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## 1. Outline

### Microniser Steam Ring Repair

The purpose of this Repair Scope of Work is to outline the minimum acceptable requirements for the overhaul of all Microniser Steam Rings from Tiwest Joint Venture.

All repairs are to be completed in accordance with drawings and technical specifications referenced in this Scope of Work without exception.

All repair quotes and report documents are to be completed as per the requirements of this document and returned to the Tiwest Repair & Maintenance Inspector responsible for the equipment whilst being repaired.

## 2. Nomenclature

For the purpose of this Standard Repair Specification, the following Definitions shall apply:  
For the purpose of this Standard Repair Specification, the following Definitions shall apply:

'Tiwest'	Means Tiwest Joint Venture.
'Work'	Means all things required of the Contractor under the Contract, including any Approved Variations.
'Vendor'	Means the persons or body corporate that has undertaken to carry out the work, and includes the Vendors/Contractor's permitted assigns, successors, legal representatives, and Sub – Contractors.
'TRMI'	Means Tiwest Repair & Maintenance Inspector.
'Shall'	Compulsory
'May'	Optional
'SSR'	Strip and Survey Report – report detailing the findings from the initial stripping of a piece of equipment.
'RCR'	Repair Closing Report – report detailing measurements and testing following the repair of a piece of equipment.
'RQ''	Repair quote; itemised list of labor, materials and services with costs, required to complete the agreed scope of work.
'RSOW'	Repair Scope of Work; requirements that the work shall be complete to
'ASNZ'	Australian and New Zealand Standard(s)
'ANSI''	American National Standards Institute
'ISO''	International Standards Organisation

### **3. Scope of Work**

Detailed in this section is a breakdown of the required works that shall be followed unless otherwise requested from the TRMI. All costing including labor and material as a minimum shall be itemized against the individual section summarised below.

#### **3.1 Work Process**

3.1.1 The Inspection and Test Plan will be adhered to at all times. Sample in Appendix "A".

#### **3.2 Inspection**

##### **3.2.1 *Initial Visual Inspection***

- 3.2.2 Inspection & Test Plan
- 3.2.3 Remove all pipe plugs
- 3.2.4 Remove all steam jets
- 3.2.5 Remove the wear ring
- 3.2.6 Visual inspection of the steam ring
- 3.2.7 100% Sweep Blast
- 3.2.8 NDT – Magnetic Particle Inspection
- 3.2.9 Dimensional Inspection
- 3.2.10 Gasket face inspection
- 3.2.11 Compile a Strip and Survey Report.

#### **3.3 Steam Ring Repair – Mechanical Work**

- 3.3.1 Replace the wear ring
- 3.3.2 Install Steam Jets
- 3.3.3 Establish Gasket Face
- 3.3.4 Apply HVOF Spray
- 3.3.5 Reinstate Steam Inlet Flange
- 3.3.6 Identification
- 3.3.7 Work Excluded
- 3.3.8 Preservation & Packaging
- 3.3.9 Final Inspection
- 3.3.10 MDR

## 4. Strip, Access and Quote

The Steam Ring shall be fully stripped to allow the condition of all components to be assessed. All findings shall be documented in the Strip and Survey Report (SSR). The following is an outline of the requirements for Strip, Survey and Quote:

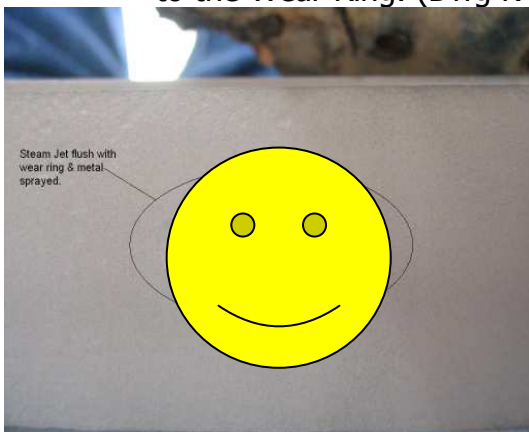
### 4.1 Strip and Access

4.1.1 The vendor shall take photographs of the Steam Ring to capture the "as removed" service condition. Capture the condition of the microniser steam ring throughout the inspection / survey process.

4.1.1.1 Photographs taken shall be of sufficient quality to assure that any discrepancy is clearly seen. This may require an overall view and then detail views to highlight the discrepancy such that no question may arise in further reviews, even if the discrepancy has been removed or repaired. It is recommended a digital camera be used.

4.1.1.2 Sufficient quantities of photographs shall be taken so that the repair shop and Tiwest may have their own copies as a minimum. Photographs shall have an explanation of the photograph either on or adjacent to the photograph.

4.1.2 Carry out a visual inspection of the Steam Ring. Pay particular attention to the Wear Ring. (Dwg K-29299) around the Steam Nozzle area.



Wear ring in a good serviceable condition



Typical wear pattern of a Wear Ring that has been in service.



Typical wear of the jet ring due to complete failure of the Wear Ring.

4.1.3 Remove all xxx of xxxx" pipe plugs. Visually inspect the threaded socket for damaged threads.



Picture of socket showing threads.

4.1.4 Remove all xx off Steam Jets. Item 3 of drawing K-29501. Retain for further inspection.

4.1.5 Remove the Steam Ring Wear Ring. Drawing K-29299. Retain for further inspection.

4.1.6 Visually inspect the steam jet ring (item 2 Dwg K-29501) after removal of the wear ring. Look for evidence of erosion. If erosion exists then weld repair of the steam jet ring may be required. Consider distortion of the steam ring and steam jet holes when determining the amount of weld which is to be deposited. If the erosion is too excessive cease any further inspection of the Steam Ring. Liaise with a Tiwest Repair & Maintenance Inspector.



Steam Ring with the Wear Ring removed showing the eroded Steam Jet Ring

4.1.7 100% Sweep (brush) Blast (AS1627.4 Appendix D) the Steam Ring welds. Protect the bore, steam jet holes and gasket faces.

4.1.8 Carry out 100% Magnetic Particle Inspection of all fabrication welds.

4.1.9 Dimensionally inspect the Steam Ring in way of;

4.1.9.1 Inside diameter, xxxx +0.00 / 0.xx mm

4.1.9.2 xx off Steam Jet Holes, xx mm +0.00 / 0.0xx mm

4.1.9.3 Top & Bottom Dome location diameter, xx m

4.1.9.4 Height between gasket surfaces, xx mm

4.1.9.5 Record all dimensions on the survey sheet.

4.1.10 Visually inspect the Steam Ring gasket face contact surface. Surface finish is to comply with AS2129, section 4.3.2. Record all finding on the survey sheet.

4.1.11 Visually inspect the Steam Inlet Flange gasket face contact surfaces. Surface finish is to comply with AS2129, section 4.3.2.

4.1.12 Compile an Opening Strip and Survey Report. Following certain failures the TRMI may request that an in-depth failure report be completed – the requirements of this will be communicated on a case by case basis

## 4.2 Quoting

Following the strip and assess the Opening Survey Report and Tiwest Quote Sheet shall be completed and submitted to the TRMI. Should this process require more then 10 working days to complete, the repairer should notify the TRMI of the impending delay.

Every Tiwest Quote Sheet shall have the following detail:

- Tiwest equipment number (as applicable)
- Repair purchase order number
- Tiwest work order number
- Rotable number / serial number
- Description of the Steam Ring
- Date of quote issue
- Lead time for repair; from receipt of approval
- Name of person who prepared the quote
- Vendor job number

All quotes shall have all individual labor and material cost itemised clearly

All quotes shall be submitted to the TRMI electronically or via fax. Email of the quote to the TRMI is the preferred method. It is at the vendors discretion as to the file format in which the quote is prepared and submitted (Excel, Word, PDF, or other) however email text format is not acceptable (quote needs to be in the form of a separate document). The file name of all electronic quotes shall have the Repair Purchase Order as the prefix, RQ\*\*\*\*.

Please see Section 9.1 for further details on the repairing requirements

## 5. Repair

The repair of all Microniser Steam Rings shall be in adherence to the following requirements:

### 5.1 Steam Ring – machining / welding

5.1.1 Any machining works are considered a variance to the standard repair and as such section 10 "Standard Variances to repair" shall be complied to.

5.1.2 In the case of Jet Ring replacement, any work is considered a variance to the standard repair scope and as such section 10 "Standard Variances to repair" shall be complied to.

5.1.3 Install case of Steam Ring welding , any welding is considered a variance to the standard repair scope and as such section 10 "Standard Variances to repair" shall be complied to.

## 6. Assembly

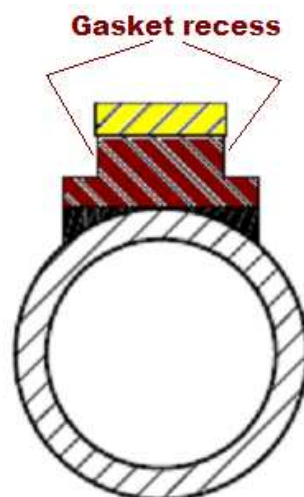
6.1.1 All new components are to be used. Steam Jets, Wear Ring

6.1.2 Replace the Steam Ring Wear Ring. Drawing K-29299.

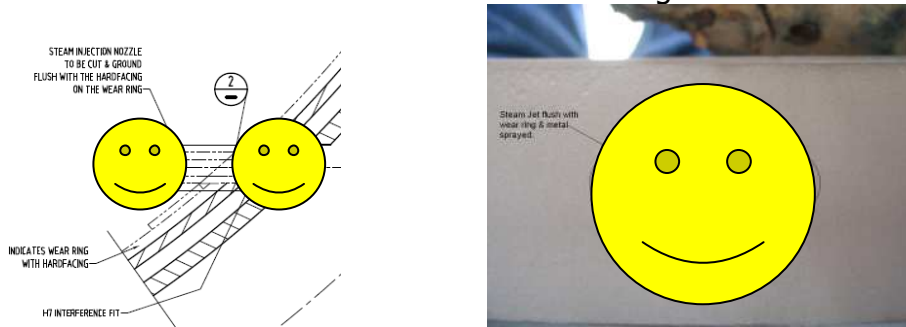
6.1.2.1 Ensure the joint between the Wear Ring and the Jet Ring is kept to a minimum.



6.1.2.2 Ensure the position of the Wear Ring is equally located over the Jet Ring which creates the gasket recess. xxx mm equal recess.



6.1.3 Install off Steam Jets. Item 3 on drawing K-29501. Cut off flush.



6.1.4 Establish the gasket face (if required). To comply with AS2129, section 4.3.2.

6.1.5 Apply the HVOF spray on the Wear Ring, details on drawing K-29299 Note 4.

6.1.5.1 All finished HVOF coating shall be smooth in contour with specific emphasis for the circumferential swirling flow that exists within this device.

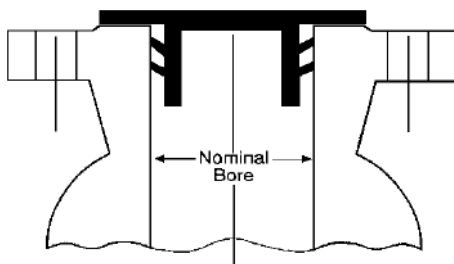
6.1.6 Reinstall the Steam Inlet Flange and Pipe.

6.1.7 NDT the Flange Pipe weld, 100% RT. Report required.

## 7. Preservation and packaging

7.1.1 Flange Face Protection. After inspection flange faces shall be protected as follows.

7.1.1.1 Flange faces (gasket contact surfaces) shall be adequately protected by coating with a removable rust preventive and attaching a plastic Raised Face Flange Protector. Gasket contact surfaces shall not be painted. If the surface is painted or damaged, it shall be restored to original specification condition before application of protection.



7.1.1.2 Threaded connections shall be closed with a pipe plug or a thread protector of a material compatible with the parent pipe.



7.1.1.3 Package in accordance with Tiwest Specification GSP-002 Rev 1 Packaging and Delivery of Equipment. Para 7.2 Packaging.

## **8. Painting**

Paint is to be applied in accordance with Tiwest specification document MSP02 System 4. The following recommendations should be adhered to:

8.1.1 All machined surfaces to remain paint free

8.1.2 All HVOF coated surfaces are to remain paint free.

8.1.3 All exposed steel surface following painting are to be treated with preservative.

## **9. Transport**

9.1.1 Transport to comply with Tiwest specification document GSP-002 Rev 1 Packaging and Delivery of Equipment Para 7.7 Transport.

## **10. Standard Variances to Repair**

All variances to the works specified in section 5 "Repair" shall be individually itemised on the Tiwest Quote Sheet and require approval from the TRMI. In order for the variance to be approved adequate information regarding specific dimensions, tolerances, standards used and all other such technical detail is required by the OSRR prior to any works being completed.

## **11. Technical Specifications**

Within this section are the minimum technical and engineering requirements to ensure the Steam Ring is repaired to an acceptable standard.

11.1.1 All works are to be completed inline with Tiwest's safety procedures and expectations; this also warrants that all works are completed by competently trained trades people

11.1.2 All works are to be carried out in compliance with Tiwest's drawings and specifications relevant to the Steam Ring being repaired

11.1.3 Any deviation for the SoW for the implementation of improvements and/or otherwise required changes shall be approved by Tiwest in writing prior to these changes taking place.

11.1.4 Metal spraying to be as per EN ISO 14921: 2001; upon request the vendor shall supply to the TRMI the metal spraying procedure as per EN ISO 14921: 2001.

## **12. Drawings**

Where Steam Ring modifications are required for any reason it shall be the vendor's responsibility to provide the TRMI with detailed drawings of the modification.

## **13. Measurement and Reporting**

Measurement and reporting shall be completed and submitted to the TRMI as specified in this section.

### **13.1 Strip and Survey Report (SSR)**

This is to be completed in full as submitted with the Tiwest Quote Sheet. The report should detail all the findings from stripping the Steam Ring with detail given on the suspected case of failure. Appendix B has an example of the level of information required.

### **13.2 Repair Closing Report (RCR)**

This is to be completed in full and submitted when the item is dispatched for return to site.

### **13.3 Nameplate Requirement**

Upon completion of the repair the Vendor shall install an identification nameplate to the repaired equipment. The name plate may be secured either by a suitable adhesive or by welding. The location of the nameplate shall be such that it is easily visible when the equipment is in its installed position (e.g. top and centre). The nameplate shall include the following information: See Appendix B.

# 14. Appendices

## 14.1 Appendix A

### TIWEST JOINT VENTURE PTY LTD - INSPECTION AND TEST PLAN

Supplier:	Lloyds Mechanical Engineering	Document Number	Page 1 of ?
Equipment Number:	R406 Microniser	_____	Revision
Description:	Steam Ring		
Repair Order No: _____	Supplier's Ref No: _____	Tiwest	Contact Person:
Contract No: _____			

Activity Number	Activity Description	Reference Document	Acceptance Criteria	Verifying Document	Inspection & Verification				Notes
					Contractor		Tiwest		
					Action	Signature	Action	Signature	
1.0	Review & approve the inspection and test plan	Repair Contract			R / A		R / A		Both parties to review and accept the Inspection and Test Plan. Technical query forms to be used / Submitted.
2.0	Visual Inspection of the Steam Ring.								
3.0	Remove Pipe Plugs								
4.0	Remove Steam Jets								
5.0	Remove Wear Ring								
6.0	Inspection of Steam Ring						H / W		
7.0	Sweep (brush) Blast	AS1627.4							
8.0	NDT								Report required
9.0	Dimensional Inspection								Report required
10.0	Gasket face inspection								
11.0	Inlet flange inspection								
12.0	Compile survey report						H / S		
13.0	Replace the Wear Ring								
14.0	Install Steam Jets								
15.0	Establish Gasket Face								
16.0	Apply HVOF Spray						H / V		
17.0	Weld on inlet Pipe								
18.0	NDT Weld								
19.0	Up date I.D Tag								
20.0	Post delivery inspection						H / W		

## 14.2 Appendix B

EQUIPMENT NAME		
REPAIR HISTORY		
DATE	COMPANY	REPAIRER'S JOB No

Notes:

Repair data plate  
details

- 1 Each row is 10mm high, each column is approx. 30mm wide
- 2 Plate dimension is 110mm wide x 120mm high
- 3 All lettering and grid lines shown are engraved
- 4 Plate is either 3mm or 5mm thick 316 SS
- 5 Plate is either tack welded or fitted to an approved backing plate (Tiwest to specify in each case)
- 6 Repairer's details may be stamped or engraved in the boxes provided

File: Repair history data plate rev 0

