**PART A-01**

**TITLE:** Pre-Amble to the Standard Specification for Medium and Low Voltage Electricity Distribution Works

**INCEPTION DATE:** After Gazetting (Working Document for a 3 year period)

**AMENDMENTS/REVISIONS**

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A-13 STANDARDS & CODES OF PRACTICE TO BE USED AS REFERENCE TO THIS DOCUMENT

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A-1 DEFINITIONS

All definitions shall not used in this Standard Specification are to be considered together with those stated in the Electricity Act of Namibia. If any discrepancies arise the definitions contain in the Electricity Act shall take preference.

A-1.1 Supply Authority
Will mean the authority that is responsible for electricity distribution and sale of electrical energy to end customers in its area of responsibility.

A-1.2 Electricity Distribution Work (or Works)
Will mean the planning, design, procurement, erection, installation, testing, commissioning, and repair of the electricity supply infrastructure under the responsibility of the Supply Authority.

A-1.3 Engineer
Will mean the competent person responsible for the planning, design and supervision of the Works. The Engineer may either be a staff member of the Supply Authority or a Consulting Engineer appointed by the Supply Authority.

A-1.4 Contractor
Will mean the electrical contractor appointed by the Supply Authority to perform certain erection, installation, maintenance or repair works on the electricity supply infrastructure as specified by Engineer according to Supply Authority’s requirements.

A-1.5 Developer
Will mean a person developing any structure or building, new suburbs, townships or any other service within an already proclaimed or not proclaimed area to the exact standards of the Supply Authority.

A-1.6 Detailed Technical Specification
Will mean the detailed specification prepared by the Engineer to describe the specific scope and extent of the Works, including all designs and drawings.

A-1.7 Contract
Will mean the contract entered into between the Supply Authority and the Contractor for the performance of certain works. The Contract is normally composed of the written undertaking by the Contractor to perform the works in accordance with the Supply Authority’s conditions of contract, standard specification, detailed technical specification including all drawings and variation orders issued in terms of the Contract.

A-1.8 Bulk Supply
Will mean and include all supply mains, switchgear, transformers and any other apparatus required to supply electricity, at the voltage prescribed by the supply authority up to the point or points of supply for the electricity distribution in the township. The point or points will be located in positions approved by the supply authority either at the boundary of the township or where such access supply includes a transforming and/or switching substation installed within the boundary of the township by the supply authority, at the outgoing terminals of the supply authority’s switchgear.
A-1.9 **Electricity Distribution**
Will mean and include all supply mains, switchgear, transformers, street lighting, metering and other apparatus required beyond the Access Supply, which are necessary to provide electricity supplies within the township to individual customers, traffic control and other installations, but will exclude the internal wiring of premises.

A-1.10 **Distributor**
A MV or LV cable or overhead feeder that is tapped along its route to supply customers.

A-1.11 **Customer's Point of Supply**
The metering point of a customer. At this point, the customer's electrical installation is connected to the Supply Authority's main.

A-1.12 **Declared or Agreed Voltage**
The voltage declared to the customers by the supply authority in terms of the Electricity Act.

A-1.13 **Maximum Demand (MD)**
The highest average electrical demand for a specific period of time between regular meter readings. Maximum Demand requirements are to be implemented according to the rules and codes stipulated by the ECB. Synchronisation with NamPower’s power monitors shall be achieved in order to gather information correctly.

A-1.14 **Diversity Factor (DF)**
The ratio of the sum of the individual customer Maximum Demands to the Maximum of the whole group of customers.

A-1.15 **After Diversity Maximum Demand (ADMD)**
Maximum Demand over Diversity Factor, i.e. MD/DF. This is dependent upon the class of the residential property, climatic conditions, customer habits and the supply authority’s control measures. The figure must be adjusted to cater for the diversity appropriate to the number of customers in the group being considered.

A-1.16 **Unbalance Factor (UF)**
The ratio of the current in the neutral conductors to the arithmetical average sum of the current in the phase conductors.

A-1.17 **Voltage Drop**
The difference in electrical potential (RMS) between two points on a feeder due to actual circuit parameters, e.g. circuit impedance, line reactance, length and size of conductors and the type of material of the conductor (electrical resistance).

A-1.18 **Short-Circuit**
The deliberate or accidental connection of two points of different potential, via a conductor of negligible impedance.
A-1.19  **Earth Fault**  
An insulation failure between a current-carrying conductor and earth.

A-1.20  **Earth Resistance**  
The resistance of earth to stray currents (should be as low as possible to be effective.)

A-1.21  **Fault Current**  
The current flowing through the fault itself as a result of a fault.

A-1.22  **Power Factor**  
The ration of the real power and apparent power, flowing to the load

A-1.23  **High Voltage**  
High voltage means a voltage of more than 44 000 Volts (RMS) (National Electricity Act)

A-1.24  **Medium Voltage**  
Medium voltage means a voltage of more than 1000 Volts (RMS) but more than 44000 Volts (RMS) (National Electricity Act)

A-1.25  **Low Voltage**  
Low voltage means a voltage of 1000 Volts (RMS) or less (National Electricity Act)

A-1.26  **Transmission**  
"Transmission", in relation to electricity, means the conveyance of electricity by means of a transmission system, which consists wholly of high voltage networks and electrical plant, from an energy source or system to a customer.

A-1.27  **Distribution**  
"Distribution", in relation to electricity, means the conveyance of electricity by means of a distribution system, which consist wholly or mainly of medium and low voltage networks, to the consume.
A-2 ABBREVIATION USED IN THIS STANDARD SPECIFICATION

<table>
<thead>
<tr>
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<tr>
<td>ABC</td>
<td>Aerial bundle conductor</td>
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<tr>
<td>ACC</td>
<td>Aerial concentric conductor</td>
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<td>ACSR</td>
<td>Aluminium conductor steel reinforced</td>
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<td>XLPE</td>
<td>Cross linked polyethylene</td>
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<td>PVC</td>
<td>Polyvinyl chloride</td>
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<td>TI</td>
<td>Transformer installations</td>
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<td>ST</td>
<td>Street lighting</td>
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<td>SC</td>
<td>Service Connection</td>
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<tr>
<td>LV</td>
<td>Low voltage – voltage less than 1000V</td>
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<tr>
<td>MV</td>
<td>Medium voltage – voltage in excess of 1000V but less than 44kV</td>
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<td>PG</td>
<td>Parallel groove</td>
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<td>SABS</td>
<td>South African Bureau of Standards</td>
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<tr>
<td>SANS</td>
<td>South African National Standards</td>
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<tr>
<td>BS</td>
<td>British Standards</td>
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<tr>
<td>IEC</td>
<td>International Electromechanical Commission</td>
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<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
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<tr>
<td>IEEE</td>
<td>Institute Electrical and Electronic Engineers</td>
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<td>NRS</td>
<td>National Rationalized Standards</td>
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<td>BECC</td>
<td>Bare Earth Continuity Conductor</td>
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<tr>
<td>ECC</td>
<td>Earth Continuity Conductor</td>
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<tr>
<td>CNE</td>
<td>Combined Neutral Earth</td>
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<td>DB</td>
<td>Distribution box</td>
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<td>Ω</td>
<td>Ohm</td>
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<td>ADMD</td>
<td>After diversity maximum demand</td>
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<tr>
<td>DF</td>
<td>Diversity factor</td>
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<tr>
<td>N</td>
<td>Number of customers</td>
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<td>MD</td>
<td>Maximum demand</td>
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<tr>
<td>UF</td>
<td>Unbalance factor</td>
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<tr>
<td>IDMT</td>
<td>Inverse definite minimum time</td>
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<tr>
<td>PME</td>
<td>Protective multiple earthing</td>
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<tr>
<td>CSP</td>
<td>Completely self protective</td>
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<td>PM</td>
<td>Pole mounted</td>
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<td>ICP</td>
<td>Insulation piercing connector</td>
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<tr>
<td>PEN</td>
<td>Protective earth and neutral conductor</td>
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<tr>
<td>CSA</td>
<td>Cross sectional area</td>
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<tr>
<td>COC</td>
<td>Certificate of Compliance</td>
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A-3 GENERAL INFORMATION

(a) This Detailed Specification covers the general technical requirements for the planning, design, erection, installation, testing, commissioning, maintenance and repair of the materials and equipment for the electricity supply infrastructure of the Supply Authority.

(b) The complete Works will comply with the requirements of the Detail Design Specification. Should any discrepancies or contradictions exist between this specification and the Stock List or bill of quantities for the specific Works, then the latter will take precedence.

(c) The Engineer will inspect the Works from time to time during the progress of the Works. Discrepancies will be pointed out to the Contractor and these will be remedied at the Contractor’s expense. Under no circumstances will these inspections relieve the Contractor of his obligations in terms of the Contract.

(d) The Contractor will notify the Supply Authority timeously when the Works reaches important states of completion (e.g. before closing cable trenches, before casting concrete, etc.) so that the Engineer may schedule his inspections in the best interest of all parties concerned.

(e) This standard is a developing standard (Working Document) being implemented and updated over a period of three (3) years from inception. This is to allow for the amendment of the document regarding the requirements of the industry in Namibia.

(f) It is also to be noted that this Standard Document is developed in an effort to harmonise electrical infrastructure and maintenance practises on distribution lines up to and including 33kV. This Standard is applicable to all electricity supply network infrastructure up to and including the Supply Authorities jurisdiction. This standard is therefore not applicable to applications beyond the Supply Authorities jurisdiction.

(g) During the three year review period, stakeholders are encouraged to document suggestions and amendments with regards to this document. The amendments are to be forwarded to the review committee, who will consider the suggestions and amendments for inclusion in the development of the document as part of the review process.

A-4 SAFETY CODE

(a) The Works will be performed in accordance with applicable safety legislation. Consideration shall be given to The Occupational Health and Safety Act, The Labour Act, Electricity Act and Rules and codes of the ECB (Quality of supply and Quality of service codes). If any discrepancies arise between information provided in this standard, the respective Act or code stated above shall take precedence.

(b) The Contractor will issue all notices and pay all the required fees in respect of the Works to the authorities, and will supply and install all notices and warning signs that are required by the relevant safety legislation. The Supply Authority will be exempt from any losses, claims, costs or expenditures which may arise as a result of the Contractor’s negligence to comply with the applicable safety legislation.

(c) It will be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirements, by law or regulation, which contradicts the requirements of this document, apply or become applicable during the erection of the installation, such requirement, by law or regulation will overrule this Document and the
Contractor will immediately inform the Supply Authority of such a contradiction. Under no circumstances will the Contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Supply Authority.

A-5 TECHNICAL STANDARDS

(a) The technical standards used in this Detail Standards document have been adapted from existing technical standard specifications and codes of practice, in particular those of the South African Bureau of Standards (SABS/SANS), the South African National Rationalization of Standards (NRS), International Electrotechnical Commission (IEC) and British Standards (BS). Where reference is made to any code of practice or standard specification in this document the latest edition or amendment will be applicable.

(b) A list of standard specifications and codes of practices to be used as reference this Detail Standards Document is found in section A-12 of this pre-amble.

(c) All materials and equipment will conform in respect of quality, manufacture, test and performance, with the requirements of the South African National Standards (SANS/SABS) or where no such standard exist, with the relevant current specification of the IEC and NRS or any other standard referenced in this document.

(d) All material and equipment will be suitable for the conditions on site. These conditions will include weather conditions as well as conditions under which materials are installed, stored and used. Should the materials not be suitable for use under temporary site conditions then the Contractor will at his own cost provide suitable protection until these unfavourable site conditions cease to exist.

(e) The Contractor will, where requested to do so, submit samples of equipment and material to the Supply Authority or Consulting Engineer for approval prior to installation. Samples may be retained in the Supply Authority’s possession until the contract is completed after which they will be returned.

A-6 SITE CONDITIONS

(a) Contractors (tenderers) are advised to visit the site and acquaint themselves with all local conditions pertaining to the execution of the Works before tender closing date. No claims from the Contractor which may arise from insufficient knowledge of site access, type of site, labour conditions, establishment space, transport and loading/unloading facilities, power and water supply etc. will be considered after submission of tenders.

(b) For services where prior permission is required before contractors can visit the site, a visit will be arranged for all interested parties.

A-7 ARRANGEMENTS WITH THE SUPPLY AUTHORITY

(a) Consultants shall inform the Supply Authority of any Works to be performed in its area of responsibility. All Works must be designed in accordance with this Standard Specification and should any discrepancies arise, arrange prior approval with the Supply Authority before implementation of a design.
(b) Any Contractor wanting to perform Works in the Supply Authority's area of responsibility shall conform to the regulations of the relevant Supply Authority, in accordance with the applicable regulations and Acts.

A-8 SUPPLY AUTHORITY’S RESPONSIBILITY

(a) If required, the Supply Authority shall provide its assistance during the planning stages for the Works.

(b) The Supply Authority shall be responsible for approving way-leaves and right of admission facilities where needed to cross or enter landowners’ or tenants’ areas.

(c) The Supply Authority shall be responsible for notifying its customers of planned power disruptions for maintenance or construction purposes well in advance.

(d) The Supply Authority shall calculate and inform customers/developers of the fees payable for connection to the grid.

(e) The Supply Authority reserves the right to accept Works as complete only if the relevant certificates and reports from the Engineer and the Contractor are produced and with receipt of proper as-built drawings.

(f) The Supply Authority shall be responsible for the installation and commissioning of electricity meters at customers’ premises.

(g) The Supply Authority shall be responsible for inspection and testing of customers’ installations prior to connection.

A-9 ENGINEER’S RESPONSIBILITY (ENGINEER TO BE REGISTERD AT ECN)

(a) The Engineer Registered at ECN shall be responsible for the design, costing and preparation of drawings and detailed technical specifications to be available for the Contractor to execute the Works.

(b) The Engineer shall make regular inspections as to the requirements of project specifications, of the Works so as to ensure that the Works are performed in accordance with the specifications.

(c) The Engineer shall assist with the setting out of the Works.

(d) The Engineer shall keep the Supply Authority informed of progress on the Works.

(e) The Engineer shall certify the Works as complete once he has satisfied himself that the Works have been performed in accordance with the specification and have been tested and commissioned.

(f) It is the Engineer's responsibility to provide network expansion design specifications to the Supply Authority for approval. Designs must take into account future designs and network expansions, considering the upstream network at all times.
A-10 CONTRACTOR’S RESPONSIBILITY (CONTRACTOR TO CONFORM TO THE REQUIREMENTS OF THE SUPPLY AUTHORITY)

(a) The Contractor shall issue all notices, submit relevant forms and pay the applicable fees for the Works to be performed, in accordance with the relevant regulations.

(b) The Contractor shall set out the works in liaison with the Engineer and perform the Works in accordance with the specifications and drawings.

(c) The Contractor shall notify the Supply Authority in accordance with requirements of the Supply Authority well in advance of any power disruptions to the LV or MV supply to be caused during execution of the Works. All required procedures as stipulated in the Quality of Supply Code shall be adhered to. The Quality of Supply Code shall take precedence in all circumstances.

(d) The Contractor shall be liable for any damages caused by his workmen to existing services during execution of the Works.

(e) It shall be the responsibility of the Contractor to make the necessary arrangements with the Supply Authority and the Engineer to inspect, test and commission the Works to the requirement of the Supply Authority, it shall however stay the responsibility of the Contractor for the complete and successful testing and commissioning of all Works.

(f) The Contractor shall ensure that the site is properly cleaned and made good after completion of the Works.

A-11 DEVELOPER’S RESPONSIBILITY

(a) Developers wanting to develop projects that concern the Supply Authority’s infrastructure shall notify the Supply Authority well in advance of the scope and programme for the planned development.

(b) The developer must, on own cost develop the applicable township’s electrical infrastructure with the appointment of an electrical consulting engineer registered at ECN and who will provide a detailed design for approval by the supply authority. The developer shall also use of a registered electrical contractor under the supervision of an electrical consulting engineer registered at ECN, to the standards of the Supply Authority.

(c) The developer must, where applicable reward the Supply Authority in accordance with approved connection charge policies utilised by the relevant Supply Authority.

A-12 DEFINITION OF METERING POINTS

Define Metering points classified as:
- Residential property
- Business buildings
- Flat Complex (large density accommodation)
- Complex having Prepayment Meters
- Buildings having Conventional Meters
GENERAL INFORMATION

The following Standards and Acts shall take precedence:

- National Electricity Act of Namibia
- Occupational Health and Safety Act of Namibia
- Labour Act of Namibia
- Quality of Service Standard
- Quality of Supply Standard
- NamPower Specifications for the Erection of Overhead Power Lines
- NamPower Specifications and General Conditions for Survey and Route Clearing for New Power Lines

The following Standard shall be used as reference:

NRS 033 : Electricity Distribution – Guidelines for the application design, planning and construction of medium voltage overhead power lines up to and including 33kV, using wooden pole structures and bare conductors.

NRS 034 : Guidelines for the provision of electrical distribution networks in residential areas.

NRS 043 : Code of practice for the joint use of structures for power and telecommunication lines

NRS 059 : Recommendations to minimize problems associated with the theft of transformer neutral and neutral earthing copper conductors

NRS 060 : Code of practice for clearances for electrical systems with rated voltages up to and including 145kV, for the safety of persons

NRS 082 : Recommended maintenance policy for electricity networks

SANS 10280 : Overhead power lines for conditions prevailing in South Africa
OVERHEAD CONDUCTORS

Regional Standards

SANS 182-1: Conductors for overhead electrical Transmission line part 1: Copper wires and stranded copper conductors (metric units)

SANS 182-2: Conductors for overhead electrical Transmission line part 2: Stranded aluminium conductors

SANS 182-3: Conductors for overhead electrical Transmission line part 3: Aluminium conductors, steel reinforced

SANS 182-5: Conductors for overhead electrical Transmission line part 5: Zinc-coated steel wires for conductors and stays.

SANS 1418-1: Aerial bundled conductor system Part 1: Cores

SANS 1418-2: Aerial bundled conductor system Part 2: Assembled insulated conductor bundles

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