Eskom	Standard	Technology

Title: **SPECIFICATION FOR NON-METALLIC CABLE GLANDS STANDARD**

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1. Introduction

This specification has been compiled in order to provide a technical specification for non-metallic cable glands used in the Eskom distribution division as there is currently no SANS standard covering non-metallic cable glands.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

This specification covers Eskom's technical requirements for a non-metallic compression cable gland (NM Gland). The NM Gland is used to receive the entry of a cable or wires into an electrical enclosure. This specification is intended to standardise the NM Glands used on pole top distribution boxes and other outdoor equipment

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 Normative/Informative References

2.2.1 Normative

[1] EN ISO 4892-3, Plastics Methods of exposure to laboratory light sources - Fluorescent UV lamps

[2] SANS 62444, Cable gland for electrical installations.

[3] SANS 1213: 2002, Mechanical cable glands

2.2.2 Informative

None

2.3 Definitions

2.3.1 General

Definition	Description
Seal	Flexible compression seal

2.3.2 Disclosure Classification

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

2.4 Abbreviations

Abbreviation	Description
N	Newton
NM	Non-metallic gland
UV	Ultra-Violet

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2.5 Roles and Responsibilities

The relevant sections within Eskom Distribution are responsible to implement the new design according to the requirements as listed in this document

2.6 Process for monitoring

Adherence to this document shall be monitored through routine inspections.

2.7 Related/Supporting Documents

Not applicable.

3. Requirements

3.1 Non-metallic Cable Glands

3.1.1 Conditions of services

The NM gland shall be suitable for use on an electrical enclosure in an inland/coastal climate of hot, cold, wet, humid and corrosive conditions with exposure to severe ultraviolet radiation during daylight hours.

3.1.2 Materials and finish

a) The lock nut, gland body and compression nut shall be manufactured from a material which is pigmented black, white or grey and shall be treated with a UV stabiliser, compatible with the material used so that a twenty-year life may be expected when subjected to continuous UV light.

b) The NM gland material shall be self-extinguishing when a flame source has been removed.

c) The material and construction of the NM gland shall ensure that the lock nut, gland body and compression nut can be fully tightened with a standard spanner without jumping or stripping the threads.

d) When the NM gland is fitted the entry hole shall be watertight.

e) The NM gland seal shall be manufactured from a weather resistant material that can be compressed and has a twenty year life.

f) The NM Gland shall have a smooth or matt finish and bear the manufacturer's trade mark or name and the gland size.

3.1.3 Gland sizes

a) The NM Gland sizes and outer diameters are given in the table below.

Gland size	Cable outer diameter (mm)	
	Min	Max
no.X	7,5	13
no.2	13	19

b) The gland size shall be given in schedule A (if supplied as end items) and/or in the purchasing description of an enquiry document associated with the equipment that the gland is to be supplied with.

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3.1.4 NM gland components

3.1.5 The NM gland shall comprise the following components:

a) compression nut

b) flexible compression seal

c) slip ring or claw

d) gland body

e) lock nut

3.1.5.1 Compression nut

When the compression nut is tightened, it shall increase the pressure on the flexible compression seal and in turn increase the pressure on the cable running through the centre of the gland. The compression nut shall be hexagonal in shape so that it can be tightened with a standard spanner. The compression nut shall include the male thread to fit into the main gland body.

3.1.5.2 Flexible compression seal

The seal shall be suitably sized to ensure compression against the cable running through the gland.

3.1.5.3 Slip ring or claw

The slip ring or claw shall ensure that the flexible compression seal is not damaged while applying a uniform pressure on the cable running through the gland as the compression nut is tightened.

3.1.5.4 Gland body

On one side, the gland body shall have a male thread (nipple thread to suit gland size) with a minimum length of 9 mm to ensure that the lock nut can be fitted firmly and easily. The other side, the gland body shall accept the compression nut. The slip ring or claw and flexible compression seal shall fit firmly into the gland body. The centre part shall be hexagonal in shape so that it can be tightened with a standard spanner. The centre part of the main gland body shall be a minimum of 10 mm wide.

3.1.5.5 Lock nut

The lock nut shall be used to hold the gland firmly in place. It shall have a female thread (to suit gland size) and shall be at least 4 mm thick with a hexagonal outside shape so that it can be tightened with a standard spanner.

3.2 Tests

The following tests shall be carried out on the NM gland:

3.2.1 Slip load test

The supplier shall carry out a factory slip load sample test on batches at regular intervals. The tests shall be carried out as follows:

a) Place a PVC insulated cable (diameter to suit gland size) into the NM Gland and tighten the gland fully.

b) Apply the slip load given in table 2 to the cable for 3 minutes.

c) After 3 minutes check that there has been no slippage.

d) Inspect the NM gland for damage.

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Sample slip load test certificates shall be supplied at the time of tender.

NM gland size	Cable diameter (mm)	Slip load (N)
no.X	7,5	20
no.2	13	40

3.2.2 Accelerated UV aging test

The material used for the NM gland shall be tested in accordance with EN ISO 4892 (or an equivalent test). The test shall be equivalent to a 20-year lifespan in order to comply with the requirements of 3.1.2. Details of the materials used and the UV test certificate shall be supplied at the time of tender.

3.2.3 Glow-wire test

A glow-wire test shall be carried out in accordance with SANS 62444 using a temperature of 650 °C ± 10 °C. The glow wire shall be applied to any random location on NM gland for a period of 30 s ± 1 s. The glow-wire test certificate shall be supplied at the time of tender.

3.2.4 Seal test

A seal test shall be carried out in accordance with SANS 1213. The seal test certificate shall be supplied at the time of tender.

3.3 Packaging

Where NM glands are supplied as end items, the complete NM gland shall be packed in cardboard boxes of two hundred NM glands in each box and securely closed. The boxes shall be labelled:

- "200 Non-Metallic Cable Glands - size".

3.4 Quality

The supplier (deemed to be an organization that undertakes any manufacturing or assembly operation) shall have a formally documented and implemented quality management system (QMS). Eskom reserves the right to audit quality management systems for suitability and effectiveness, and to verify all goods for conformance prior to delivery.

4. Authorisation

This document has been seen and accepted by:

Name and surname	Designation
Jutas Maudu	Senior Engineer
Andreas Beutel	MV/LV SC Chairperson
Mfundi Song	Senior Manager Eng. & Tech

5. Revisions

Date	Rev	Compiler	Remarks
March 2024	3	Jutas Maudu	Document due for revision, SANS 62444 added
May 2017	2	Jutas Maudu	Document content transferred from old template to latest SCOT template, no technical changes on the document

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Date	Rev	Compiler	Remarks
Feb 2014	1	Jutas Maudu	No change in content, format change only. This Document supersedes Document number: DSP_34-623
April 2007		N E Sithole	New document number DSP 34-623 assigned. Document reviewed and formatted with new template. References updated. Testing clauses revised. Glow wire test added to prove compliance with 4.2.2. References to EN ISO and IEC standards added for testing.
July 1996	0	A.M Abrosie	Specify reasons for compiling of document.

6. Development team

- A.M Abrosie
- Rhett Kelly
- Nkumbulo Sithole
- Jutas Maudu

7. Acknowledgements

Not applicable.

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Annex A – : impact assessment

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: This specification is intended to standardise the NM Glands used on pole top distribution boxes and other outdoor equipment.

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: N/A

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

Comment: N/A

2.4 When will new stock be available?

Comment: Only when required/ordered

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: N/A

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: N/A

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: N/A

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

Comment: N/A

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4) Buyers Guide and Power Office

4.1 Does the Buyers Guide or Buyers List need updating?

Comment: N/A

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

Comment: N/A

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

Comment: N/A

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: N/A

5) Training or communication

5.1 State the level of training or communication required to implement this document. (E.g. none, communiqués, awareness training, practical / on job, module, etc.)

Comment: N/A

5.2 State designations of personnel that will require training.

Comment: N/A

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

Comment:

5.4 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

5.5 Was Training & Development Section consulted w.r.t training requirements?

Comment: N/A

6) Special tools, equipment, software

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

Comment: N/A

6.2 Are there stock numbers available for the new equipment?

Comment: N/A

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7) Finances

7.1 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: N/A

Impact assessment completed by:

Name: AJ Maudu

Designation: Engineer, Technology and Engineering

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Annex B – Technical Schedules A and B

Schedule A: Purchaser's specific requirements

Schedule B: Particulars of equipment offered

Item	Clause	Description		Schedule A	Schedule B
1		Component: compression nut, lock nut & gland body			
		Material offered			
	3.1.1			XXXXXXXX	_____
	3.1.2	Finish	Smooth/matt	XXXXXXXX	_____
		Manufacturer's Trade Mark		Yes	XXXXXXXX
		Gland size indicated		Yes	XXXXXXXX
		Component: slip ring or claw			
		slip ring provided	Yes/No	XXXXXXXX	_____
		claw provided	Yes/No	XXXXXXXX	_____
	3.1.5	Material offered		XXXXXXXX	_____
		Component: flexible compression seal			
		Material offered		XXXXXXXX	_____
2		Gland size			
	3.1.3	Size required (when supplied as end item)	No. X / No. 2	_____	XXXXXXXX
3		Testing in accordance with 5			
	3.2.1	Slip load test passed		Yes	_____
	3.2.2	UV aging test certificate supplied		Yes	_____
	3.2.3	Glow-wire test certificate supplied		Yes	_____
	3.2.4	Seal test certificate supplied		Yes	_____

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