Eskom	Standard	Technology

Title: **STEEL GRADES AND WELDING REQUIREMENTS FOR STEELWORK AND OVERHEAD LINE HARDWARE COMPONENTS**

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1. Introduction

This document builds on and replaces the previous standard DSP-34-2051. Whilst all relevant aspects of the latter document have been incorporated into this standard, this revision represents a complete re-compilation of the original standard. This specification has been accepted by the Distribution High Voltage Overhead Powerlines Study Committee for use by Eskom Distribution as a specification for steel grades and welding requirements for overhead powerline structures and hardware components.

2. Supporting clauses

2.1 Scope

This specification provides information on steel grade selection for various sizes, to rule out any discrepancies and to ensure compliance. It also covers the welding requirements used on LV, MV and HV distribution electrical networks.

2.1.1 Purpose

This standard specifies the welding requirements for products manufactured for Eskom Distribution.

2.1.2 Applicability

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

2.2 Normative / informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] AWS D1.1/D1.1M:2020, Structural Welding Code- Steel.

[2] SANS 50025-2:2009, Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels.

[3] EN 1043-1, Destructive Tests on Welds in Metallic Materials Hardness Testing Part 1: Hardness Test on Arc Welded Joints.

[4] EN 1321, Destructive Test on Welds in Metallic Materials. Macroscopic and Microscopic Examination of Welds.

[5] EN ISO 2063-2, Thermal spraying — Zinc, aluminium and their alloys.

[6] EN 895, Destructive Tests on Welds in Metallic Materials - Transverse Tensile Test.

[7] EN ISO 14713-2: Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures — Part 2: Hot dip galvanizing (ISO 14713-2).

[8] EN ISO 148-1, Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1)

[9] SANS 121:2011, Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.

[10] SANS 1431:2007, Weldable structural steels.

[11] SANS 10044-1:2004, Welding Part 1: Glossary of terms.

[12] SANS 10044-2:2004, Welding Part 2: Symbols.

[13] SANS 10162-1:2005, The structural use of steel Part 1: Limit-state design of hot-rolled steelwork.

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[14] SANS 15614-1:2004, Specification and qualification of welding procedures for metallic materials-Welding procedure test Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys.

[15] SANS 2001-CS1:2005, Construction works, Part CS1: Structural steelwork.

[16] The Blue Book: Eighth edition 2007, Structural Steel Tables, chapter 4: Welds and welding.

2.2.2 Informative

[1] 240-75883830, Specification for Steel Pole Overhead Line Supports.

[2] 240-47172520, Standard for the Construction of Overhead Powerlines.

[3] South African Steel Construction Handbook, Eighth Edition 2016, The South African Institute of Steel Construction.

2.3 Definitions

2.3.1 General

Definition	Description
American Welding Society (AWS):	The American Welding Society (AWS) is a professional organization and certifying body in the field of welding and associated processes in the United States.
Arc Welding:	Welding process that uses electric flow to melt and fuse the base metal with filler.
Base metal:	Base metal is the material being welded,
Butt Joint:	A butt joint is a form of weld joint in which two pieces of metal are bonded together along with their edges in a linear fashion, without any overlapping.
Cold Welding:	Cold welding is a welding method that uses pressure on the work area instead of heat, to fuse two metal pieces together.
Cracks:	Cracks in welding are discontinuities or defects in the weld metal or heat-affected zone that can compromise the structural integrity of the welded joint.
Dye Penetrant Testing:	Dye penetrant testing is a non-destructive testing method used to detect surface defects or discontinuities in welds and base metals.
Electrode:	An electrode is a consumable or non-consumable component that conducts electricity and is used to create an arc between itself and the work piece.
Fillet Joint:	A joint where two metals are welded in 90 degrees to create a triangular shape.
Heat-Affected Zone (HAZ):	The heat-affected zone is the portion of the base metal adjacent to the weld where its microstructure and properties have been altered by the heat generated during the welding process.
Non-Destructive Testing (NDT):	Techniques used to perform visual inspections to evaluate a weld's quality without damaging the work piece, for example, X-ray and Ultrasonic.

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Definition	Description
Parent metal:	The parent metal, also known as the base metal, is the primary piece or pieces of material that are being joined together by the welding process.
Radiographic Inspection	Radiographic inspection uses a range of techniques to discover and quantify discontinuities in materials such as cracks, voids, porosity, and inclusions. These approaches can be classified according to how ultrasonic waves are introduced into the material, as well as the specific modes and advanced methodologies employed to improve fault detection and measurement.
Ultrasonic Testing:	A non-destructive testing procedure that uses high-frequency sound waves to identify and assess internal flaws or defects in welds and base metals.
Weld metal:	Weld metal is the filler material used to connect two parts of base metal.
X-ray Inspection:	A non-destructive testing method using X-rays to detect internal defects in welds.

2.3.2 Disclosure classification

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

2.4 Abbreviations

Abbreviation	Description
AWS	American Welding Society
HAZ	Heat Affected Zone
HB	Brinell Hardness
HV	Vicker's Hardness
NDT	Non-Destructive Testing
TCIF	Technology Change Implementation Forum
TEAP	Technical Evaluated and Accepted products.
SAISC	South African Institute of Steel Construction
SANAS	South African National Accreditation System

3. Requirements

3.1 Material specification

Steel used in the fabrication of structural steelwork shall comply with the latest requirements of SANS 50025-2 unless otherwise specified. All imported steel shall undergo a landing test that includes mechanical (tensile, impact, and bending) testing and chemical composition.

3.1.1 Sections and dimensions

Table 1 below indicates sections and dimensions with the associated material grading. All designers and specifiers of steel structures and hardware components shall comply with these latest changes.

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Table 1: Sections and dimensions along with material grading

Sections	Dimensions		Material
1) I & H	All sizes		S355JR
2) Plates	All sizes		S355JR
	Other, 275MPa yield		S275JR
3) Channels	All sizes		S355JR
4) Angles	Equal angles 45x45 and less		S275JR
	Equal angles 50x50 and higher		S355JR
5) Unequal Angles	All sizes		S355JR
6) Flat Bars	90mm wide and less		S275JR
	100mm wide and above		S355JR
7) Rounds	General	40mm diameter and less	S275JR
		30mm diameter and above	S355JR can still be specified
	Steel reinforcements	Straight round bars - R6, R8 and R10	S275JR
		Weld mesh fabric ref. no. 245	S275JR
		Y10-Y40 high tensile steel bars	S450J0
8) T	Cut out of I or H sections		S355JR
9) Compound Girders for Cranes Gantries	All sizes		S355JR
10) Plate Girders	All sizes		S355JR
11) Square Solids	Up to 50mm square		S275JR
	50mm and above		S355JR
12) Lipped Angles, Lipped Channels, Lipped Z and Top Hat Sections	2,5mm thick and less		S275JR
	2,5mm thick and higher		S275JR
13) Circular Hollow Sections, Square Hollow Sections and Rectangular Hollow **Sections**	Hollowed sections made from square or rectangle flat sheet, 2.5mm wall thickness and less		S275JR
	63mm diameter and higher, 2.5mm wall thickness and higher		S355JR

The South African steel grades, Mild steel/commercial steel, 300W and 350WA are not allowed for use in Eskom. The SAISC requires and always emphasizes on use of international steel grades ranging from S185 to E360 for design and construction.

3.2 Material properties

All material grades used to manufacture Eskom products shall be supplied with a material grade certificate/mill test certificate and it shall include but not limited to:

3.2.1 Chemical composition

Chemical composition of all steel grades shall be stated in a mill test certificate and shall comply with the requirements in SANS 50025-2.

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3.2.2 Mechanical properties

3.2.2.1 Tensile properties

If requested at the time of order, tensile strength, yield strength and elongation of steel shall comply with the appropriate requirements given in SANS 50025-2.

3.2.2.2 Impact resistance tests

The impact resistance of steel is determined using the Charpy V-notch impact test in accordance with SANS 50025-2 and shall be specified at the time of order for all steel grades intended for Eskom use. V-notch test pieces shall be machined and prepared in accordance with EN ISO 148-1. In addition, the following requirements shall apply:

a) Flat products and sections:

- For nominal thicknesses > 12 mm, standard 10 mm × 10 mm test pieces shall be machined in such a way that one side is not further away than 2 mm from a rolled surface.
- For nominal thicknesses ≤ 12 mm, when test pieces with reduced widths are used, the largest width possible has to be chosen.
- For nominal thickness < 6 mm no impact tests are required.

b) Bars and rod:

- For nominal diameter ≥ 16 mm (round cross section) or nominal thickness ≥ 12 mm (rectangular cross section), standard 10 mm × 10 mm test pieces shall be machined.
- For nominal diameter < 16 mm (round cross section) or nominal thickness < 12 mm (rectangular cross section) no impact tests are required.

All imported steel shall undergo tensile, impact resistance and bending tests. The JR grade is the most frequently used steel in Eskom, as indicated in Table 1. All imported or locally produced steel intended for Eskom use shall conform to SANS 50025-2, with the minimum impact energy value of 27 J at of 20°C.

3.2.2.3 Bending properties

If specified at the time of order, plate, sheet, strip, wide flats and flats (width < 150 mm) with a nominal thickness ≤ 30 mm shall be suitable for bending without cracking and shall comply to SANS 50025-2. Plate thickness of ≥ 16mm shall be hot bend.

3.2.2.4 Material hardness

SANS 50025-2 specifies chemical analyses, impact resistance tests, bending tests energy and no hardness values. Due to a number of hardware failures experienced in Eskom Distribution business, Eskom reserves the right to request hardness values on critical items from suppliers/manufacturers. Table 2 below indicates typical Hardness values for specific materials.

Table 2: Material Brinell Hardness Values

Steel Grade	Brinell Hardness, HB max
S235	100 - 154
S275	121 -163
S355	146 - 187
S420	143 - 184

Please note that hardness varies for specific materials and thus hardness values shall be used as a non-destructive method to determine if the heat treatment process were properly controlled.

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4. Limit state design

All steelwork shall meet the requirements of SANS 10162-1 with respect to strength of fasteners and welds, strength, stability and resistance to cracking, rupture or unacceptable deformation of the steel in the connection. The quality standard and the fabrication process (including materials, drawings, and erection) shall comply with SANS 2001-CS1.

4.1 Welding

The welding procedure shall comply with clause 5 of SANS 15614-1. Zinc coated steels may be welded satisfactorily by most commonly practised welding techniques. However, closer control of welding parameters is necessary in order to reduce the formation of toxic fumes that are not encountered when welding uncoated steel.

4.1.1 Welding electrodes

All electrode classifications for steel grades shall comply to SANS 50025-2. All these electrodes have a tensile strength in excess of 480 MPa whereas the yield strength differs per electrode.

4.1.2 Minimum sizes for fillet welds

Cracking of a fillet weld due to rapid dissipation of heat into the parent metal can be avoided by placing a lower limit on the weld size (leg length) in relation to the thickness of the thicker part joined. The limits as laid down by AWS D1.1 (America Welding Society) are shown in Table 3. The weld size does not have to exceed the thickness of the thinner part.

Table 3: Minimum sizes for fillet welds

Thickness of thicker part (mm)	Minimum fillet weld size (mm)
Up to 12	5
Over 12 to 20	6
Over 20 to 40	8
Over 40 to 60	10
Over 60 to 150	12

4.2 Compliance with the requirements

4.2.1 General inspection of steelwork during manufacture

At least 2 x sample products of every batch shall be checked for dimensional accuracy and conformity to drawings, to prove that the manufacturing process is working satisfactorily. The two samples shall contain properties of the same form, grade and quality, and of the same thickness range.

4.2.2 Welder qualification

Welders, welding operators and tack welders shall be qualified by a fabricator, steelwork erector or an independent testing agency, in accordance with the provisions of AWS D1.1/D1.1M.

4.2.3 Examination and testing of welds.

Testing includes both non-destructive testing (NDT) and destructive testing which shall be in accordance with the requirements of Table 4. The following table must be read in conjunction with SANS 15614, all references made in this table and its foot notes are comprised in SANS 15614.

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Table 4: Examination and testing of the test pieces

Test piece	Type of test	Extent of testing	Footnote
Butt joint with full penetration - Figure 1 and Figure 2	Visual	100 %	-
	Radiographic or ultrasonic	100 %	a
	Surface crack detection	100 %	b
	Transverse tensile test	2 specimens	-
	Transverse bend test	4 specimens	c
	Impact test	2 sets	d
	Hardness test	required	e
	Macroscopic examination	1 specimen	-
T- joint with full penetration - Figure 3 Branch connection with full penetration - Figure 4	Visual	100 %	f
	Surface crack detection	100 %	b and f
	Ultrasonic or radiographic	100 %	a, f and g
	Hardness test	required	e and f
	Macroscopic examination	2 specimens	f
Fillet welds - Figure 3 and Figure 4	Visual	100 %	f
	Surface crack detection	100 %	b and f
	Hardness test	required	e and f
	Macroscopic examination	2 specimens	f

[a] Ultrasonic testing shall not be used for $t < 8$ mm and not for material groups 8, 10, 41 to 48.

[b] Penetrant testing or magnetic particle testing. For non-magnetic materials, penetrant testing.

[c] For bend tests, see 7.4.3.

[d] 1 set in the weld metal and 1 set in the HAZ for materials $\geq$ 12 mm thick and having specified impact properties. Application standards may require impact testing below 12 mm thick. The testing temperature shall be chosen by the manufacturer with regard to the application or application standard but need not be lower than the parent metal specification. For additional tests see 7.4.5.

[e] Not required for parent metals: -sub-group 1.1, and groups 8, 41 to 48.

[f] Tests as detailed do not provide information on the mechanical properties of the joint. Where these properties are relevant to the application an additional qualification shall also be held e.g. a butt weld qualification.

[g] For outside diameter $\leq$ 50 mm no ultrasonic test is required.

For outside diameter > 50 mm and where it is not technically possible to carry out ultrasonic examination, a radiographic examination shall be carried out provided that the joint configuration will allow meaningful results.

Note: Specific service, material or manufacturing conditions may require more comprehensive testing than is specified by this standard in order to gain more information and to avoid repeating the welding procedure test at a later date just to obtain additional test data.

4.2.4 Non-destructive testing of welds

4.2.4.1 Record of testing

Records of test results shall be kept by the fabricator or steelwork erector.

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4.2.4.2 Visual inspection of welds

All welds on Eskom's structures and hardware components shall be visually inspected in accordance with AWS D1.1/D1.1M, over the full length of the weld before NDT is performed. Any welds which will be rendered inaccessible by subsequent work shall be examined before the loss of access.

A suitably qualified person for visual inspection of welds may be a welding inspector or a welder who can provide evidence of having been trained and assessed for competence in visual inspection of the relevant types of welds.

4.2.4.3 Surface flaw detection

Where a closer examination of a weld surface is required, magnetic particle inspection shall be used in accordance with the recommendations given in AWS D1.1/D1.1M. If magnetic particle inspection is impractical, dye penetrant inspection may be used in accordance with the recommendations given in AWS D1.1/D1.1M.

A suitably qualified person for surface flaw detection of welds may be a welding inspector or a welder who holds a current certificate of competence in surface flaw detection of the relevant types of work, from a nationally recognized authority.

4.2.4.4 Ultrasonic and radiographic examination

Where ultrasonic or radiographic examination is required in terms of the specification data/Technical A and B schedule, it shall be made in accordance with AWS D1.1/D1.1M.

Operators carrying out final ultrasonic or radiographic examination of the weld shall hold a current certificate of competence from a nationally recognized authority.

4.2.5 Destructive testing of welds

The extent of testing shall be as required by Table 4. Destructive testing will be required to test new materials, qualify welding procedures, to perform weld failure analysis and to determine a welder's ability to make a weld with a particular process. Welding destructive tests must be performed by an accredited testing institution, and the results shall be made available to Eskom upon request.

4.2.5.1 Transverse tensile test

Specimens and testing for transverse tensile testing for butt joint shall be in accordance with EN 895.

4.2.5.2 Bend Test

Specimens and testing for bend testing for butt joints shall be in accordance with EN 910.

4.2.5.3 Macroscopic examination

The test specimen shall be prepared and etched in accordance with EN 1321 on one side to clearly reveal the fusion line, the HAZ and the build-up of the runs.

4.2.5.4 Impact testing

Test specimens and testing for impact tests shall be in accordance with SANS 15614 for location of specimens and temperature of testing, and with EN 875 for dimensions and testing.

4.2.5.5 Hardness testing

Vickers hardness testing with a load of HV10 shall be performed in accordance with EN 1043-1.

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5. Heat treatments

Unless otherwise requested by Eskom on critical items, the supplier/manufacturer shall heat treat certain materials found not to comply with the test requirements and or underwent an extensive welding process. The total number of heat treatment cycles permitted on heat treatable materials shall be limited to two. All reasonable precautions shall be taken to avoid undue decarburization of any material by heat treatment.

6. Galvanizing of the product body

All welding procedures shall be performed prior to hot dip galvanizing, sherardizing or thermal spraying. Coatings applied by hot dip galvanizing are designed to protect the iron and steel products against corrosion. Welding residues have to be removed before coating. The use of welding anti-spatter sprays that cannot be removed in the pre-treatment process at the galvanizers' works should be avoided. For this reason, where welding sprays are used, low silicone, water-soluble sprays are recommended. After welding, the surface should be prepared to the standard specified for preparing the steelwork overall before applying the protective coating process. The normal pre-treatments for thermal spraying are usually sufficient for this purpose but extra pre-treatment may be needed for hot dip galvanizing; in particular, weld slag should be removed separately. Some forms of welding leave alkaline deposits behind. These must be removed by blast-cleaning followed by washing with clean water before applying thermally sprayed coatings.

In a high corrosive environment, it is suggested that a high quality, flexible and corrosion inhibiting epoxy such as polyurethane shall be used to top up the galvanising coat. The coating shall be capable of inhibiting corrosion settlement in heavy polluted areas such as coastal regions and mines. All galvanising procedures and tests shall be conducted by a SANAS approved laboratory in accordance with SANS 121. Certificates shall indicate at least five coating thicknesses and the average value.

6.1 Repairing damaged galvanizing coat areas

The total uncoated areas for renovation by the galvanizer shall not exceed 0,5 % of the total surface area of the article. Each uncoated area for renovation shall not exceed 10 cm2. If uncoated areas are larger, the article containing such areas shall be re-galvanized, unless otherwise agreed upon by Eskom.

Galvanising repairs shall be by either:

- a suitable zinc-containing paint with a zinc dust pigment.
- a suitable zinc-containing paint with a lamellar zinc pigment.
- a suitable zinc paste product or zinc alloy stick.
- thermal zinc spraying (see ISO 2063-2), within the practical limits of such systems.

The repair coating on the renovated areas shall be capable of giving sacrificial protection to the steel to which it is applied. The treatment shall include the removal of any scale, cleaning, and any necessary pre-treatment to ensure adhesion. The repair coating thickness on the renovated areas shall have a minimum average thickness of 105 µm unless otherwise agreed because, for example, a different thickness for renovated areas is more compatible with a different surrounding galvanized coating thickness on the article; or when the galvanized surface is to receive an additional coating and the thickness for renovated areas shall be the same as for the galvanized coating.

7. Test facility

The supplier/manufacturer shall ensure that tests conducted outside Eskom, are SANAS approved. Eskom shall not at any stage accept test certificates from an unapproved testing facility.

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8. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Al' Louise Van Deventer	General Manager: Technology and Engineering
Mfundi Songo	Senior Manager: Technology and Engineering
Lucy Sangweni	High Voltage Overhead Lines Study Committee Chairperson
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Thandiwe Nkambule	Asset Creation Senior Manager - Gauteng Cluster
Cynthia Ngomane	Asset Creation Senior Manager - Gemma Cluster
Paul Matiwani	Asset Creation Senior Manager - Cape Coastal Cluster

9. Revisions

Date	Rev	Compiler	Remarks
Feb 2025	2	Lucy Sangweni	Added the following sections: 2.3, 4.2.3, 4.2.5 and 6.1. Updated the following sections: 3.1, 3.2.2.2 and 6. Replaced EN 10025-2:2004 with SANS 50025-2:2009
March 2017	1	N.Henderson	Document reformatted on to new template, with new document number. No content change. This document supersedes document DSP_34-2051
March 2012	1	S Mashaba	This revision combines this specification DSP 34-2051 and the technical bulletin 10TB-033, "Review of material steel grade". They both phase out all South African steel grades. SANS 2001-CS1 added Corrosion spec added
June 2010	0	S Mashaba	Original Document

10. Development team

The following people were involved in the latest revision of this document:

- Lucy Sangweni
- Jacques Calitz
- Leon Christiaans

11. Acknowledgements

Distribution High Voltage Overhead Powerlines Study Committee for their contribution in reviewing this document.

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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: The document was compiled as part of an initiative by the Line hardware committee to develop a specific Eskom welding specification that could outline the design, manufacturing and testing of welded components.

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: Existing standards acts as guidance in this document and thus there is no impact on legal requirements

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: N/A

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: This document will be communicated via Technology Change Implementation Forum (TCIF), comments and voting and eventually be published on the DT website.

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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: 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) TEAP 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: N/A

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

Comment: Yes

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

Comment: Yes. This document existed before pre-qualification of TEAP listed products. This revision does not introduce new technical requirements.

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: No

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: See section 3 of this document.

6) Training or communication

6.1 Is training required?

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

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

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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: Technology Change Implementation Forum (TCIF).

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: N/A

7.2 Are there stock numbers available for the new equipment?

Comment: N/A

7.3 What will be the costs of these special tools, equipment, software?

Comment: N/A

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

…….

…….

Impact assessment completed by:

Name: Lucy Sangweni

Designation: Chief Engineer

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