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TABLES

1. INTRODUCTION

This document provides mandatory requirements for all welding activities on Eskom power plants.

2. SUPPORTING CLAUSES

2.1 SCOPE

The requirements contained in this standard shall apply to all welding activities performed on all Eskom power plants.

2.1.1 Purpose

The purpose of this document is to set out the welding rules and requirements for welding on Eskom power plants.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall use the most recent editions of the documents listed in this section except where specifically stated otherwise.

2.2.1 Normative

[1] Occupational Health and Safety Act 85 of 1993 (OHS-Act)

[2] Pressure Equipment Regulations (PER);

[3] ASME Section I Rules for construction of power boilers;

[4] ASME Section III Rules for construction of nuclear facility components (divisions 1, 2 and 3);

[5] ASME Section VII Recommended guidelines for the care of power boilers;

[6] ASME Section VIII Rules for construction of pressure vessels (divisions 1, 2 and 3);

[7] ASME Section XI Rules for in-service inspection of nuclear power plant components;

[8] ASME Piping Codes: B31.1 – Power Piping, B31.2 – Fuel Gas Piping, B31.3 – Process Piping;

[9] ASME PCC-2: Repair of Pressure Equipment and Piping;

[10] ASME PCC-3: Inspection Planning Using Risk-based Methods;

[11] BS 806: Specification for design and construction of ferrous piping installations for and in connection with land boilers;

[12] PD 5500: Specification for unfired fusion welded pressure vessels;

[13] EN 12952 (All parts) Water-tube boilers and auxiliary installations;

[14] EN 12953 (All parts) Shell boilers;

[15] EN 13445 Unfired pressure vessels;

[16] EN 13480 (All parts) Metallic Industrial Piping;

[17] AWS Structural Welding Codes;

[18] AWS B2.1/B2.1M: Specification for Welding Procedure and Performance Qualification;

[19] EN 16691- Risk Based Inspection Framework;

[20] CWA 15740: Risk-based inspection and maintenance procedures for industry (RIMAP);

[21] RCC-M: Design and construction rules for mechanical components of PWR nuclear standards;

[22] Technical Rules Technical rules for steam boilers (TRD), all sections;

[23] AD-2000 Technical rules for pressure vessels (TRB), all sections;

[24] EN 10052 – Vocabulary of heat treatment terms for ferrous products;

[25] ISO 13916 - Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature;

[26] EN 60584 – Thermocouples;

[27] AWS D10.10/D10.10M – Recommended Practices for Local Heating of Welds in Piping and Tubing;

[28] EN 1011: Welding- Recommendations for welding of metallic materials;

[29] ISO 15607: Specification and qualification of welding procedures for metallic materials - General rules;

[30] ISO/TR 15608: Welding – Guidelines for a metallic material grouping system;

[31] ISO 15609: Specification and qualification of welding procedures for metallic materials;

[32] ISO 15610: Specification and qualification of welding procedures for metallic materials. Qualification based on tested welding consumables;

[33] ISO 15611: Specification and qualification of welding procedures for metallic materials. Qualification based on previous welding experience;

[34] ISO 15612: Specification and qualification of welding procedures for metallic materials. Qualification by adoption of a standard welding procedure;

[35] ISO 15613: Specification and qualification of welding procedures for metallic materials Qualification based on pre-production welding test;

[36] ISO 15614 Specification and qualification of welding procedures for metallic materials;

[37] ISO 5817: Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections;

[38] ISO 17663: Welding – Quality requirements for heat treatment in connection with welding and allied processes;

[39] ISO 14731: Welding co-ordination. Tasks and responsibilities;

[40] EN 14732: Welding personnel. Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials;

[41] ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories;

[42] ISO 9606: Approval testing of welders;

[43] ISO 3834: Quality requirements for Welding;

[44] ISO 14175: Welding Consumables – Gases and Gas Mixtures for Fusion Welding and Allied Processes;

[45] BS EN 12814: Testing of welded joints of thermoplastics semi-finished products;

[46] PD/CEN/TS 16892: Plastics. Welding of thermoplastics. Specification of welding procedures;

[47] BS EN 13067: Plastics welding personnel. Qualification of welders. Thermoplastics welded assemblies;

[48] PD CEN/TR 16862: Plastics welding supervisor. Task, responsibilities, knowledge, skills and competence;

[49] BS EN ISO 6947 Welding and allied processes. Welding positions;

NATIONAL STANDARDS

N/A

ESKOM STANDARDS

[50] 240-83539994 Standard for Non- Destructive Testing (NDT) on Eskom Plant.

[51] 240-72273656 Power generation asset critical classification standard.

[52] 240-105658000 Supplier Quality Management Specification.

2.2.2 Informative References

N/A

2.3 DEFINITIONS

N/A

2.3.1 Disclosure classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
AIA	Approved Inspection Authority
AWS	American Welding Society
ECSA	Engineering Council of South Africa
FCAW	Flux Core Arc Welding
GMAW	Gas Metal Arc Welding
HSLA	High-strength low-alloy
IIW	International Institute of Welding
IWE	International Welding Engineer registered with IIW
IWP	International Welding Practitioner registered with IIW
IWS	International Welding Specialist registered with IIW
IWT	International Welding Technologist registered with IIW

Abbreviation	Description
MMA	Manual Metal Arc
NDT	Non-Destructive Testing
PQR	Procedure Qualification Record
PWHT	Post Weld Heat Treatment
Q&T	Quenched and Tempered
SAIW	Southern African Institute of Welding
SAQA	South African Qualification Authority
SAW	Submerged Arc Welding
TIG	Tungsten Inert Gas
WPQR	Welding Procedure Qualification Record
WPS	Welding Procedure Specification
WQR	Welder Qualification Record

2.5 ROLES AND RESPONSIBILITIES

The System Engineer at the power station responsible for plant to be welded shall ensure compliance to this Standard.

2.6 PROCESS FOR MONITORING

Eskom Welding Care Group shall conduct periodic technical assessments to ensure compliance to these requirements.

3. GENERAL REQUIREMENT

3.1 TECHNICAL REQUIREMENTS

Eskom fossil-fired steam generators (steam boilers) designed to BS 1113 and TRD shall use EN ISO 12952:2012, EN ISO 13480:2012 or EN ISO 13445:2014 design code/s to carry out in -service repairs and modifications.

3.2 CODES, STANDARDS AND SPECIFICATIONS REQUIREMENTS

Welding procedure qualification for welds shall be in accordance with the appropriate welding standard incorporated into the relevant design and construction code. Combination or mixing of different health and safety standards (codes) on the same equipment/system shall not be permitted.

Where design codes indicate the welding code to be BS EN 15614-1, qualification shall be as per the requirements of BS EN 15614-1 level 2.

Heat treatment during procedure qualification shall simulate the actual production post weld heat treatment; for instance, where production heat treatment is (to be) performed following local post weld heat treatment procedures, the welding procedure shall be qualified using local post weld heat treatment.

A WPS supported by a valid WPQR/PQR shall be required for all welding work on Eskom plant. The WPQR/PQR shall be approved by a manufacturer's registered IWE or IWT with minimum qualifications as defined in section 8 below. Eskom shall reserve the right to review a WPS, WPQR/PQR and associated weld maps prior to commencement of fabrication.

Mechanical tests conducted during welding procedure qualifications shall be performed at an accredited mechanical test laboratory conforming to the requirements of ISO/IEC 17025.

Welding and testing (destructive and non-destructive) of the test pieces shall be witnessed by an AIA or Notified Body.

Proximity of welds shall comply with the applicable health and safety standards and/or engineering specification, taking into account the requirements for non-destructive testing, in particular requirements for complete coverage of each weld requiring volumetric inspection by ultrasonic testing.

[1]The maximum hardness limit during welding procedure qualification for the materials listed below shall be 300 HV_{10}.

- 7CrMoVTiB10-10 (P/T24);
- 7CrWVMoNb9-6 (P/T23);
- X20CrMoV11-1;
- X10CrMoVNb9-1 (P/T91);
- X10CrWMoVNb9-2 (P/T92);
- VM12-SHC.

[1] Applicable to new WPQR/PQR that were qualified after the publication of the standard for welding on Eskom plant (240-106628253 Revision1). Any WPQR/PQR qualified prior to the publication is exempted from this requirement.

3.3 WELD BUILD-UP

Weld build-ups for pressure boundary thickness restoration shall not be permitted. Weld build-ups for dimensional restoration of sealing faces on flanges, casings, valve seats and trims, hard-facing overlays is permitted.

3.4 HARDFACING OF VALVES

For improving the properties of the base metal through application of a hardfacing weldment, the following requirements apply:

Production Post-Weld Testing: Once the hardfacing weld is completed and the component is machined to its semi-final dimensions, both *hardness testing* (spark test) and *chemical composition verification* (PMI) shall be carried out to confirm that the required material properties as specified by the hardfacing filler material technical data sheet have been achieved.

3.5 WELDER AND WELDING OPERATOR QUALIFICATION

Welders and welding operators shall be qualified in accordance with the requirements of the latest applicable construction code or engineering specification relevant to the plant.

3.6 INSPECTION AND NON-DESTRUCTIVE TESTING (NDT)

NDT on welds shall be performed according to the requirements of the relevant health and safety standards, applicable engineering or product specifications and 240-83539994 (Standard for Non-Destructive Testing on Eskom Plant). The manufacturer or repairer and the Authorised Inspection Authority (AIA) shall not be permitted to conduct NDT on their own work during manufacturing.

3.7 WELDING CONSUMABLES CONTROL

Consumables requiring strict control of and protection from moisture shall be stored in a clean and dry atmosphere at a minimum temperature of 80°C. Consumables not used during any shift shall be returned to the consumable storage area for re-baking as per the maximum allowable re-baking works procedure.

All consumables showing signs of damage to coatings, rust or contamination by any carbonaceous (paint, oil, polymers etc.) substance shall be promptly removed from storage or circulation and properly disposed of. There shall be no mixing of different class/grade of consumables in one container.

4. SPECIFIC REQUIRMENTS FOR WELDING ON HIGH PRESSURE AND TEMPERATURE TUBE AND PIPEWORK

4.1 WELDING CONSUMABLES

Welding consumables for use in the creep range shall comply with the applicable consumable standard for creep resistant steels. For commonly used welding processes the following standards are normally applicable:

- MMA: ISO 3580 **OR** AWS A5.5M.
- SAW wire: ISO 24598 **OR** AWS A5.23M/A5.17M.
- SAW flux: ISO 14174 **OR** AWS A5.23M/A5.17M.
- TIG: ISO 21952 **OR** AWS A5.28M.

- GMAW: ISO 14343 **OR** AWS A5.28M.
- FCAW ISO 17634 **OR** AWS A5.36M.

4.2 THERMAL CUTTING

Where thermal cutting by plasma arc or by the oxy-fuel technique is required for these materials:

- 14MoV6-3 (660);
- 15NiCuMoNb5-6-4 (WB 36);
- 7CrMoVTiB10-10 (T/P24);
- 7CrWVMoNb9-6 (T/P23);
- X20CrMoV11-1;
- X10CrMoVNb9-1 (T/P91);
- X10CrWMoVNb9-2 (T/P92) and
- VM12-SHC;

the procedure specifying the following minimum critical parameters shall be submitted to Eskom for approval:

- Pre-heat temperature
- Cutting travel speed,
- Process gas type,
- Type of flame: neutral, oxidising or reducing
- Gas pressure
- Gas supply rate
- In the case of plasma cutting: the voltage and amperage settings.

4.3 GAS PREHEATING

Preheating by gas shall be permitted under the following conditions:

- Only propane or butane or mixtures thereof shall be permitted as fuel gas on ring burners or torches of the “rosebud” type.
- When temperature indicating crayons are used, at least three ranges shall be employed while heating to give progressive warning as the correct temperature is approached.

4.4 WELD REPAIRS

4.4.1 REMOVAL OF DEFECTS

- All gouged surfaces of welds, prior to repair, shall have a minimum of 2 mm of metal ground out in order to ensure complete removal of any oxidised material before re-welding commences.
- Carbon arc air gouging shall not be permitted on; 310Si; 14MoV6-3 (660); X20CrMoV11-1; X10CrMoVNb9-1 (P91); X10CrWMoVNb9-2 (P92); 7CrWVMoNb9-6 (T/P23); 7CrMoVTiB10-10 (T/P24); and VM12-SHC materials. On all other materials, an appropriate preheat shall be used if carbon arc air gouging is to be carried out.

- The excavated area shall be subjected to suitable surface examination to ensure complete removal of the defect. A test record attesting to this shall be generated for piping and header components.

4.4.2 WELD REPAIRS

- The repaired areas shall be re-examined using the same inspection procedures by which the defects were originally detected.
- Repair after PWHT shall not be permitted.
- Weld repairs shall be appropriately mapped on the relevant drawings for all components except for tubes.

5. SPECIFIC REQUIRMENTS FOR WELDING PRIMARY AIR, INDUCED AND FORCED DRAUGHT FANS

5.1 REMOVAL OF WEAR PLATES AND LINERS

Removal of the liners with the fan in-situ is not generally recommended other than in the exceptional circumstances where an individual wear plate or liner needs replacement, in which case the following shall be observed:

- Prior to any preheating being applied for gouging or welding purposes, a small hole of 3 mm diameter must be drilled near the blade trailing edge weld (minimum 20 mm from the weld). The hole must enter the air space between the blade plates. All holes shall be closed by welding after completion of the work.
- Preheating before gouging or welding is essential and must conform to the applicable WPS.
- Liners to liner welds may be removed by argon arc air gouging. All other liner to fan impeller welds shall be removed by abrasive grinding where practically possible.
- Once all the required wear plates are removed, the previously welded areas shall be ground to a smooth profile.
- 100% MPI inspection shall be carried out on all the ground areas as well as the adjacent material

5.2 INSPECTION OF WELDMENTS

Final inspection of welds on HSLA and Q&T steels shall be delayed and performed at least 48 hours after cooling down from welding and PWHT unless section 5.3 stated below is followed. The time between completing the weld or PWHT (if applicable) and performing final inspection shall be as long as possible within the time constraints of the outage. Delayed inspection on the HSLA and Q&T steels shall be performed as per table below.

Table 1: Delayed inspection on the HSLA and Q&T steels

(A) only applicable to WT<= 50mm	(B)
BS 1501 151 430A	EN 10025 Grade: S550 QL
EN 10025 S355 JR	EN 10025 Grade: S690 QL
CORTEN or CORTEN A	EN 10025 ROQ-tuff: AM 700
BS 4360-43A	EN 10137 ROQ-tuff: AD690
BS 970 070 M20	EN 10025 Weldox: 700E
EN 3A	
EN 10025 S460QL	
316 L Stainless Steel	

- If a material in column (A) is welded to itself or to any other material in column (A) there is no need for waiting period and NDT on the weldment can be conducted immediately after it has cooled down.
- If a material in column (B) is welded to itself or repair welded or welded to a material in column (A) then delayed inspection of 48 hours before NDT is required unless section 5.3 below is followed.

5.3 WELDING OF BALANCING WEIGHT TO THE SIDE PLATE WHERE DELAYED INSPECTION IS (TO BE) WAIVED

For preheating and bake-out heat treatment, resistance heating mats shall be applied. A gas heating technique may be considered for applications where resistance heating methods are found to be impractical.

A pre-weld hydrogen bake-out shall be performed in the area of welding, using heating pads (covered with insulation material) to a temperature of between 200ºC and 250 ºC and a dwell time of 3 hours.

100% MPI inspection must be carried out after welding and/or PHWT where applicable.

Where the WPS does not require PWHT the following conditions shall also apply:

- Stringer bead welds shall be applied when using the high/upper end of the permitted heat input range as specified in the WPS.
- Only SMAW and/or GTAW welding process shall be allowed. A minimum of two weld layers shall be required to fill the butt weld or complete a fillet weld to provide for some tempering on the first layer by the subsequent layer.
- A post-weld hydrogen bake-out shall be performed in the area of welding, using heating pads (covered with insulation material) to a temperature of between 200ºC and 250 ºC and a dwell time of 3 hours.

6. HEAT TREATMENT OF WELDED COMPONENTS

6.1 PREHEAT AND INTERPASS TEMPERATURE

When temperature indicating crayons are used for measuring preheat and interpass temperatures, crayons rated for both minimum preheat and maximum interpass temperatures shall be used.

The measured preheat, interpass and preheat maintenance temperatures shall be recorded as part of the final report that shall be included in the data book.

6.2 HEATING AND COOLING RATES DURING LOCAL PWHT

For local post weld heat treatment, maximum heating and cooling rates for temperatures ≥300°C shall be as indicated below:

- 220 °C/h – for component thicknesses *e* ≤ 25 mm;
- 5 500/*e* °C/h – for component thicknesses within the range 25 mm < *e* ≤ 100 mm;
- 55 °C/h – for component thicknesses *e* > 100 mm.

Where *e* is the components thickness in *mm*

When welding is performed on material that has exceeded its creep design life, post-weld heat treatment parameters (in particular the heating and cooling rates) shall be specified having regard to the material condition and component configuration in accordance with international best practice to ensure that the integrity of the final welded component is not impaired.

6.3 POST WELD HEAT TREATMENT

Post weld heat treatment procedures shall be demonstrated to be adequate for the component geometry in production.

Production heat treatment cycles and/or cumulative heat treatment soaking times shall be limited to the number of heat treatment cycles and/or cumulative heat treatment soaking times simulated during the welding procedure qualification test (refer to the figure below for illustration). When full mechanical testing in accordance with code requirements has been performed for each cycle, each cycle may be considered as a stand-alone production cycle.

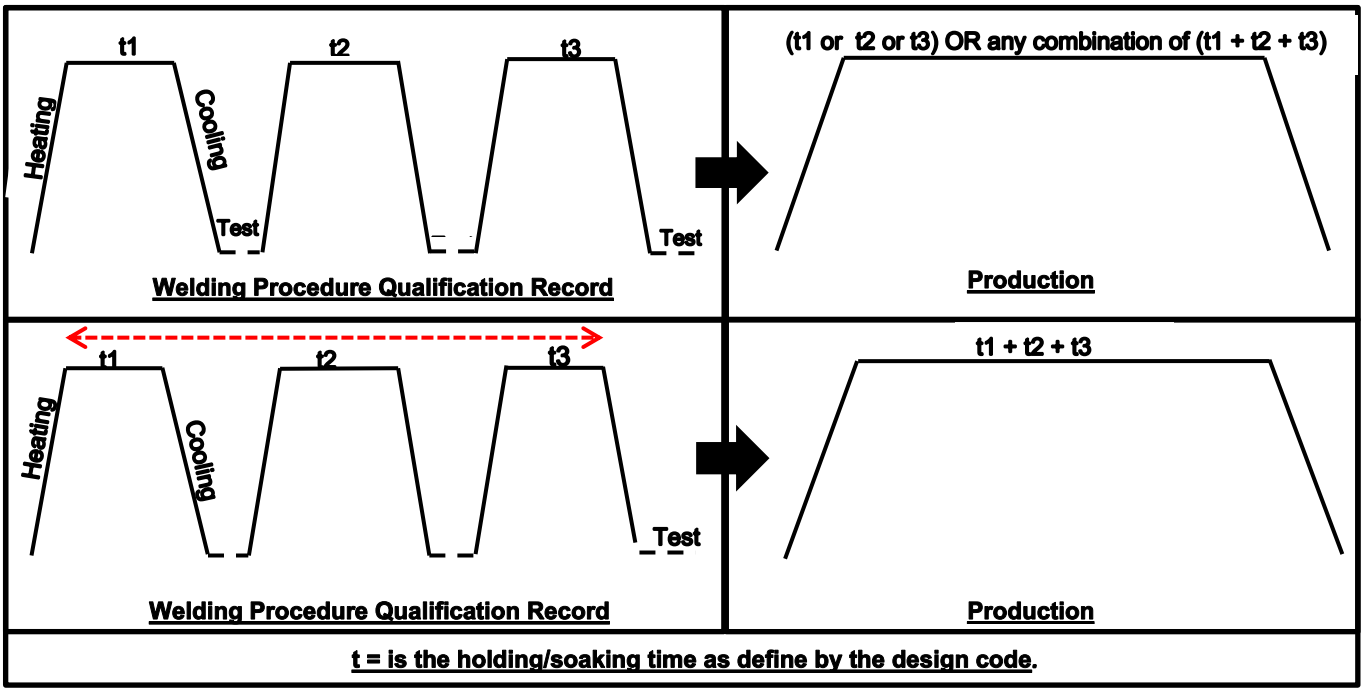

Figure 1: Soaking Times Simulated During the Welding Procedure Qualification Test

Prior to PWHT, welded joints involving ferritic/martensitic steel grades [such as X20CrMoV11-1; X10CrMoVNb9-1 (T/P91); X10CrWMoVNb9-2 (T/P92) and VM12-SHC] shall be cooled down from interpass temperature to a temperature below 80°C, over the full thickness of the component to allow for complete martensitic transformation of the microstructure.

6.4 INTERRUPTION DURING POST WELD HEAT TREATMENT

When heat treatment is interrupted during heating, the heat treatment shall be restarted (as per the heat treatment procedure) from any temperature and heating rate in accordance with the applicable codes and Section 6.2 of this standard.

When heat treatment interruption occurs during soaking, the remaining soaking time as per the heat treatment procedure shall be implemented upon resumption of the heat treatment from a temperature and rate appropriate for the component. Where there is reasonable technical justification for exemption against this requirement, a written motivation shall be submitted to the Eskom-appointed welding coordinator for evaluation and approval.

NOTE: *If the interruption violates the specified cooling rates, the incident shall be reported to the Eskom-appointed Welding Coordinator for resolution.*

In the event of heat treatment interruption during cooling, the heat treatment shall be considered completed unless the interruption violates the cooling rates specified in Section 6.2 above, in which case the incident shall be reported to the Eskom-appointed Welding Coordinator for resolution.

7. WELD REPAIR RATE CALCULATIONS

7.1 WELD REJECT RATE (WRR) CALCULATIONS METHODOLOGY

The purpose of this is to ensure that a uniform, fair and transparent process is followed in accounting for the calculation of “Weld Reject Rate” (WRR).

It is important to note that the results of this calculation methodology indicate the overall quality performance of the manufacturer and is not the performance of the welder. This is due to the inclusion of other performance measurement areas, e.g. poor workmanship, misalignment and incorrect fitment.

This calculation methodology is for use only on small bore piping, i.e. ≤88.9mm outside diameter. Eskom has decided not to use this methodology or any other calculation methodology to determine the weld reject rate on large bore piping.

Calculation of Weld Reject Rate:

$$WRR = \frac{\textbf{Total Number of Welds Rejected by NDT}}{\textbf{Total Number of Welds Tested or Examined by NDT}}$$

Where: Total Number of Welds Rejected by NDT is simply a count of the number of welds that have been rejected by the appropriately qualified level 2 volumetric testing interpreter. The following clarifications apply:

- The acceptance criteria are as per the applicable Health and Safety Standards
- Exclusion of “snag welds” for WRR is prohibited.
- If a weld has been rejected, then it is counted as a reject and the repair strategy – local repair or cut off is of no significance in the calculation.
- The manufacturer may appoint a qualified person to observe the NDT activities undertaken by the NDT service provider and have access to inspection reports as and when required, for their information. This will however be at no additional cost to Eskom.

- In the event of a questionable interpretation by the appointed level 2 volumetric testing technician the manufacturer has the option to firstly escalate the matter to the relevant Site Service Manager of the NDT service provider for review. If there is no agreement, the manufacturer can then further escalate to the Eskom level 3 for final interpretation. The decision of the Eskom level 3 is final and binding for all parties.
- Any challenges shall be concluded with all the associated parties, before beginning with repairs. Once the weld has been cut no further challenges will be considered in retrospect.
- The volumetric orientation shall at all times be clearly marked on the tube and the follow up weld examination must be executed from exactly the same orientation as the original. In the event that a local repair fails to remove the original defect due to an error in the orientation and the weld is again rejected due to the presence of the same defect (fault on the side of the NDT service provider can be proven) then the calculation of the WRR will be adjusted to exclude the repair weld as a second reject and therefore consider it an acceptable weld.
- Should a weld reject be identified incorrectly and repairs carried out on the wrong tube due to no fault on the part of the repair manufacturer, the calculation of the WRR will be adjusted to exclude the weld as a reject and consider it an acceptable weld. However, if the subsequent weld is tested/examined and rejected, it will then be included in the WRR calculation.
- Any additional butt welds that may be required in order to execute the repair of a rejected weld will not be counted as weld rejects; however it will be included in the WRR calculation. Should there be rejects on any weld associated with such a repair, such weld rejects will however be included in the count of “Total welds Rejected”.
- “Repairs related to poor workmanship”. This refers to any additional butt welds that might be required in order to correct poor workmanship other than weld defects such as incorrect fitment, incorrect tube diameters, tubes bent due to rigging, tubes misaligned within the element, incorrect pitch between tubes, nick marks, arc strikes, etc. Such repairs might require the cutting of butt weld or butt welds that have been welded during the outage and have already been subject to volumetric inspection and accepted. A good example of such would be a tube that has been installed with the incorrect pitch between tubes. Such weld/welds will not be classified as weld rejects for purposes of the WRR calculation. Once repairs have been executed such welds will follow the standard process outlined above. That is, they will subsequently be volumetrically examined and should any of these welds be rejected, such rejects will be included in the calculation of the WRR as additional weld rejects.

Where: Total Number of Welds Tested/Examined by NDT is simply the sum of all welds tested or examined by appropriate NDT. The following clarifications apply:

- Should the first weld at a given location be examined or tested a single count will apply.
- Should this weld examination require weld reshoot for any reason (information shot or unacceptable volumetric testing image quality) this reshoot will not be counted as an additional “weld examination” since it is just another version of the same weld.
- Should a weld at a given location be rejected, require repair (single or multiple times), the count of the “Total welds tested/examined” will escalate by the number of times the weld failed. Cases to illustrate this:
    - **Case 1**: A single cutting instruction is issued with one butt weld to be done, and that butt weld is completed, examined and rejected. It is subsequently cut and re-welded, examined again and passes. The WRR is then equal to 1 reject / the 2 welds that were examined = 50%.
    - **Case 2**: Taking this example a step further, should the first repair again be rejected and passes on round three, then the repair rate is equal to 2 rejects / the 3 welds that were examined which is equal to 67%.

This means WRR should never be more than 100%.

8. QUALIFICATION AND ACCREDITATION REQUIREMENTS FOR PERSONNEL AND ENTITIES PERFORMING WELDING RELATED WORK ON ESKOM PLANT

8.1 WELDERS

Welders and welding operators working on Eskom plant shall be qualified in accordance with the latest applicable health and safety standard.

8.2 WELDING COORDINATOR

Welding coordinators shall have one of the following minimum requirements for education, examination and qualification:

- International Welding Engineer (IWE) in line with IIW requirements.
- International Welding Technologist (IWT) in line with IIW requirements.

In addition, the Welding Engineer/Technologist shall be registered with ECSA as Professional Engineer/Technologist. Registration with other professional bodies shall be subject to approval by the Eskom Welding Care group.

8.3 WELDING SUPERVISOR

Welding supervisors shall have at least one of the following minimum requirements for education, examination and qualification:

- International Welding Specialist (IWS) in line with IIW requirements.
- International Welding Practitioner (IWP) in line with IIW requirements.

8.4 WELDING INSPECTOR

Welding inspectors shall have at least one of the following minimum requirements for education, examination and qualification.

Minimum requirements for welding inspection on Eskom level 1 and 2 plant:

- SAIW Welding and Fabrication Inspector Level 2.
- IIW International Welding Inspector: Comprehensive (IWI- C)
- IIW International Welding Inspector: Standard (IWI- S)

Minimum requirements for welding inspection on Eskom level 3 plant:

- SAIW Welding and Fabrication Inspector Level I.
- IIW International Welding Inspector: Basic (IWI- B)

8.5 ACCREDITATION OF COMPANIES PERFORMING WELDING ON ESKOM PLANT

All companies performing welding related activities on Eskom plant shall have accreditation to ISO 3834 as per Table 2. The Eskom plant level classification shall be classified in accordance with 240-72273656 Power generation asset critical classification standard.

Table 2: Accreditation to ISO 3834

Equipment Group	Minimum Quality Level	Type
Eskom Plant Level 1	IS0 3834 Part 2	Comprehensive
Eskom Plant Level 2 and 3	IS0 3834 Part 3	Standard

9. RECORDS AND DATA PACKAGES

Records pertaining to any manufacture, repairs or modifications shall be compiled as per the requirements of 240-105658000, Supplier Quality Management Specification.

10. AUTHORISATION

This document has been seen and accepted by:

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Jaco Van Zyl	Senior Engineer- Turbine Peaking Generation
Samu Seleke	Generation Engineering Documentation Controller

11. REVISIONS

Date	Rev.	Compiler	Remarks
Jul 2016	0	P. Dlamini	First Draft for Internal Review and comments
Aug 2016	0.1	P. Dlamini	Final Draft for Formal Comments Review Process
Sep 2016	1	P. Dlamini	Final Document for Authorisation and Publication
Feb 2020	1.0	M. Mogale	First Draft for Internal Review and comments
Jun 2020	1.1	M. Mogale	Final Draft for Formal Comments Review Process
Jul 2020	1.2	M. Mogale	Final Draft after Comments Review Process
Jul 2020	2	M. Mogale	Final Rev 2 Document for Authorisation and Publication
Jul 2025	2.1	M. Mogale	First Draft for Comments Review Process
Aug 2025	2.2	M. Maroga	Second Draft after Comments Review Process
Aug 2025	2.3	M. Maroga	Final Draft after Comments Review Process
Aug 2025	3	M. Maroga	Final Rev 3 Document for Authorisation and Publication

12. DEVELOPMENT TEAM

The following people were involved in the development of this document:

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- Morongwa Mogale