial Bundled Conductors
ACSR	Aluminium Conductor Steel Reinforced
IARC	industry Association Research Centre
ILAC	International Laboratory Accreditation Cooperation
LV	Low Voltage
MV	Medium Voltage

2.5 Roles and responsibilities

Not applicable.

2.6 Process for monitoring

Not applicable.

2.7 Related/supporting documents

Not applicable.

3. Requirements

3.1 Applications

Suppliers and manufacturers shall familiarize themselves with the applications of helically formed products and the associated hardware by studying the Eskom MV and LV Distribution Standards.

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3.2 Standard conductors

The following are standard conductors used for construction of lines, fault current ratings are also included as per DST 32-319:

Table 1: Standard Conductor

Conductor	Specification	Conductor name	Design temp.	Current rating @ normal (A)	Current rating @ emergency (A)
ACSR	BS 215 SANS 182	Squirrel	75 °C	138	183
		Fox		196	258
		Mink		270	361
		Hare		376	496
		Magpie		58	68
		Wolf		498	671
		Bear		706	962
		Chickadee		559	761
		Kingbird		771	1136
AAAC	BS 3242	Acacia		145	194
		35 (.327)		209	275
		Fir		-	-
		Pine		293	385
		Oak		391	530
Steel for stays	SANS 182:5	3/3,35			
		7/4.0			
		19/2.65			
LV ABC (50/35mm²)	DSP 34-1803	refer to spec			
4mm² concentric service cable	DSP 34-1706	refer to spec			
10mm² concentric service cable	DSP 34-1706	refer to spec			

Notes:

1) 3/3,35 wire is also used for SWER lines

2) 35 mm² bare neutral aluminium alloy supporting conductor for 35mm^2 ABC

3) 50 mm² bare neutral aluminium alloy supporting conductor for 70mm^2 ABC

3.3 Tools

The helically formed line hardware shall be easily and safely installed without tools.

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3.4 Colour coding

The list of conductors and their colour coding shall comply with the following Distribution specification: DSP 34-329: *COLOUR CODING FOR HARDWARE TO BE USED ON DIFFERENT CONDUCTORS*

A standard colour coding system is required to ensure the correct installation of the products regardless of the manufacturer or supplier. The system to be used by Eskom is based on a single colour code for any type of helically formed line hardware for each conductor size.

The same colour code for a similar size conductor e.g. OAK or HARE indicates that the product can be used on either conductor. Fittings of different sizes having the same colour code will not be able to be successfully applied. The re-use of colour codes at extremes in the range is a practical necessity.

A system has been designed to enable each conductor to have a single colour code for all its associated helically formed line hardware. The colour code applicable to a conductor range for dead-end fittings was chosen as the base. All the other fittings (armour rod and ties) have been adopted to fall in the same range.

3.5 Post insulator neck designs

Eskom specifies an F-Neck design for its post insulators. The Eskom insulator specification DSP 34-510 also requires that each post insulator manufacturer have its insulator tested for compatibility with each helically formed product suppliers.

3.6 Line angles

The manufacturer's product shall specify the line angles permissible. The line angles shown on the Eskom standard structure drawings shall be the minimum requirement. The suppliers are required to refer to the following sections of the Eskom DT website Part 4 MV standard: DSP 34-1191 and DSP 34-1192 to ensure that the products offered are compatible with the Eskom installation needs.

3.7 Materials

The manufacturer shall be responsible for the selection and use of appropriate materials such as wire and other inputs and shall ensure that the material is compatible with and appropriate to the service conditions. This includes elastomer mouldings and cushion pads which must be in all cases included with the relevant fittings.

Where the surface coating such as galvanising on steel wire is involved such coating shall be compatible with the outer layer of the conductor to which the fitting is to be applied. The coating shall be in accordance with BS EN 10244-2:2001 or latest revision.

A chemically inert grit shall be applied where applicable by an appropriate method of adhesion to the inner surfaces of the helical fittings.

The type and quality of the grit shall not be deleterious to the product or the conductor especially under service conditions.

The material specification for all helically formed line hardware shall comply with those stated in the Buyers Guide and in addition, for those related specifically to dead ends is covered in section 4.12.

3.8 Movement

Helically formed fittings shall permit controlled movement of the conductors at their support or termination points under unbalanced load conditions resulting from impact loads on conductors or supports, conductor oscillation, galloping, broken conductors and ice loading.

3.9 Insulator flashover values

Top and side ties shall not reduce the flashover and withstand voltage capabilities of the insulators to which they are applied.

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3.10 Radio interference voltages

Studies of RIV type interference have shown that up to 36kV spark type voltages caused by conductive surfaces in close proximity (nearly touching or touching but not making electrical contact) are the main source of RIV type interference. Manufacturers are to design the fittings to minimise this phenomenon under service conditions.

3.11 Particular requirements for top and side ties

- Refer to the definitions in Section 3.1.
- The fittings shall not cause the conductor or insulator to wear in any way.

3.12 Particular requirements for dead-ends

- These shall grip the conductor uniformly and prevent distortion of the conductor.
- Where dead ends are of homogeneous stranding the Rated Holding Strength approximates the Rated Breaking Strength of the stay wire.
- The products used on LV ABC shall comply with DSP 34-1643.
- The products used on concentric service cable shall comply with DSP 34-1045
- SABS test reports are available for further analysis:
  - a) Reference number: CX 135699, Arching tests and short-time current tests
  - b) Reference number: O/NO CX 135699, Current impulse tests on dead end

3.13 Shelf life

The life of the fittings shall not deteriorate in any way when stored under the following conditions for the specified periods:

a) Stored inside a container without any air-conditioning for up to 5 years.

3.14 Length

The fittings are to be as short as possible without compromising the requirements of this specification.

4. Tests

4.1 General

Tests shall be performed to establish the design characteristics of the fittings when installed on the relevant conductor and to ensure compliance with all requirements specified. Tests shall be conducted on new fittings in the same state as they are normally supplied. Unless otherwise specified, tests shall be conducted at ambient temperatures between 15 °C and 30 °C. Type tests shall be conducted by an independently accredited organisation or person approved by ILAC and IARC. Eskom reserves the right to witness any or all of these tests. The manufacturer/supplier shall invite Eskom personnel to witness any tests.

Conductors used for the tests shall be new clean conductors that are in accordance with DSP 34-377. Fittings shall be tested on South African and not international equivalents. The conductor used in the test shall be tested mechanically, to ascertain that the breaking strength is within the limits specified in IEC 61089. Eskom reserves the right to supply all the conductors for the tests.

Manufacturer/suppliers are requested to indicate their compliance with this specification at the tendering stage and shall submit all the required type tests (in accordance with table 2), design drawings and samples.

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The qualifying type tests need not be performed if they were successfully completed for a previous Eskom tender, provided that the design and material have not been changed or modified in any way. The type test certificates of completed successful type tests previously submitted shall be submitted with the current inquiry. Any change in components shall be indicated at the time of tender. References to the appropriate enquiry for which the tests were successfully completed, shall be included in the current enquiry.

The fittings shall be mounted on the conductors in accordance with the technical specification of the manufacturer meeting the requirements of the relevant specification to be tested to.

The transfer of test certificates between manufacturers will not be allowed.

All fittings shall be marked with the part number unique to each fitting and manufacturer. Each part number shall have a corresponding test certificate.

4.2 Qualifying tests

Tests to be performed on fittings are divided into three groups. Type tests, sample tests and routine tests. The testing procedures and conformance criteria, for the tests required, are set out in this specification and the various specifications referenced. The qualifying tests are given in table 2.

Table 2: Qualifying tests

Fitting	Tests									
1	2	3		4	5	6	7	8	9	10
	Sampling and Visual Inspection	Dimension and Material Verification	Grit Retention	Tensile	Vertical Pull-off	Transverse Pull-off	Unbalanced Load / Broken Conductor	Pull Through Withstand	Swing Conductor (Not compulsory)	Electrical Ageing
Top Groove Tie	□	□	■		■	■	×	×	×	
Side Groove Tie.	□	□	■		■	■	×	×	×	
Dead End	□	□	■	■						
Guy Strain Termination.	□	□	■	■						
Armour Rod	□	□								
One Part Line Splice	□	□	■	■						×
Three Part Line Splice.	□	□	■	■						×
Pole Top Stay Make Off	□	□	■	■						×
Arcing Horn	□	□	■							×
Road Crossing Tie Broken Conductor	□	□	■		■	■	×		×	×

□ = Type tests, sample tests and routine tests.

■ = Type tests and sample tests only.

× = Type tests only.

Note: The sampling, visual inspection, dimensional and material verification is not a test done separately from any of the other tests. These two procedures should form part of all other tests done on fittings such that the fitting can be traced back to all type test certificates. The dimensional verification should be done with reference to a design drawing. This design drawing should be included with all test reports for the fitting and be signed and stamped by the testing engineer for the testing facility. The unique product code (e.g. es122) for each fitting must be displayed on design drawings and engraved on the fitting

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4.2.1 Type tests

Type tests are intended to establish design characteristics. They are normally only performed once and repeated only when the design or the material of the fitting is changed. The results of type tests are recorded as evidence of compliance with the design requirements. Prior to the type test, a sample to be tested must be selected and sample tested according to procedures ISO 2859-1 and ISO 2859-2 (inspection and attributes) and to ISO 3951 (inspection by variables).

All type test shall conclude whether or not the product has met the requirement of the spec or not and what is the deviation. All test reports shall include an engineering drawing with dimensions from which the product tested can be clearly identified. This drawing shall be signed by the testing engineer and shall bear the stamp of the test authority. Photographs of the test being performed where the item under test can be identified are advisable. This is required in order to validate the test report,

Example

“The test result show that the “Item name” catalogue number ##### performed well and passed all the tensile requirements according to IEC 61284 and DSP 0034”

4.2.2 Sample test

Sample tests are intended to verify the quality of materials and workmanship.

Unless otherwise agreed between the purchaser and the manufacturer/supplier, the sampling plan procedures according to ISO 2859-1 and ISO 2859-2 (inspection and attributes) and to ISO 3951 (inspection by variables) shall be applied.

For each sample test, the type of inspection (by attributes or by variables and detailed procedures inspection level, acceptable quality level, single, double or multiple sampling, etc.) shall be agreed between the purchaser and the manufacturer/supplier.

Note: Sampling inspection by variables is an acceptance sampling procedure to be used in place of inspection by attributes when it is more appropriate to measure on some continuous scale characteristic(s) under consideration. In the case of failure load test and similar expensive tests, better discrimination between acceptance quality and objective quality is available with acceptance sampling by variables than by attributes for the same sample size.

The purpose of the sampling process may also be important in the choice between a variables or attributes plan. For example, a purchaser may choose to use an attributes acceptance sampling plan to ensure that parts in a shipment lot are within a required dimensional tolerance; the manufacturer may make measurements under a variables sampling plan of the same dimensions because he is concerned with gradual trends or changes which may affect his ability to provide shipment lots which meet the AQL.

4.2.3 Routine tests

Routine tests are intended to prove conformance of fittings to specific requirements and shall be made on every fitting. The tests shall not damage the fitting.

4.3 Visual inspection and verification of dimensions

Prior to any test to be done on fittings, a visual inspection shall be completed to confirm that the fittings to be tested have dimensions that conform to the manufacturer’s design drawings. The manufacturer shall supply the relevant drawings indicating all critical dimensions and tolerances for the fittings.

All test samples shall be submitted to Eskom Distribution Technology-IARC after testing is completed.

4.4 Grit retention test

Take a new fitting and slam it on the ground 3 times using a whipping action. A visual inspection should then be done to ascertain if the grit and glue flake off or not. There shall be no flaking whatsoever.

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4.5 Tensile test

4.5.1 Test sample

Test four (4) new fittings.

4.5.2 Test procedure for dead-ends and tension joints

Dead-ends and joints shall be tested in accordance with ENATS 43-92 clause (8.2.2).

4.5.3 Acceptance criteria

For homogeneous and non- homogeneous conductors a minimum tensile load of as per ENATS 43-92 clause (8.2.2) shall be attained. However, the 95% instantaneous load shall be omitted for non-homogenous conductors.

Clarification note: The 95% instantaneous load has been dropped for non-homogenous conductor for the following reasons:

- Mike Collins the international product specialist for Dulmison has stated that the 95% instantaneous load has been included historically in the British Standards. This test is not realistic for ACSR conductor.
- Test performed at Eskom Research and Strategies, C R&D Department confirmed the aforementioned statement.

4.6 Vertical and transverse pull-off tests

4.6.1 Test samples

Test three new top groove and side groove tie type fittings.

4.6.2 Test procedure

Top and site ties shall be tested in accordance with ENATS 43-15 clauses E.1.3.1 and E.1.1.2.

4.6.3 Acceptance Criteria

Table 3: Transverse and vertical pull off values

Conductor Code Name	Squirrel	Fox	Mink	Hare
Equivalent Copper Area mm^2	12.9	22.58	38.71	64.52
Norm. Area mm^2 CSA	24.43	42.77	100.3	122.5
Cond. Diameter mm.	6.33	8.37	10.98	14.16
Material Code	ACSR	ACSR	ACSR	ACSR
Normal Breaking Load kN.	8.02	13.10	21.63	36.04
Stranding	6/2.11+1/2.11	6/2.79+1/2.79	6/3.66+1/3.66	6/4.72+1/4.72
Max. Span Length (SPL) (m)	220	180	180	180
LOAD Pull off (N)	1058	1145	2051	2268
LOAD Pull off (Kgf.)	107.89	116.72	209.03	231.21

Notes:

Calculating of pull off values from ENATS 43-15 parts, E1.3.1 and E1.1.2

< 35 mm^2 CU Eq, F = (∅ cond.) x 760 N/m2 x SPL (m)

> 35 mm^2 CU Eq, F = (∅ cond.(m) + 0.019 m) x 380 N/m2 x SPL (m)

For product application the maximum span lengths specified above shall not be exceeded, for larger spans than this use alternate fixing methods.

The fittings shall not be released from the insulator or the conductor at the specified pull off loads.

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4.7 Pull Through Withstand

4.7.1 Samples

Three new fittings shall be tested.

4.7.2 Test procedure and acceptance criteria

The pull through withstand test shall be performed as described in ENATS 43-15 clause E1.3.3.

Note: The position of the end of the fitting on the tension side of the conductor shall be marked in order to monitor relative movement for the Pass / Fail criteria.

For the purposes of this test:

Light conductors shall be considered as aluminum based conductors (ACSR & AAAC) that do not exceed 62 mm^2 (35mm^2 copper equivalents) of total cross-sectional area, (Fox and smaller). At the publishing of this document the force is specified as 350kg.

Heavy conductors shall be considered as aluminum based conductors (ACSR & AAAC) that exceed 62 mm^2 of total cross-sectional area, (Mink and larger). At the publishing of this document the force is specified as 450kg.

4.7.3 Acceptance Criteria

After the pull-through withstand test the conductor shall not have moved through the fitting more than 5mm and the fitting shall be securely attached to the insulator despite any deformation that has taken place. Following any of these tests, the insulator shall not have experienced any chips, crack or abrasion to a depth greater than the glaze thickness.

4.8 Swing Conductor

The swing conductor test shall be performed as described in ENATS 43-15 clause E1.3.4.

This test is not presently compulsory.

4.9 Unbalanced load / Broken Conductor

This test is only performed on road crossing ties.

4.9.1 Test sample

This test is a test of the resiliency of the fittings and their ability to absorb shock and contain damage to the line hardware.

Sufficient dead-ends and ties as required to complete the assembly described in the test procedure make up the test sample.

4.9.2 Test procedure

Construct a test line as show in figure 2 using the relevant information from the Eskom Distribution Standard, Part 4: Medium Voltage Reticulation.

The assembly is to be equipped with a mechanical fuse which can be precisely and safety controlled to initiate a conductor break at the mid-point of the test line as shown.

The conductor, the fittings and the insulator on each side of the ties are to be marked so that movement/slip can be monitored after the break (or unbalanced condition) has occurred.

When the test line has been totally inspected and the area is safe a break is initiated by operation of the mechanical fuse.

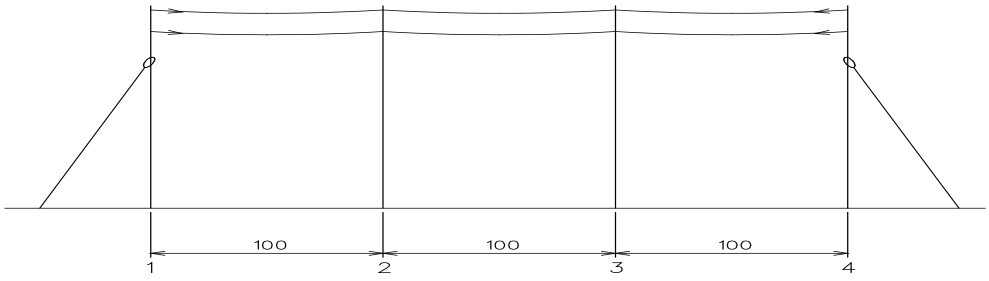
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When the conductors have settled the line is re-inspected and the condition and position relative to the conductor and insulator of the ties is recorded. Any other line hardware damage or position movement is also recorded.

4.9.3 Acceptance criteria

The movement of the line hardware must have been contained. The conductor must still be firmly fixed into position on the insulators. The movement must not have exceeded 50mm on any fitting, however permanent slippage shall not be more than 30mm.



STRUCTURES TO TEST TOP GROOVE TIES (DELTA CONFIGURATION)
1. D-DT-1222 TERMINAL ASSEMBLY (DELTA)
2. D-DT-1200 INTERMEDIATE ASSEMBLY 0-5°
3. D-DT-1200 INTERMEDIATE ASSEMBLY 0-5°
4. D-DT-1222 TERMINAL ASSEMBLY (DELTA)

STRUCTURES TO TEST SIDE GROOVE TIES (VERTICAL CONFIGURATION)
1. D-DT-1225 TERMINAL ASSEMBLY (VERTICAL)
2. D-DT-1202 INTERMEDIATE ASSEMBLY 0°
3. D-DT-1202 INTERMEDIATE ASSEMBLY 0°
4. D-DT-1225 TERMINAL ASSEMBLY (VERTICAL)

(TO TEST THE SUSPENSION CLAMP REPLACE STRUCTURES 2 AND 3 WITH D-DT-1203)

ASSEMBLY FOR UNBALANCED LOAD TEST ON TOP AND SIDE GROOVE TIES (FIG. 2)

5. Marking, labelling and packaging

All products must be properly identified by a durable label that cannot be torn or pulled off for 12 months after purchased to indicate manufacturer, size/stranding of conductor, batch number and catalogue number. The label shall be durable enough to ensure that it remains in place and is legible up to at least 12 months after installation. This must take into account the expected storage conditions and installation handling that the product will be subjected to.

In addition to the aforementioned, all manufactures shall mark their fittings in either of the following methods:

- Colour coding the glue used to attach the grit to the fitting.
- A colour band painted 100 mm wide around the fitting.

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This is done in order to identify the manufacturer in the event of a fitting failing. The colour of the marking shall be registered by the manufacturer with IARC and published in a Technical Bulletin. The colour selected for identifying a supplier shall be unique to each supplier.

All helically formed line hardware except for the pole top stay make off shall be supplied in a rigid container e.g. corrugated cardboard. The containers shall be rigid enough to withstand pallet type stacking. Pole top stay make offs, due to design, can be supplied bound securely into a bundle. The net weight in each container or bundle shall not exceed 30 kg.

On the outside of each container or on an indelible tag on each bundle, the following information shall be provided:

a) product description;

b) product code or part number;

c) name of manufacturer and contact details;

d) number of components of each type in the container;

e) address of the destination;

f) Eskom's purchase order number;

g) Eskom's material SAP number(s).

If the product is supplied by a third party supplier (e.g. importers, agents, etc.) the container shall also bear the following information on the outside of the container:

a) name of the supplier / agent

b) contact details of the supplier / agent

Package marking on containers or tags on bundles stored outdoors shall be weather resistant.

6. Authorization

This document has been seen and accepted by:

Name and surname	Designation
P Moyo	Power Delivery Engineering GM (Acting)
V Singh	Power Plant Technologies Manager
R Asmal	Technology and Quality Manager

This specification shall apply throughout Eskom Holdings Limited, its divisions, subsidiaries and entities wherein Eskom has a controlling interest.

7. Revisions

This revision cancels and replaces revision no 0 of document no. DSP_34-194.

Date	Rev	Compiler	Remarks
March 2017	1	N.Henderson	Document reformatted on to new template, with new document number. No content change. This document supersedes document DSP_34-194

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Date	Rev	Compiler	Remarks
March 2012	1	S Mashaba	Document recompiled into new TESCOD format. 2. ISO 9001:2000 Quality Management Systems removed 2. OHS Act: Occupational Health and Safety Act No 85 removed 2. Normative reference revised, SANS 61089 added 4.2 -Standard conductor table revised, current rating normal and emergency added Earth wire 19/2.65 added 4.4 Colour coding spec corrected.
Feb 2009	0	B Hill	2.8 Added comment The material for all heli-form products shall comply with those stated in the Buyers Guide. 8.6.3 Corrected values and Added table 3 8.7.2 Changed small to Light , Large to Heavy according to ENA and referenced values 8.8 Added comment, “This test is not presently compulsory” Document number changed from SCSSCAAN4 to DSP 34-194

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Date	Rev	Compiler	Remarks
June 2006	1	B Hill	Document recompiled into new IARC format. The following alterations have been made in order to address the applicability of the document: Chickadee and Kingbird conductors added as standard conductor sizes. 1/3.66 steel conductor removed. As agreed with Monyane Rapapa the conductor colour codes will be placed in the revised conductor specifications. Colour codes and conductor parameters have been removed to the respective specifications. Reference has been made to the relevant specifications. The following was agreed at the supplier interaction meeting with Rob Stephen and the suppliers: Non-tension joints would be removed as they are not used. Cradle suspension clamps will be removed as they are adequately covered in SANS 61284. The Buyers Guide is to be revised. Tensile tests are performed as in SANS 61284 to the parameters set in ENA 43-92. Pull-off tests (Vertical & Transverse) are in accordance with ENA 43-15. After consultation with the manufactures the values have been increased in relation to the failing loads of the insulators onto which they shall be applied. Unbalance load tests in ENA 43-15 is performed on a tensile testing machine. It was mooted and decided that it would be more realistic to build a section of line with a mechanical fuse as in the current Eskom specification. The manufactures are to give feedback as to where their acceptance criteria in the Eskom specification are acceptable. See DSP 34-194 section 6.5.3. Sefag (Pfisterer) have a mechanical fuse unit which is commercially available. Accelerated aging tests are not called for in any of the International specifications and no clarification is given in the current Eskom specification. After discussion it was decided that this test is to be removed from the specification. BIL tests are not called for in any of the international specifications. These tests have not been performed locally in the past. This was discussed and it was agreed by the suppliers that the other tests called for would show up any problems which were likely to reduce the BIL of the hardware the fitting was installed on. After discussion it was decided that this test is to be removed from the specification. If necessary Eskom will conduct the tests as part of a research project. Vibration tests are not called for in any of the international specifications. After discussion it was agreed that vibration testing shall only be performed on dead-end fittings. This specification shall be amended if necessary. Electrical Aging is prescribed in SANS 61284 for all fittings which carry current. The manufactures

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Date	Rev	Compiler	Remarks
Dec 1997	0	I Ferguson	Original issue as SCSSCAAN4.

8. Development team

Name and surname	Designation
V Singh	Eskom Distribution
Sylvester Mashaba	Eskom Distribution

9. Acknowledgements

Not applicable.

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Annex A – Impact Assessment

(Normative)

Impact assessment form to be completed for all documents.

1) Guidelines

- All comments must be completed.
- Motivate why items are N/A (not applicable)
- Indicate actions to be taken, persons or organisations responsible for actions and deadline for action.
- Change control committees to discuss the impact assessment, and if necessary give feedback to the compiler of any omissions or errors.

2) Critical points

2.1 Importance of this document. E.g. is implementation required due to safety deficiencies, statutory requirements, technology changes, document revisions, improved service quality, improved service performance, optimised costs.

Comment: N/A

2.2 If the document to be released impacts on statutory or legal compliance - this need to be very clearly stated and so highlighted.

Comment: No impact

2.3 Impact on stock holding and depletion of existing stock prior to switch over.

Comment: No impact

2.4 When will new stock be available?

Comment: It will be advised once the research is complete

2.5 Has the interchangeability of the product or item been verified - i.e. when it fails is a straight swop possible with a competitor's product?

Comment: It is available already as per buyers guide

2.6 Identify and provide details of other critical (items required for the successful implementation of this document) points to be considered in the implementation of this document.

Comment: None

2.7 Provide details of any comments made by the Regions regarding the implementation of this document.

Comment: (N/A during commenting phase)

3) Implementation timeframe

3.1 Time period for implementation of requirements.

Comment: ASAP

3.2 Deadline for changeover to new item and personnel to be informed of DX wide change-over.

Comment: Specification has already been used

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4) Buyers Guide and Power Office

4.1 Does the Buyers Guide or Buyers List need updating?

Comment: No

4.2 What Buyer's Guides or items have been created?

Comment: None

4.3 List all assembly drawing changes that have been revised in conjunction with this document.

Comment: None

4.4 If the implementation of this document requires assessment by CAP, provide details under 5

4.5 Which Power Office packages have been created, modified or removed?

Comment: None

5) CAP / LAP Pre-Qualification Process related impacts

5.1 Is an ad-hoc re-evaluation of all currently accepted suppliers required as a result of implementation of this document?

Comment: No

5.2 If NO, provide motivation for issuing this specification before Acceptance Cycle Expiry date.

Comment: It was reviewed to check correctness

5.3 Are ALL suppliers (currently accepted per LAP), aware of the nature of changes contained in this document?

Comment: They commended

5.4 Is implementation of the provisions of this document required during the current supplier qualification period?

Comment: No

5.5 If Yes to 5.4, what date has been set for all currently accepted suppliers to comply fully?

Comment: N/A

5.6 If Yes to 5.4, have all currently accepted suppliers been sent a prior formal notification informing them of Eskom's expectations, including the implementation date deadline?

Comment: N/A

5.7 Can the changes made, potentially impact upon the purchase price of the material/equipment?

Comment: No

5.8 Material group(s) affected by specification: (Refer to Pre-Qualification invitation schedule for list of material groups)

Comment: None

6) Training or communication

6.1 Is training required?

Comment: (If NO then 6.2 – 6.6 will be N/A) No

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6.2 State the level of training required to implement this document. (E.g. awareness training, practical / on job, module, etc.)

Comment: N/A

6.3 State designations of personnel that will require training.

Comment: N/A

6.4 Is the training material available? Identify person responsible for the development of training material.

Comment: N/A

6.5 If applicable, provide details of training that will take place. (E.G. sponsor, costs, trainer, schedule of training, course material availability, training in erection / use of new equipment, maintenance training, etc).

Comment: N/A

6.6 Was Technical Training Section consulted w.r.t module development process?

Comment: N/A

6.7 State communications channels to be used to inform target audience.

Comment: No

7) Special tools, equipment, software

7.1 What special tools, equipment, software, etc will need to be purchased by the Region to effectively implement?

Comment: None

7.2 Are there stock numbers available for the new equipment?

Comment: Yes

7.3 What will be the costs of these special tools, equipment, software? None

8) Finances

8.1 What total costs would the Regions be required to incur in implementing this document? Identify all cost activities associated with implementation, e.g. labour, training, tooling, stock, obsolescence

Comment: None

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Impact assessment completed by:

Name: Sylvester Mashaba

Designation: Engineer

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