

INCOMING INSPECTION REPORT

Customer	Nghi Son Refinery & Petrochemical LLC	UNEW Work Order No.	825092
Customer P.O. No.	1003986864	Report Date	27 April 2026
Engine Type	MS6001FA (GE Frame 6FA)	Component	MS6001FA 1st Stage Shroud Block
Component Part No.	Body: 119E4234 G001 Inner plate (Tip shoe): 176D3829 P001	Qty. Received	24 Units (1 Complete Set)
Material	Body: SS310 Inner plate (Tip shoe): Inconel 738	As-Received Coating	Body: No coating Inner plate (Tip shoe): TBC Abradable coating
Repair Classification	HEAVY REPAIR	Coating Requirement	TBC Abradable plus ceramic compound
Total Initiated Starts	476	Total Emergency Trips	125

Responsible Product Engineer: _____

Mr. Chaowarit Junjorhor

Sr. Engineer

Report prepared by: _____

Ms. Nalinee Supapradit

Report writer

Report reviewed and approved by: _____

Mr. Pheerayawat Muadna

(Engineering Manager)

INCOMING INSPECTION REPORT

1. EXECUTIVE SUMMARY:

Twenty-four (24) MS6001FA 1st stage shroud blocks were received from Nghi Son Refinery and Petrochemical LLC and subjected to full incoming inspection, including visual inspection, fluorescent penetrant inspection (FPI), dimensional measurement, and metallurgical evaluation of both the shroud body and inner plate (tip shoe) components.

The inspection confirmed severe and widespread damage across the complete set. Multiple critical damage mechanisms were identified, including extensive fretting at all load-bearing contact interfaces, foreign object damage (FOD) on exposed surfaces, structural deformation of the shroud body, and dimensional non-conformance of the inner plates. The customer-supplied operational history — 476 Total Initiated Starts with 125 Emergency Trips and 127 Breaker Trips at Load — confirms a high-severity service profile fully consistent with the extent and nature of damage observed.

The combination of material loss at contact interfaces, geometric distortion, abnormal metallurgical transformation of the base material, and complete dimensional rejection of all 24 inner plate assemblies confirms that no unit in the set is eligible for standard or medium repair. Local blending or partial correction is insufficient to restore the required geometry, interface condition, and dimensional compliance across this set.

Based on these findings, all 24 shroud blocks are classified as HEAVY REPAIR. Full structural rebuild, dimensional restoration, post-weld heat treatment, and reapplication of TBC Abradable coating are required across the complete set.

2. INTRODUCTION

Twenty-four (24) MS6001FA 1st stage shroud blocks were received and processed for inspection. The work includes cleaning, coating removal where applicable, disassembly of inner plates, and full incoming inspection supported by metallurgical evaluation.

The inspection process consists of visual inspection, fluorescent penetrant inspection, dimensional measurement, and material evaluation to determine the condition of the shroud body and inner plate components.

The shroud assembly operates under high temperature gas flow, mechanical loading, and continuous contact at mating interfaces. These conditions subject the components to wear, impact, and thermal exposure, which lead to degradation mechanisms such as fretting, surface damage, deformation, and dimensional instability over time.

The purpose of this inspection is to identify all defects, including fretting, foreign object damage, deformation, and dimensional deviation, and to evaluate their impact on structural integrity and assembly condition.

3. INSPECTION SUMMARY

Based on the inspection results, the repair scope is defined with emphasis on removal of degraded material, restoration of geometry, and recovery of interface condition. The defined scope reflects a **heavy repair requirement** to ensure proper fit-up, sealing, and stable operation after repair.

Order Information		
EE Work Order no.		825092
Date of report		09 April 2026
Customer P.O. no.		1003986864
Component Details		
Engine type		MS6001FA
Component type		1st Shroud block
Component part number	Body	119E4234 G001
	Inner plate (or Tip shoe)	176D3829 P001
Qty. received		24
Material type	Body	SS310
	Inner plate (or Tip shoe)	Inconel 738
As received coating type (s)	Body	No
	Inner plate (or Tip shoe)	TBC Abradable coating
Additional items received with main set (if any)		-
Customer supplied component history		
Total Initiated Starts		476
Manually Initiated Starts		468
Fired Starts		180
Total Emergency Trips		125
Breaker Tripped At Load Count		127
Operational fuel type		(No information supplied)
Mode of operation (base load / peaking)		(No information supplied)
Maintenance Intervals Combustion		(No information supplied)
Maintenance Intervals Hot gas path		(No information supplied)
Unloaded condition		
Incoming packing / container condition		Good
Signs of transit damage (if damaged upon receipt photos to be included within report)		No

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The following operational history directly increases the damage risk profile and supports the Heavy Repair classification across all 24 units:

- **Total Initiated Starts: 476** with 125 Emergency Trips, a critically high emergency trip ratio confirming repeated severe thermal shock events that accelerate frettage progression at all contact interfaces and drive geometric distortion of the shroud body.
- **Breaker Trips at Load: 127** consistent with high-cyclic thermal loading causing accelerated material loss at mating surfaces and dimensional instability across the inner plate population.

The following damage categories were identified across the complete set of 24 shroud blocks and collectively confirm the Heavy Repair classification:

Damage Category	Finding (As Inspected)	Disposition
Frettage at FWD and AFT Contact Surfaces — Body	Widespread frettage confirmed on FWD and AFT sides across all 24 shroud bodies. Progressive material loss and deterioration of contact interface geometry at all load-bearing rails. Frettage depth and area exceed the limits of blend repair.	Weld Build-up and Blend
Frettage at Pressure Face Body	Heavy frettage confirmed on the pressure face across multiple units. Material loss at this surface directly affects load distribution and sealing condition during high-temperature operation.	Weld Build-up and Blend
Frettage at Left and Right Side Contact Rails, Body	Frettage wear confirmed on left and right side contact rails across all 24 shroud bodies. Wear at these locations directly affects interface fit-up and structural stability of the assembly.	Weld Build-up and Blend
Frettage at Inner Plate (Tip Shoe) Contact Surfaces	Heavy frettage confirmed on FWD side, left side, and right side contact surfaces of the inner plates across all 24 assemblies. Directly affects tip clearance, sealing, and thermal performance at the gas path interface.	Weld Build-up and Blend
Foreign Object Damage (FOD) Body	FOD confirmed on exposed surfaces of multiple shroud body units, creating	Blend and Weld Repair

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Damage Category	Finding (As Inspected)	Disposition
	localized surface damage and stress concentration points. Combined with fretting, FOD significantly increases the risk of crack initiation during operation.	
Structural Deformation Shroud Body	Deformation confirmed on the left and right side regions of multiple shroud bodies. Deviation from original geometry directly affects assembly fit, inner plate interface alignment, and sealing effectiveness. Items requiring jacking and contouring (JK) are identified in the Defect Legend Table.	Mechanical Straightening and Geometry Correction
Dimensional Non-Conformance All 24 Inner Plates	All 24 inner plate assemblies recorded as REJECT across Z2 fixture check positions. Item 18 could not be assembled to the fixture. Individual plate measurements at positions L, S1, S2, S5, and S7 are outside serviceable limits across multiple items. Deviations directly affect assembly alignment, gas path sealing, and operational stability.	Full Dimensional Restoration and Re-machining
Inner Plate Side Seals Non-Serviceable	All 24 shroud blocks received with inner plate side seals (cloth type) in damaged and non-serviceable condition with complete loss of sealing function. Replacement with new L605 flat and bone-type seals is mandatory and is outside the standard repair scope.	Replace with New
Tile Retention Pins Deformed	All tile retention pins received in deformed condition confirmed visually across the complete set. Pins cannot be reused and require full replacement.	Replace with New
Abnormal Metallurgical Transformation — Body and Inner Plate	Metallurgical evaluation confirms abnormal microstructural transformation in the SS310 shroud body, indicating degradation of material stability under service conditions. The Inconel 738 inner plates show coating degradation and localized	Full Material Removal, Weld Restoration and Post-Weld Heat Treatment

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Damage Category	Finding (As Inspected)	Disposition
	material loss at critical areas. All degraded material must be fully removed prior to weld restoration and post-weld heat treatment.	
TBC Abradable Coating Full Degradation	Inner plate TBC Abradable coating is severely degraded across the complete set. Full coating removal and reapplication of TBC Abradable with ceramic compound is required on all 24 assemblies.	Full Strip and Recoat

3.1 DIMENSIONAL INSPECTION SUMMARY

Key dimensional findings from the incoming inspection are summarised below:

Inspection Parameter	Result	Status
Shroud Body Dimensions (A–K, L, M)	All 24 shroud bodies within acceptable dimensional range at positions A through K, L, and M. Recorded for baseline reference and post-repair verification.	FORCE ACCEPTABLE
Inner Plate Side Rail Thickness (S1–S8)	Multiple inner plates outside acceptable limits at positions S1, S2, S5, and S7. Item 19 records the most severe deviation across all eight positions. Item 16 records critically low values at S5 and S7.	REJECT — MULTIPLE UNITS
Inner Plate L-Dimension	Item 19 records 3.45 mm — significantly below the serviceable range of the set. Multiple additional items are at or near the lower boundary of the acceptable range.	REJECT — MULTIPLE UNITS
Fixture Check Z2 Position	All 24 inner plate assemblies recorded as REJECT at Z2. Item 18 cannot be assembled to the fixture and represents the most severe case of dimensional deviation in the set.	REJECT — 24/24

4. ENGINEERING EVALUATION & RECOMMENDATION

The incoming inspection confirms that the shroud assembly has experienced severe combined thermal, mechanical, and contact loading over its service life, resulting in progressive and widespread degradation of critical features across the complete set of 24 units.

4.1 DAMAGE ASSESSMENT

- **Fretting:** Extensive fretting is observed across multiple load-bearing mating surfaces on both the shroud body and inner plates. Material loss and deterioration of contact interface geometry are confirmed at all load-bearing rails — FWD side, AFT side, pressure face, and left/right side contact rails. Fretting depth and area exceed the limits of blend repair across all 24 units.
- **Foreign Object Damage (FOD):** FOD is confirmed on exposed surfaces of multiple shroud body units, creating localised surface damage and stress concentration points. Combined with fretting, FOD significantly increases the risk of crack initiation during operation.
- **Structural Deformation:** Deformation of the shroud body is identified on the left and right side regions of multiple units, resulting in loss of original geometry. This directly affects assembly fit, inner plate interface alignment, and sealing effectiveness. Items requiring jacking and contouring (JK) are identified in the Defect Legend Table.
- **Dimensional Non-Conformance:** Dimensional inspection confirms that all 24 inner plate assemblies are recorded as REJECT at Z2 fixture check positions. Item 18 cannot be assembled to the fixture. Individual plate measurements at positions L, S1, S2, S5, and S7 are outside serviceable limits across multiple items. These deviations directly affect assembly alignment, gas path sealing, and operational stability.
- **Abnormal Metallurgical Transformation:** Metallurgical evaluation confirms abnormal microstructural transformation in the SS310 shroud body, indicating degradation of material stability under service conditions. The Inconel 738 inner plates show coating degradation and localised material loss at critical areas. All degraded material must be fully removed prior to weld restoration and post-weld heat treatment.
- **TBC Abradable Coating:** Inner plate TBC Abradable coating is severely degraded across the complete set. Full coating removal and reapplication of TBC Abradable with ceramic compound is required on all 24 assemblies.
- **Tile Retention Pins & Side Seals:** All tile retention pins are received in deformed condition and cannot be reused. All inner plate side seals (cloth type) are in non-serviceable condition with complete loss of sealing function. Full replacement of both items is mandatory.

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4.2 ENGINEERING CONCLUSION

The combination of material loss at contact interfaces, geometric distortion, abnormal metallurgical transformation of the base material, and complete dimensional rejection of all 24 inner plate assemblies confirms that no unit in the set is eligible for standard or medium repair.

Local blending or partial correction is insufficient to restore the required geometry, interface condition, and dimensional compliance across this set. The existing condition will continue to degrade fit-up, sealing, and component life if not fully addressed.

Based on these findings, all 24 shroud blocks are classified as HEAVY REPAIR.

4.3 REPAIR RECOMMENDATION

The repair scope is defined to fully address all identified damage mechanisms and restore the components to serviceable condition. The following actions are required:

- Full removal of all degraded material, including oxidation products, worn surfaces, and zones affected by metallurgical transformation.
- Weld build-up to restore material at all frettage-damaged contact surfaces on both the shroud body and inner plates, using compatible high-temperature filler material.
- Reconstruction and machining of slot and location rails to recover interface geometry and contact condition.
- Mechanical straightening and geometry correction of deformed shroud body units to recover original dimensional profile.
- Full dimensional restoration and re-machining of all inner plate assemblies to recover tolerance and fit-up condition across positions L, S1–S8, and Z2.
- Post-weld heat treatment in a controlled vacuum environment to relieve residual stress and stabilise material properties after weld restoration.
- Multiple fluorescent penetrant inspection (FPI) cycles during and after repair to verify structural integrity at all repaired areas.
- Fixture alignment correction and assembly requalification to confirm all units meet dimensional acceptance criteria prior to coating.
- Full strip and reapplication of TBC Abradable coating with ceramic compound on all 24 inner plate gas path surfaces to restore thermal protection and clearance control performance.
- Replacement of all tile retention pins and inner plate side seals (L605 flat and bone type) — mandatory items outside standard repair scope.

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4.4 SPECIAL ADDITIONAL REPAIR SCOPE

SPECIAL ADDITIONAL REPAIR SCOPE	QTY	UNIT
Weld build-up and restoration of frettage-damaged contact surfaces (Body & Inner Plate)	1	set
Reconstruction and machining of slot and location rails to recover interface geometry	1	set
Pressure face material removal and contour restoration	1	set
Mechanical straightening and correction of shroud body deformation	1	set
Dimensional restoration and re-machining to recover tolerance and fit-up condition	1	set
Multiple fluorescent penetrant inspection (FPI) cycles during repair process	1	set
Post-weld heat treatment in controlled vacuum environment	1	set
Surface reconditioning and preparation after heavy weld and machining	1	set
Fixture alignment correction and assembly requalification	1	set
New Inner plates side seal (Flat and bone type)	1	p/set
New Tile Retention Pins	6	p/set
New Internal retaining ring	72	s/ea
Weld Plug Pin of old Dowel holes	1	p/set
Coating – TBC Abradable plus ceramic compound	1	set

Note: The repair scope defined above reflects a Heavy Repair classification. All work is to be performed in accordance with applicable engineering procedures and OEM requirements. Post-repair dimensional inspection and FPI are mandatory before final assembly and coating.

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5. TECHNICAL SCOPE AND TIME & COST IMPACT:

Category	Standard / Medium Repair	Heavy Repair (Required Condition)	Time & Cost Increase
Damage Level	Localized wear, minor frettage	Widespread frettage, deformation, FOD	3.0x
Material Condition	Base material intact	Surface erosion and interface degradation	2.5x
Geometry Condition	Within tolerance	Distortion, misalignment	3.0x
Dimensional Status	Mostly acceptable	Multiple reject conditions	3.5x
Repair Philosophy	Surface restoration	Full structural rebuild	3.0x
Material Removal	Limited blending	Full removal of degraded zones	3.0x
Weld Scope	Local weld	Extensive weld build-up	3.5x
Machining	Minimal finishing	Full contour restoration	3.0x
Deformation Correction	Not required	Mechanical straightening	3.0x
Heat Treatment	Limited	Mandatory post-weld cycle	2.0x
Inspection Scope	Standard	Repeated NDT and validation	2.5x
Process Complexity	Linear	Multi-step with rework loops	2.5x – 3.5x

The heavy repair scope represents a significantly increased level of engineering work, including structural rebuild, dimensional restoration, and enhanced inspection requirements. The multipliers reflect increased labor time, process duration, and technical control required.

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5. SPARE PART (Repair / Replace):

Item	Part description	Received/ Required	Condition	Quantity	Remark
1	Tile Retention Pins (EETH4069-01)	72/72	Replace	72	Additional
2	Internal retaining	72/72	Replace	72	Additional
3	Inner plates side seal – long (L605 Dog bone seal) (EETH4070-01)	48/70	Replace	70	in scope
4	Inner plates side seal – short upper (L605 Dog bone seal) (EETH4070-03)	44/70	Replace	70	in scope
5	Inner plates side seal – short lower (L605 Dog bone seal) (EETH4070-02)	47/70	Replace	70	in scope
6	Split line seal-Inner plate-long (L605 Flat seal) (EETH4070-01)	2/2	Replace	2	in scope
7	Split line seal-Inner plate-short upper (L605 Flat seal) (EETH4070-03)	2/2	Replace	2	in scope
8	Split line seal-Inner plate-short lower (L605 Flat seal) (EETH4070-02)	2/2	Replace	2	in scope

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All shroud blocks were received with inner plate side seals (cloth seal type) in damaged and non-serviceable condition, with loss of sealing function. Replacement with new inner plate side seals (L605 flat and bone type) is required for heavy repair and is not included in the standard repair scope.

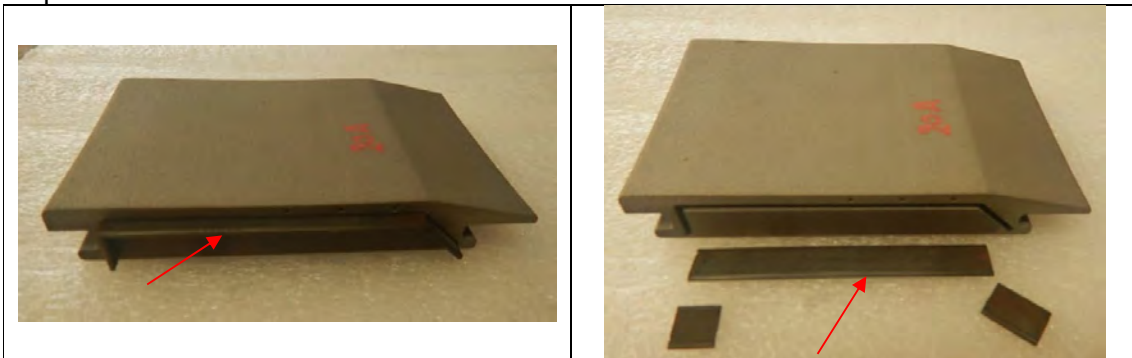


Figure 1–2. As-received cloth-type side seals in damaged and non-serviceable condition with loss of sealing function; replacement with new inner plate side seals (L605 flat and bone type) is required outside standard repair scope (heavy repair).

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6. PACKING LIST FROM CUSTOMER:

NGHI SON REFINERY AND PETROCHEMICAL LLC (NSRP)
 Nghi Son Economic Zone, Hai Binh Ward, Thanh Hoa Province, Viet Nam

PACKING LIST

2

Ship to:	ETHOSENERGY (THAILAND)	PL number	VI/2026.02-UNEW
Address:	39-9 Semsuwan Road, Tambon Maptaphut Amphur Muang, Rayong, 21150, THAILAND	Date	3 Mar-2026
	PIC: Mr. Chanut Chauwan	Contract	128/2024.NSRP.Maint-UNEW
	Office: (+66) 084 817 8477	Origin	USA
	Mobile: (+66) 084 873 8339	Terms	FOB
	chanut.chauwan@ethosenergy.com		INCOTERMS 2010

Bill to: **UNEW Inc.**
 3321 SE Gran Park Way
 Stuart, Florida USA 34997
 Attn: Jessica porter
 Phone: +1-772-406-4600

Description	MAXIMO	P/N	S/N	UOM	Box	DIM (CM)	Gross Weight	Net Weight
CAP AND LINER ASSY	2080129788	119E9620G001	11151561	PC	1/6	H135 X W115 X L151	310	188
			11151562					
			11151560					
			11151561					
			11151566					
			11151569					
BFA+E TRANSITION PC ASSY	2080129787	119E9974G002	213998-773	PC	2/6	H100 X W100 X L136	285	192
			213998-775					
			213998-774					
			213998-778					
			213998-777					
BUCKET KIT, STG 1, BFA	2080119749	105T4986P0016XRV3	As attached file	SET	5/6	H83 X W98 X L111	355	230
		105T4986P0015XRV3						
NOZZLE KIT, TURB-STG 1	2080157737	143E5711G02	SNEG842589	SET	6/6	H64 X L226 X W128	700	575
		128E9734 P002						
SHROUD ARR, STG 1 BFA+E	2080119751	119E4234G001	As attached file	SET	7/8	H85 X W92 X L115	255	200
					8/8	H85 X W92 X L115	155	100
							2,630.00	1,867.00

Total packages: 08 packages
 Total gross weight: 2630.00 kg

I hereby certify that this is true and correct.
NSRP LLC

Ms. Cu Thi Mai

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7. COMPONENT CORRELATION:

CORRELATION SHEET (BODY)			
Item	Part number	Serial number	Material
1	119E4234 G001	1	SS310
2	119E4234 G001	2	SS310
3	119E4234 G001	3	SS310
4	119E4234 G001	4	SS310
5	119E4234 G001	5	SS310
6	119E4234 G001	6	SS310
7	119E4234 G001	7	SS310
8	119E4234 G001	8	SS310
9	119E4234 G001	9	SS310
10	119E4234 G001	10	SS310
11	119E4234 G001	11	SS310
12	119E4234 G001	12	SS310
13	119E4234 G001	13	SS310
14	119E4234 G001	14	SS310
15	119E4234 G001	15	SS310
16	119E4234 G001	16	SS310
17	119E4234 G001	17	SS310
18	119E4234 G001	18	SS310
19	119E4234 G001	19	SS310
20	119E4234 G001	20	SS310
21	119E4234 G001	21	SS310
22	119E4234 G001	22	SS310
23	119E4234 G001	23	SS310
24	119E4234 G001	24	SS310

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CORRELATION SHEET (Tip shoes/Inner plate)							
Item	Part number	Serial number	Material	Item	Part number	Serial number	Material
1A	176D3829 P001	176DEW68D 216	Inconel738	17A	176D3829 P001	176DEL37X 229	Inconel738
1B	176D3829 P001	176DEW68E 045	Inconel738	17B	176D3829 P001	176DEL37X 147	Inconel738
1C	176D3829 P001	176DEL37X 280	Inconel738	17C	176D3829 P001	176DEL37Y 029	Inconel738
2A	176D3829 P001	176DEW68C 025	Inconel738	18A	176D3829 P001	176DEL37X 233	Inconel738
2B	176D3829 P001	176DEW68E 007	Inconel738	18B	176D3829 P001	176DEL37X 248	Inconel738
2C	176D3829 P001	176DEW68C 004	Inconel738	18C	176D3829 P001	176DEL37X 281	Inconel738
3A	176D3829 P001	176DEW68E 039	Inconel738	19A	176D3829 P001	176DEL37X 156	Inconel738
3B	176D3829 P001	176DEW68E 044	Inconel738	19B	176D3829 P001	176DEL37Y 132	Inconel738
3C	176D3829 P001	176DEW68D 196	Inconel738	19C	176D3829 P001	176DEL37X 293	Inconel738
4A	176D3829 P001	176DEW68C 014	Inconel738	20A	176D3829 P001	176DEW68E 011	Inconel738
4B	176D3829 P001	176DEW68E 021	Inconel738	20B	176D3829 P001	176DEW68D 195	Inconel738
4C	176D3829 P001	176DEW68C 010	Inconel738	20C	176D3829 P001	176DEW68C 020	Inconel738
5A	176D3829 P001	176DEL37Y 099	Inconel738	21A	176D3829 P001	176DEW68C 019	Inconel738
5B	176D3829 P001	176DEL37X 138	Inconel738	21B	176D3829 P001	176DEW68E 008	Inconel738
5C	176D3829 P001	176DEL37X 264	Inconel738	21C	176D3829 P001	176DEW68C 076	Inconel738
6A	176D3829 P001	176DEW68D 203	Inconel738	22A	176D3829 P001	176DEW68C 006	Inconel738
6B	176D3829 P001	176DEW68C 015	Inconel738	22B	176D3829 P001	176DEW68B 021	Inconel738
6C	176D3829 P001	176DEW68C 001	Inconel738	22C	176D3829 P001	176DEL37V 013	Inconel738
7A	176D3829 P001	176DEW68E 003	Inconel738	23A	176D3829 P001	176DEW68B 020	Inconel738
7B	176D3829 P001	176DEW68E 032	Inconel738	23B	176D3829 P001	176DEW68E 027	Inconel738
7C	176D3829 P001	176DEL37X 247	Inconel738	23C	176D3829 P001	176DEW68C 030	Inconel738
8A	176D3829 P001	176DEW68E 035	Inconel738	24A	176D3829 P001	176DEW68E 025	Inconel738
8B	176D3829 P001	176DEW68E 040	Inconel738	24B	176D3829 P001	176DEW68D 204	Inconel738
8C	176D3829 P001	176DEW68C 012	Inconel738	24C	176D3829 P001	176DEL37X 135	Inconel738
9A	176D3829 P001	176DEW68C 033	Inconel738				
9B	176D3829 P001	176DEW68E 034	Inconel738				
9C	176D3829 P001	176DEW68C 032	Inconel738				
10A	176D3829 P001	176DEW68E 042	Inconel738				
10B	176D3829 P001	176DEW68C 007	Inconel738				
10C	176D3829 P001	176DEW68C 029	Inconel738				
11A	176D3829 P001	176DEL37Z 274	Inconel738				
11B	176D3829 P001	176DEW68C 077	Inconel738				
11C	176D3829 P001	176DEW68D 211	Inconel738				
12A	176D3829 P001	176DEW68C 005	Inconel738				
12B	176D3829 P001	176DEW68D 215	Inconel738				
12C	176D3829 P001	176DEW68E 015	Inconel738				
13A	176D3829 P001	176DEL37Y 174	Inconel738				
13B	176D3829 P001	176DEW68C 009	Inconel738				
13C	176D3829 P001	176DEW68C 026	Inconel738				
14A	176D3829 P001	176DEW68D 205	Inconel738				
14B	176D3829 P001	176DEW68C 028	Inconel738				
14C	176D3829 P001	176DEW68E 010	Inconel738				
15A	176D3829 P001	176DEL37X 290	Inconel738				
15B	176D3829 P001	176DEW68C 013	Inconel738				
15C	176D3829 P001	176DEW68C 021	Inconel738				
16A	176D3829 P001	176DEL37X 151	Inconel738				
16B	176D3829 P001	176DEL37X 155	Inconel738				
16C	176D3829 P001	176DEL37X 036	Inconel738				

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8. SCOPE OF WORK:

Work scope	Inspect	Heavy	Coating
Inspect			
Perform receipt inspection and record serial numbers	X		
Degrease components	X		
Perform metallurgical evaluation of base material and coating type, report on condition	X		
Disassemble inner plate from shroud body, record block number plates are removed from.	X		
Abrasive blast to remove coating and to clean, blow out with dry compressed air to remove all media	X		
Perform visual inspection and segregate obvious scrap components	X		
Perform incoming solution heat treatment in partial pressure vacuum environment (shroud face only)	X		
Mask non coated surfaces and chemical strip to remove coating.	X		
Perform fluorescent penetrant inspection and record all defects	X		
Perform dimensional inspection, report all non-conformities	X		
Compile incoming inspection report and forward to customer	X		
Repair			
Blend to remove oxidation product on pressure face surface		X	
Scallop/ Route to remove defective material in pressure face, location rails preparation for weld repair		X	
Perform local penetrant inspection		X	
Perform weld repairs to the slot, pressure face, location rails		X	
Blend all repaired areas to restore component profile		X	
Perform fluorescent penetrant inspection		X	

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Perform post weld heat treatment heat treatment in full vacuum environment		X	
Perform fluorescent penetrant inspection (FPI)		X	
Perform visual inspection		X	
Perform dimensional inspection		X	
Coating			
Mask off non coated areas in preparation for abrasive blast			X
Abrasive blast gas path surfaces to receive coating			X
Blow out with clean dry compressed air to ensure no media entrapment			X
Apply TBC Abradable coating to gas path areas with ceramic compound for high temperature protection			X
Perform coating heat treatment in furnace			X
Perform dimensional inspection			X
Perform final visual inspection (plates and blocks)			X
Final assemblies shroud plates to blocks			X
Compile Final Report, pack and ship components with all required documentation as listed in Purchase Order			X

Required:

- TBC Abradable ceramic (heavy repair work scope).
- New Tile Retention Pins, 6 ea.
- New Internal retaining ring, 72 ea.
- New Inner plates side seal (Flat and bone type), 1 set.

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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9. MATERIAL EVALUATION

Report No.	L11387					Job order no.	825092				
Serial no.(or ID)	Item# 1					Cutting location	Body				
Received status	<input checked="" type="checkbox"/> As-Received <input type="checkbox"/> Pre-Weld HT <input type="checkbox"/> Post-Weld HT <input type="checkbox"/> Other										
Analysis Result											
Main composition,%										Hardness Test	-
Element	Co	Cr	Ni	Ti	W	Ta	Mo	Fe	Al	Grain size	-
Nominal	-	24-26	19-22	-	-	-	-	Bal	-	Coating Type	No Coating
Result	-	23.7	20.5	-	-	-	-	53.2	-	Nearest Alloy	SS310

Microstructure

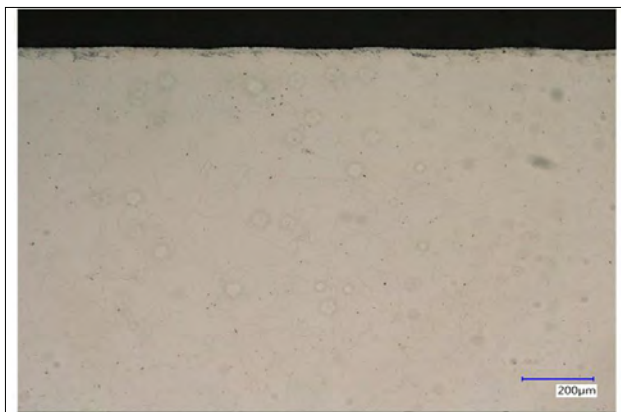


Fig.1 Showing the hot gas path surface condition.(Etched)

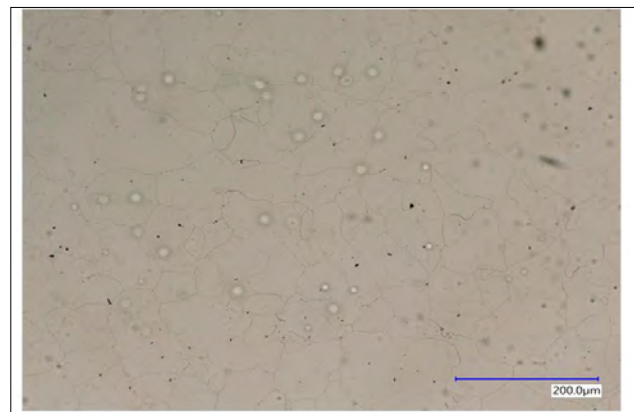


Fig.2 Showing the typical microstructure at higher magnification.(Etched)

The component was evaluated to determine the condition of the base material for repair. The internal combustion surface is uncoated and exhibits surface degradation from service exposure, including localized oxidation, wear, and material loss in high temperature regions. The base material was confirmed as SS310 alloy, consisting of a gamma matrix with primary and secondary carbide distribution along grain boundaries. Abnormal metallurgical transformation is observed in the base material, indicating degradation of microstructural stability under service conditions. Based on these findings, all degraded and affected material must be fully removed, followed by restoration through weld build-up and controlled heat treatment as part of the heavy repair scope.

RECOMMENDATION

All degraded surface layers, including oxidation, worn material, and areas affected by metallurgical transformation, will be fully removed. Damaged and material-loss regions will be restored by weld build-up using compatible high-temperature filler material. Repaired areas will be machined and contoured to recover original geometry and dimensional requirements. Deformed components will be corrected through mechanical straightening and geometry restoration. Critical interface surfaces will be re-established to ensure proper fit-up and load distribution. Post-weld heat treatment will be applied to relieve residual stress and stabilize material properties. All repaired areas will undergo repeated non-destructive testing to verify integrity. Internal surfaces will be recoated with TBC & ceramic abrasion coating to restore thermal protection and performance.

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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Report No.	L11387-1	Job order no.	825092
Serial no.(or ID)	Item# 1	Cutting location	Inner Plate
Received status	<input checked="" type="checkbox"/> As-Received <input type="checkbox"/> Pre-Weld HT <input type="checkbox"/> Post-Weld HT <input type="checkbox"/> Other		

Analysis Result											
Main composition,%										Hardness Test	-
Element	Co	Cr	Ni	Ti	W	Ta	Mo	Fe	Al	Grain size	-
Nominal	8.5	16.0	61.5	3.4	2.6	-	1.8	-	3.4	Coating Type	TBC-Abradable coating
Result	8.7	14.6	62.1	3.5	2.7	-	1.8	-	3.4	Nearest Alloy	In738

Microstructure

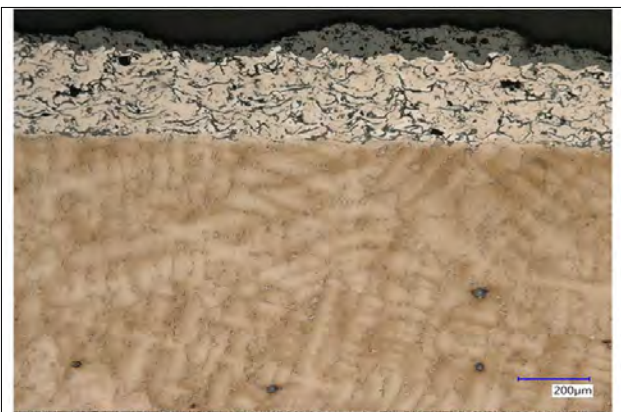


Fig.1 Showing the hot gas path coating and substrate condition.(Etched)



Fig.2 Showing the typical microstructure at higher magnification.(Etched)

The component was evaluated to determine the condition and suitability of the base material for repair. The internal combustion surface is protected by TBC abrasion coating; however, inspection indicates coating degradation and localized damage associated with service exposure, including wear and material loss in critical areas. The base material was confirmed as Inconel 738 alloy, consisting of a gamma matrix with fine gamma prime, primary carbide, and dispersed secondary carbide along grain boundaries. Abnormal metallurgical transformation is observed, indicating degradation of microstructural stability under high temperature service conditions. Based on these findings, all affected coating and degraded material must be fully removed, followed by restoration through weld build-up, controlled heat treatment, and reapplication of the coating system as part of the heavy repair scope.

Recommendation

The TBC abrasion & ceramic coating shall be fully removed from all affected areas to expose and assess the base material condition. Any degraded coating, oxidized material, worn surface, or material-loss region shall be completely removed before repair.

Damaged areas on the Inconel 738 inner plates shall be restored by controlled weld build-up using compatible high-temperature filler material. Repaired surfaces shall be machined and contoured to restore original profile, clearance control, and assembly fit-up.

Post-weld heat treatment shall be performed to relieve residual stress and stabilize the repaired material. After dimensional verification and FPI confirmation, the repaired surfaces shall be recoated with TBC abrasion coating to restore thermal protection and operating clearance performance.

Based on the coating degradation, material loss, and abnormal metallurgical transformation observed, these components require heavy repair rather than standard repair.

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

10. PHOTOGRAPHS:



Fig.1 As received condition.



Fig.2 As received condition.



Fig.3 Heavy damaged as received condition.



Fig.4 Heavy damaged as received condition.

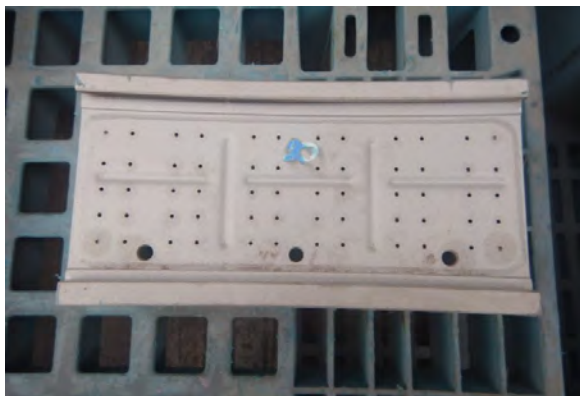
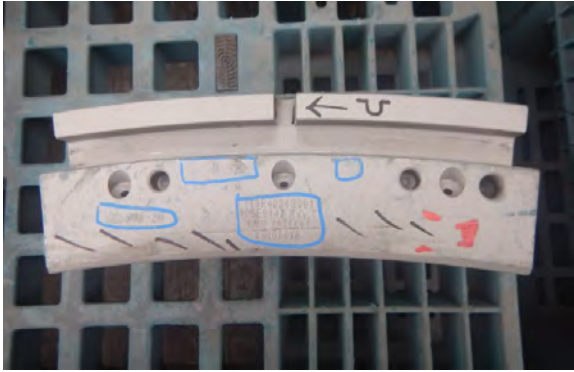




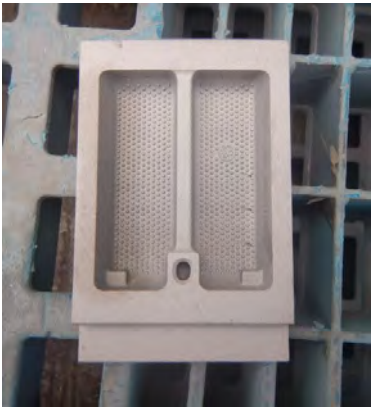


Fig.5 Tear & wear shroud block body.



Fig.6 Tear & Wear shroud block body

INCOMING INSPECTION REPORT

	
<p>Fig.7 Heavy wear and surface degradation.</p>	<p>Fig.8 Heavy wear and surface degradation.</p>
	
<p>Fig.9 Heavy tear/wear of shroud block body.</p>	<p>Fig.10 Heavy tear/wear of shroud block body.</p>
	
<p>Fig.11 Severe degradation on tip shoe (inner plate).</p>	<p>Fig.12 Severe degradation on tip shoe (inner plate).</p>

INCOMING INSPECTION REPORT



Fig.13 Severe degradation on tip shoe (inner plate).



Fig.14 Severe degradation on tip shoe (inner plate).



Fig.15 Heavy deformation on right side-Body.

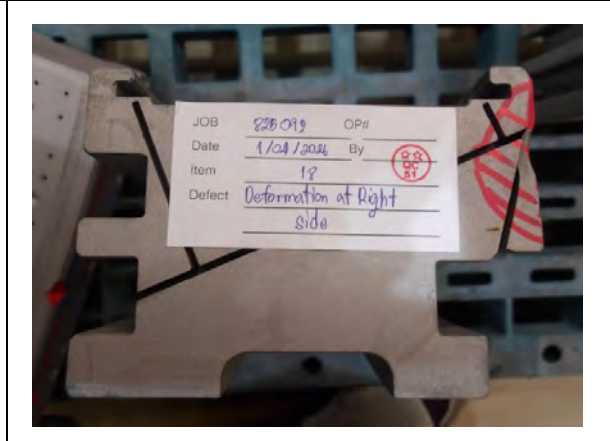


Fig.16 Heavy deformation on rightside-Body.

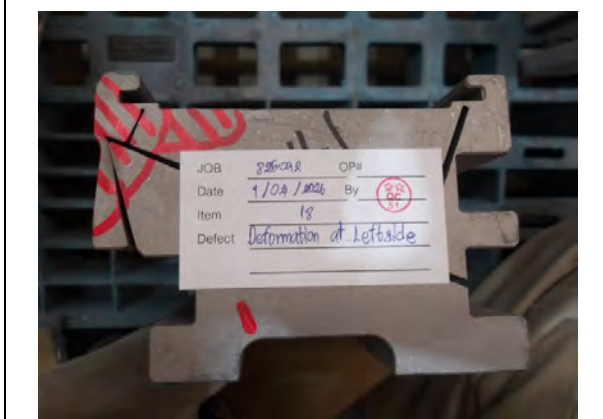


Fig.17 Heavy deformation on left side-Body.



Fig.18 Heavy deformation on left side-Body.

INCOMING INSPECTION REPORT



Fig.19 Heavy FOD damaged on left side-Body.



Fig.20 Heavy frettage on pressure face-Body.



Fig.21 Heavy frettage on back side - Body.



Fig.22 Heavy FOD damage on FWD side-Body.



Fig.23 Heavy frettage on FWD side-Body.



Fig.24 Heavy frettage on FWD side-Body.

INCOMING INSPECTION REPORT

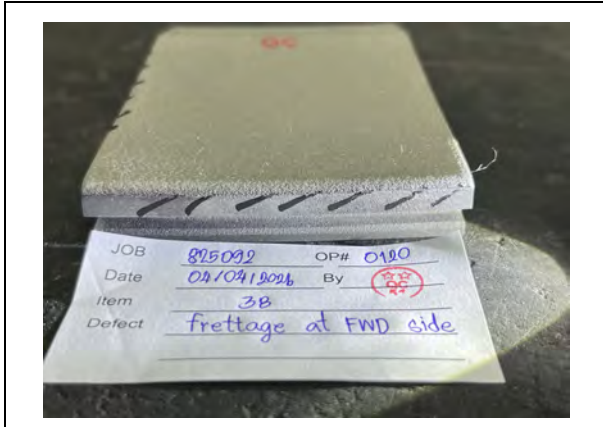


Fig.25 Heavy fretting on FWD side-Tip shoe.



Fig.26 Heavy fretting on FWD side-Tip shoe.

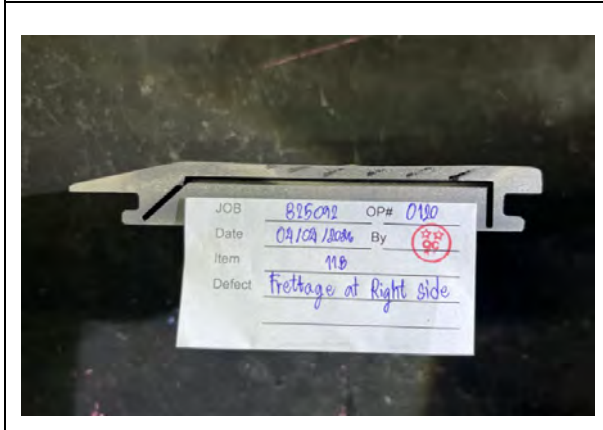


Fig.27 Heavy fretting on right side-Tip shoe.



Fig.28 Heavy fretting on left side-Tip shoe.

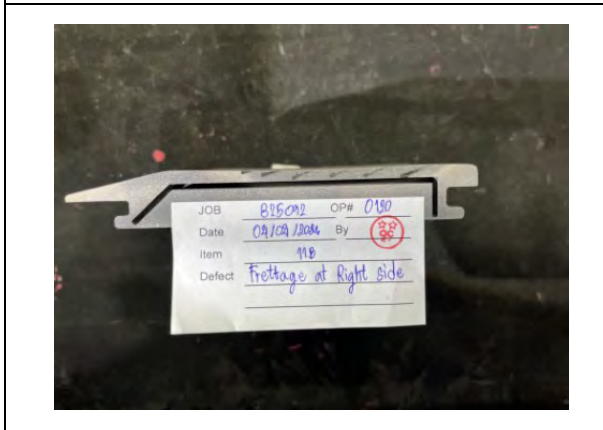
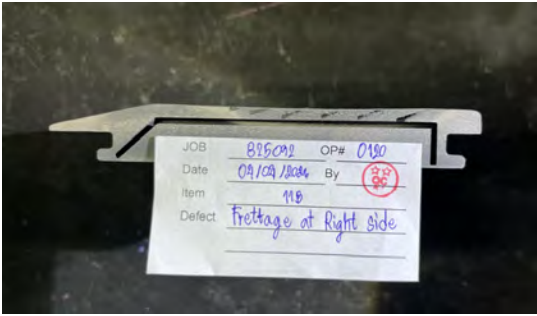



Fig.29 Heavy fretting on right side-Tip shoe.



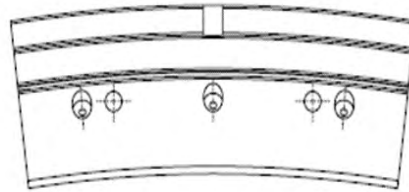
Fig.30 Heavy fretting on left side-Tip shoe.

INCOMING INSPECTION REPORT

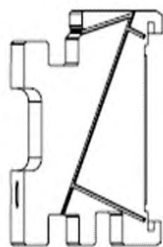
	
<p>Fig.31 Heavy fretting on right side-Tip shoe.</p>	<p>Fig.32 Deformation on Tile retention pins which require replacement with new.</p>

INCOMING INSPECTION REPORT

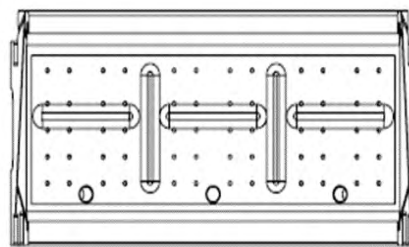
11. DEFECT LEGEND TABLE:



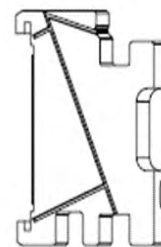
FWD SIDE



LEFT SIDE



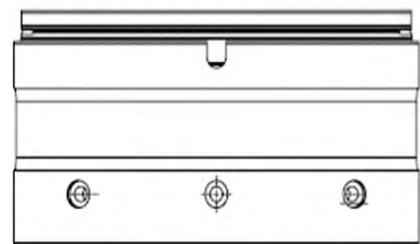
PRESSURE FACE



RIGHT SIDE



AFT SIDE



BACK SIDE

INCOMING INSPECTION REPORT

DEFECT LEGEND LABEL: Body											
ITEM	POSITION										
	Top face					Left side/Right side					
	Cracking	Frettage	Corrosion	Porosity	F.O.D.	Cracking	Frettage	Corrosion	Porosity	Deformation	F.O.D.
1											
2											
3											B
4											
5											
6											
7											
8											
9											B
10											
11											
12		B									
13											B
14										JK	B
15											B
16											B
17										JK	B
18										JK	B
19										JK	B
20											
21											B
22											B
23											B
24											B

DEFECT LEGEND LABEL: Body											
ITEM	POSITION										
	FWD side						AFT side				
	Cracking	Frettage	Corrosion	Porosity	Deformation	F.O.D.	Cracking	Frettage	Corrosion	Porosity	F.O.D.
1		B/WB				B/WB		B			
2		B/WB				B/WB		B/WB			
3		B/WB				B/WB		B/WB			
4		B/WB				B/WB		B/WB			
5		B/WB				B/WB		B/WB			
6		B				B/WB		B/WB			
7		B/WB				B/WB		B/WB			
8		B/WB				B/WB		B/WB			
9		B/WB				B/WB		B/WB			
10		B/WB				B/WB		B			
11		B/WB				B/WB		B			
12		B				B/WB		B/WB			
13		B/WB				B/WB		B/WB			
14		B/WB				B/WB		B			
15		B/WB				B/WB		B/WB			
16		B/WB				B/WB		B			
17		B				B/WB		B			
18		B/WB				B/WB		B/WB			
19		B				B/WB		B/WB			
20		B				B/WB		B			
21		B				B/WB		B/WB			
22		B/WB				B/WB		B/WB			
23		B/WB				B/WB		B/WB			
24		B/WB				B/WB		B/WB			

INCOMING INSPECTION REPORT

DEFECT LEGEND TABEL: Body											
ITEM	POSITION										
	Back side					Cover plate					
	Cracking	Frettag	Corrosion	Porosity	F.O.D.	Cracking	Corrosion	Deformation	Porosity	F.O.D.	Missing material
1											
2											
3											
4											
5											
6											
7											
8											
9											
10		B									
11											
12											
13											
14											
15											
16		B									
17											
18		B									
19		B									
20											
21		B									
22											
23											
24											

DEFECT LEGEND TABEL: Inner plate/Tip shoe											
ITEM	POSITION										
	Pressure face					Left side/Right side					
	Cracking	Frettag	Corrosion	Porosity	Missing material	Cracking	Frettag	Corrosion	Porosity	Deformation	F.O.D.
1							B				
2							B				
3							B				
4							B				
5							B				
6							B				
7							B				
8							B				
9							B				
10							B				
11							B				
12							B				
13							B				
14							B				
15							B				
16							B				
17							B				
18							B				
19							B				
20							B				
21							B				
22							B				
23							B				
24							B				

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

DEFECT LEGEND LABEL: Inner plate/Tip shoe											
ITEM	POSITION										
	FWD side					AFT side					
	Cracking	Frettage	Corrosion	Missing material	F.O.D.	Cracking	Corrosion	Deformation	Missing material	F.O.D.	Frettage
1		B									
2		B									
3		B									
4		B									
5		B									
6		B									
7		B									
8		B									
9		B									
10		B									
11		B									
12		B									
13		B									
14		B									
15		B									
16		B									
17		B									
18		B									
19		B									
20		B									
21		B									
22		B									
23		B									
24		B									

DEFECT LEGEND LABEL: Inner plate/Tip shoe						
ITEM	POSITION					Inner plate ID.
	Back side					
	F.O.D.	Cracking	Frettage	Corrosion	Deformation	
1						Rej
2						Rej
3						Rej
4						Rej
5						Rej
6						Rej
7						Rej
8						Rej
9						Rej
10						Rej
11						Rej
12						Rej
13						Rej
14						Rej
15						Rej
16						Rej
17						Rej
18						Rej
19						Rej
20						Rej
21						Rej
22						Rej
23						Rej
24						Rej

INCOMING INSPECTION REPORT

B = Blend repair to be performed in accordance with the location blend limits.

JK = Jacking and contouring to be performed based on the deformation and distortion detected.

WB = Weld and Blend to be performed based on the area limits and defects detected.

WM = Weld and Machining to be performed to build material dimensions and restore original dimensions and contours.

WE = Welding and Electric discharge machining (EDM) to be performed to build material dimensions and restore original dimensions.

TPR = Transient Phase Restoration to be performed based on the defects detected.

R = Replace with new.

ACC = Acceptable as is.

REJ = Dimension unacceptable and will require repair or cause of scrap.

S = Non-repairable / Scrap

L = Light repair category

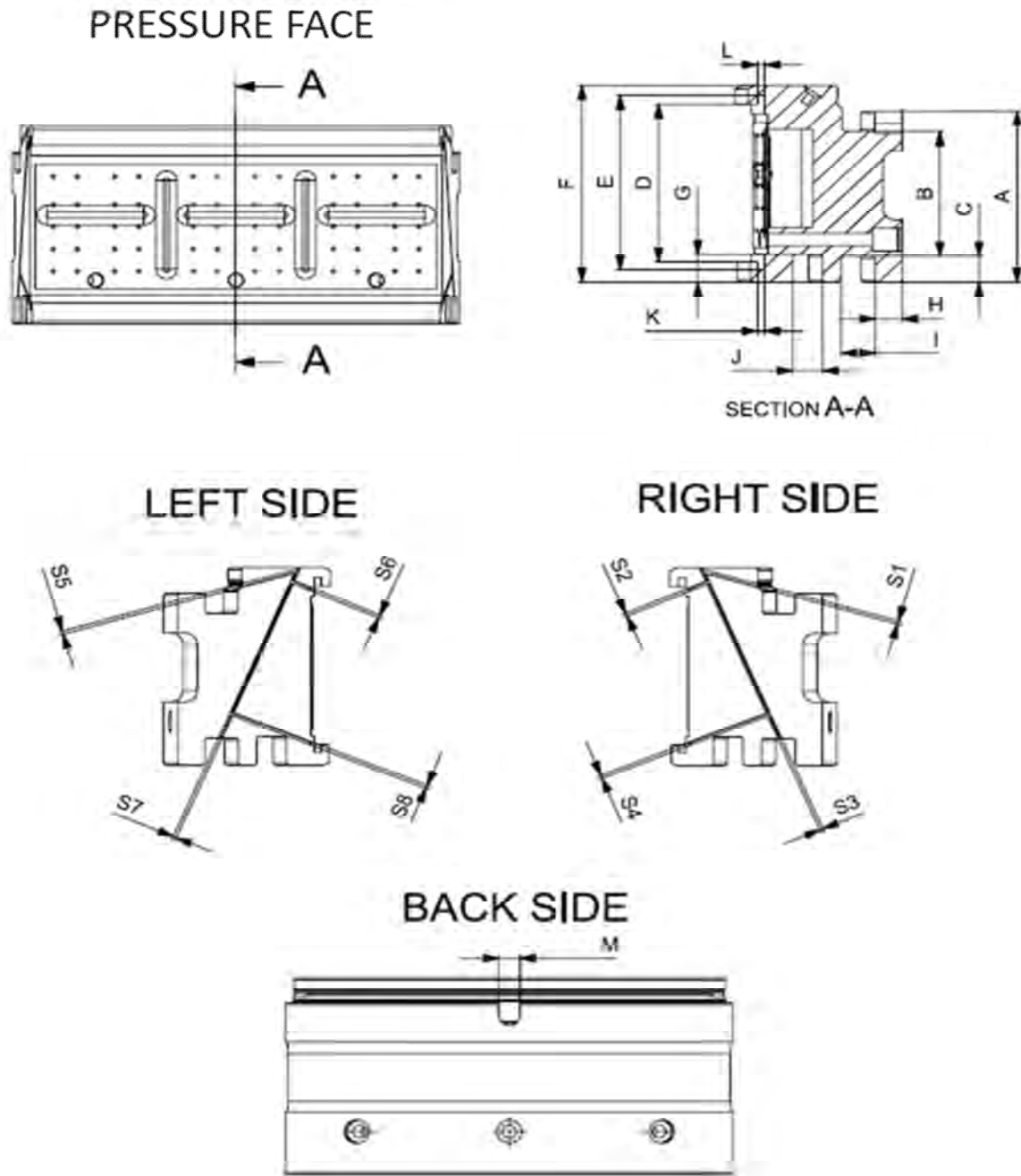
M = Medium repair category

H = Heavy repair category

EX = Salvation repair category

INCOMING INSPECTION REPORT

12. DIMENSION INSPECTION:



Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

Dimension Inspection (Unit: mm)											
ITEM	POSITION										
	A	B	C	D	E	F	G	H	I	J	K
1	97.59	71.06	14.95	89.63	99.31	112.13	16.04	14.21	17.73	15.70	3.99
2	97.60	71.05	15.13	89.60	99.25	112.25	16.37	14.19	17.68	15.72	3.85
3	97.60	71.06	15.11	89.58	99.27	112.19	16.05	14.17	17.73	15.69	3.94
4	97.62	71.04	14.99	89.60	99.24	112.23	16.06	14.20	17.72	15.71	3.89
5	97.57	71.03	15.04	89.62	99.28	112.20	16.08	14.25	17.75	15.70	3.90
6	97.60	71.09	15.38	89.62	99.27	112.28	16.05	14.20	17.70	15.67	3.94
7	97.58	71.10	14.97	89.60	99.25	112.21	16.06	14.23	17.77	15.69	3.88
8	97.61	71.09	15.02	89.62	99.24	112.30	16.05	14.26	17.67	15.69	3.98
9	97.62	71.07	15.02	89.64	99.28	112.18	16.05	14.30	17.70	15.66	3.90
10	97.60	71.08	15.19	89.63	99.27	112.20	16.07	14.24	17.66	15.67	3.88
11	97.59	71.07	15.07	89.62	99.28	112.20	16.08	14.25	17.68	15.71	3.88
12	97.58	71.03	14.96	89.63	99.29	112.21	16.04	14.30	17.65	15.70	3.85
13	97.55	71.14	16.05	89.60	99.27	112.24	16.05	14.21	17.70	15.71	3.90
14	97.57	71.11	15.08	89.64	99.26	112.22	16.01	14.23	17.73	15.67	3.88
15	97.60	71.02	15.04	89.62	99.24	112.25	16.02	14.26	17.70	15.72	3.88
16	97.62	71.03	15.05	89.64	99.23	112.16	16.07	14.29	17.75	15.72	3.88
17	97.60	71.08	15.08	89.61	99.29	112.27	16.02	14.24	17.69	15.68	3.95
18	97.62	71.04	15.01	89.61	99.30	112.17	16.06	14.22	17.67	15.65	3.89
19	97.60	71.05	15.04	89.40	98.88	112.12	16.11	14.28	17.72	15.69	3.92
20	97.54	71.11	16.16	89.59	99.20	112.20	16.04	14.22	17.67	15.71	3.91
21	97.60	71.08	15.20	89.62	99.30	112.16	16.05	14.25	17.70	15.72	3.89
22	97.58	71.16	15.12	89.60	99.28	112.15	16.02	14.19	17.69	15.69	3.90
23	97.57	71.13	14.93	89.59	99.25	112.18	16.03	14.22	17.68	15.68	3.95
24	97.61	71.05	15.03	89.61	99.24	112.18	16.04	14.26	17.70	15.70	3.94

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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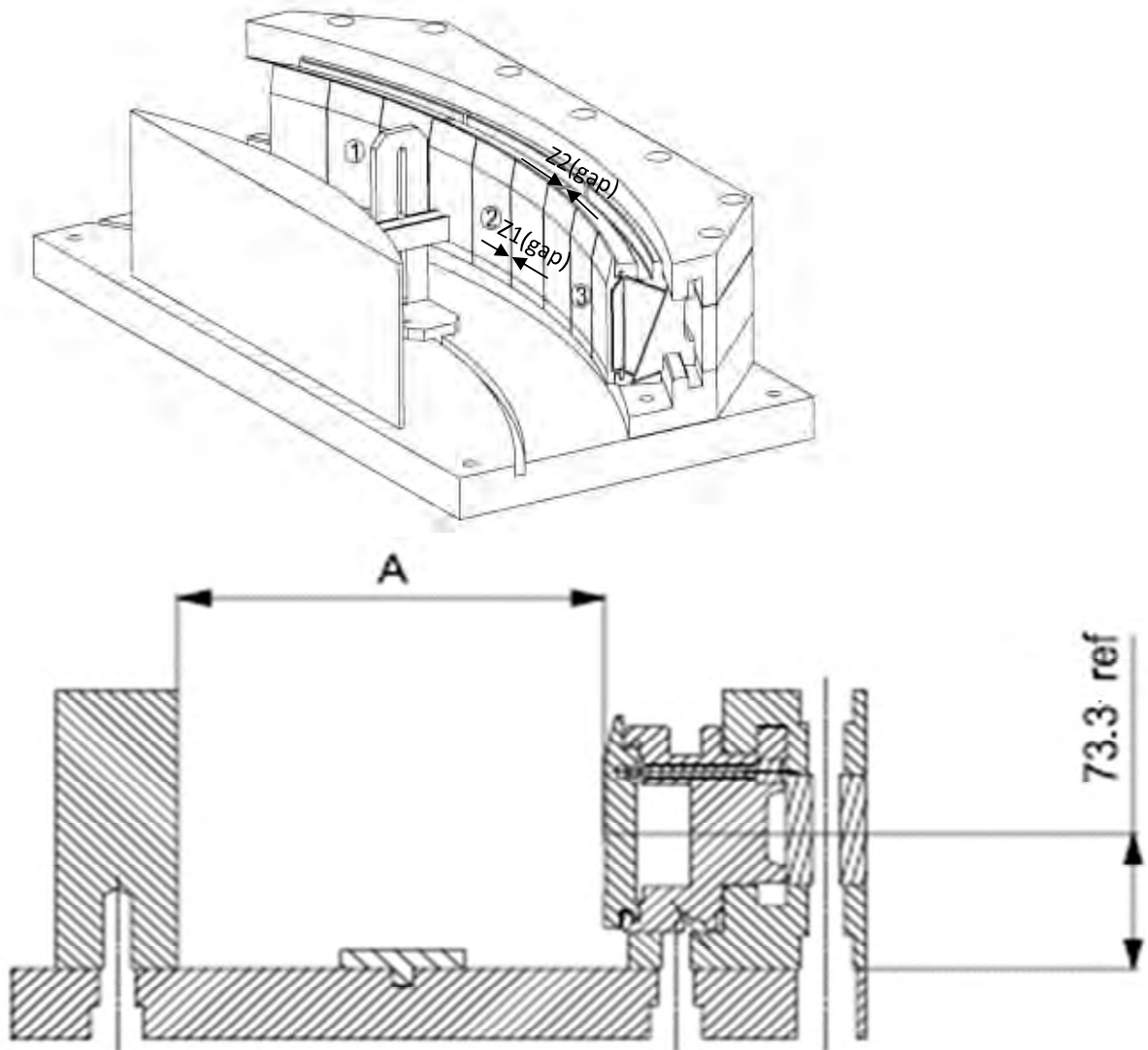
INCOMING INSPECTION REPORT

Dimension Inspection (Unit: mm)										
ITEM	POSITION									
	L	M	S1	S2	S3	S4	S5	S6	S7	S8
1	3.96	11.27	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
2	3.94	11.15	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
3	3.93	11.24	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
4	3.90	11.29	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
5	3.90	11.25	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
6	3.91	11.27	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
7	3.89	11.25	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
8	3.95	11.33	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
9	3.90	11.28	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
10	3.90	11.30	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
11	3.88	11.30	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
12	3.89	11.30	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
13	3.88	11.28	1.70	1.70	1.70	1.70	1.50	1.70	1.70	1.70
14	3.97	11.19	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
15	3.86	11.19	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
16	3.88	11.23	1.70	1.70	1.70	1.70	1.00	1.70	1.00	1.70
17	3.84	11.20	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
18	3.91	11.23	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
19	3.45	11.23	1.50	0.90	1.50	1.20	1.50	1.50	1.10	1.70
20	3.90	11.25	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
21	3.94	11.19	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
22	3.92	11.26	1.40	1.70	1.70	1.70	1.70	1.70	1.70	1.70
23	3.88	11.23	1.70	1.40	1.70	1.70	1.70	1.70	1.40	1.70
24	3.90	11.20	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

Fixture inspection:



Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

Dimension Inspection (Unit: mm)									
Item no.	Tip shoe/ Inner plate	POSITION			Item no.	Tip shoe/ Inner plate	POSITION		
		A	Z1	Z2			A	Z1	Z2
1	A	209.15	Acc.	Rej.	11	A	209.02	Acc.	Rej.
	B	209.00	Acc.			B	209.04	Acc.	
	C	209.16	Rej.			C	209.10	Rej.	
2	A	209.00	Acc.	Rej.	12	A	209.21	Acc.	Rej.
	B	209.01	Acc.			B	208.92	Acc.	
	C	208.97	Rej.			C	208.97	Rej.	
3	A	209.06	Acc.	Rej.	13	A	208.96	Acc.	Rej.
	B	209.10	Acc.			B	209.05	Acc.	
	C	209.05	Rej.			C	209.07	Rej.	
4	A	208.92	Acc.	Rej.	14	A	208.83	Acc.	Rej.
	B	209.24	Acc.			B	208.93	Acc.	
	C	208.88	Rej.			C	208.97	Rej.	
5	A	209.07	Acc.	Rej.	15	A	209.06	Acc.	Rej.
	B	209.06	Acc.			B	209.10	Acc.	
	C	209.08	Rej.			C	209.10	Rej.	
6	A	208.85	Acc.	Rej.	16	A	208.93	Acc.	Rej.
	B	208.86	Acc.			B	209.05	Acc.	
	C	208.92	Rej.			C	208.95	Rej.	
7	A	209.08	Acc.	Rej.	17	A	208.99	Acc.	Rej.
	B	209.02	Acc.			B	209.03	Acc.	
	C	209.00	Rej.			C	209.03	Rej.	
8	A	208.94	Acc.	Rej.	18	A	Rej.	Acc.	Rej.
	B	208.94	Acc.			B	Rej.	Acc.	
	C	209.00	Rej.			C	Rej.	Rej.	
9	A	209.08	Acc.	Rej.	19	A	208.82	Acc.	Rej.
	B	208.94	Acc.			B	208.81	Acc.	
	C	209.04	Rej.			C	208.85	Rej.	
10	A	208.98	Acc.	Rej.	20	A	208.92	Acc.	Rej.
	B	208.99	Acc.			B	208.94	Acc.	
	C	208.94	Rej.			C	208.95	Rej.	

Remark: Item no.18 can not assembly to fixture

Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

Dimension Inspection (Unit: mm)				
Item no.	Tip shoe/ Inner plate	POSITION		
		A	Z1	Z2
21	A	208.93	Acc.	Rej.
	B	209.03	Acc.	
	C	209.07	Rej.	
22	A	209.02	Acc.	Rej.
	B	208.90	Acc.	
	C	209.05	Rej.	
23	A	209.03	Acc.	Rej.
	B	209.24	Acc.	
	C	209.32	Rej.	
24	A	208.87	Acc.	Rej.
	B	208.90	Acc.	
	C	208.87	Rej.	

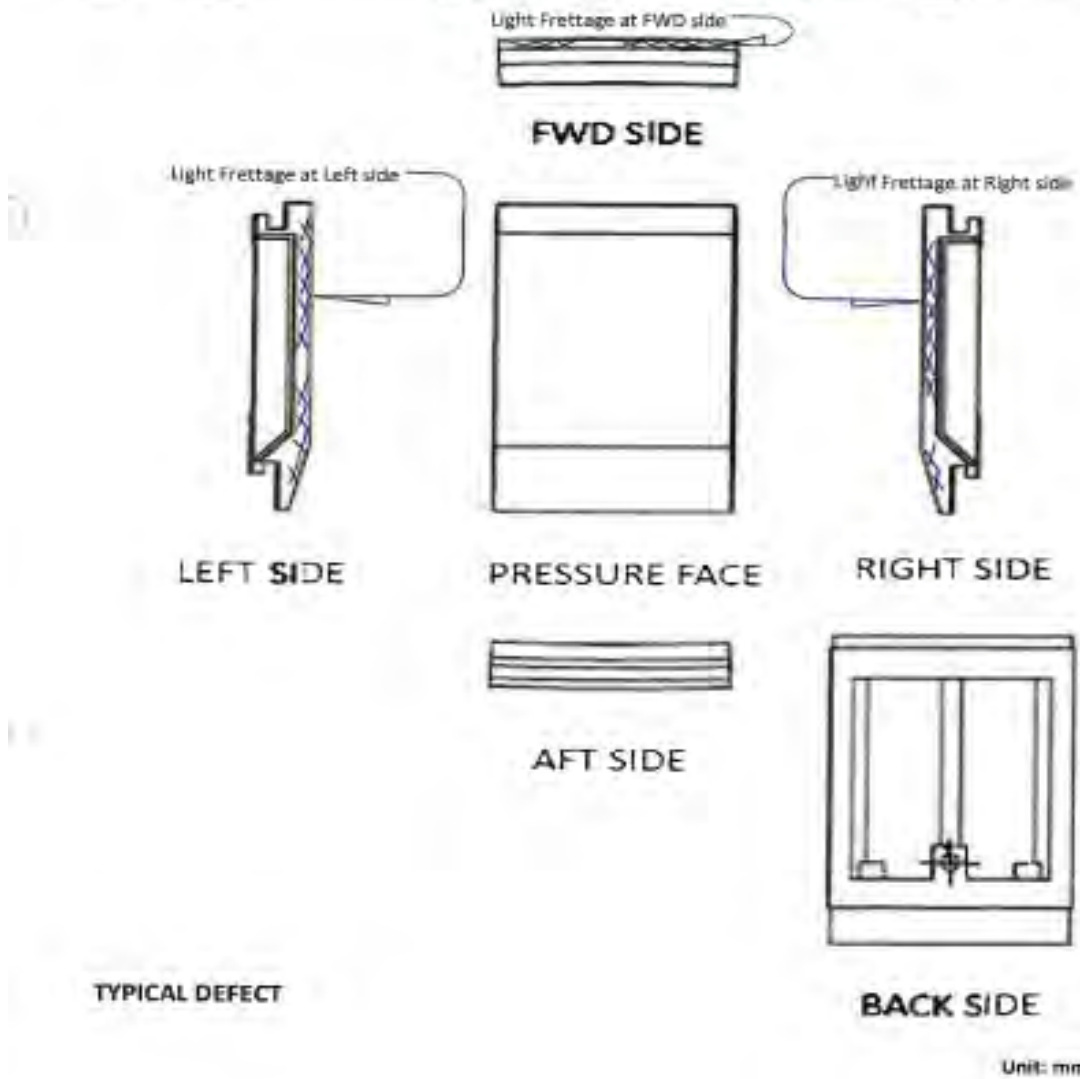
INCOMING INSPECTION REPORT

13. DEFECT MAP:

INSPECTION AND PROCESS RECORD SHEET	MS6001FA STAGE 1 SHROUD BLOCK		IPRS NO. 306B-40
	PART NUMBER : GESB01M6FA		REV. 00
CUSTOMER :	Nghi Son Refinery &	CUSTOMER PD :	W002232026-TP-LN-SH
JOB NUMBER :	825092	OP.:	0130
INSPECTED BY :	Methee	DATE :	04/04/2026

Mapping of FPI and Visual Inspection

Crack (red)
 Foreign Object Damage (LAWN)
 Pitting (LAWN)
 Corrosion (LAWN)
 Missing Material (red)



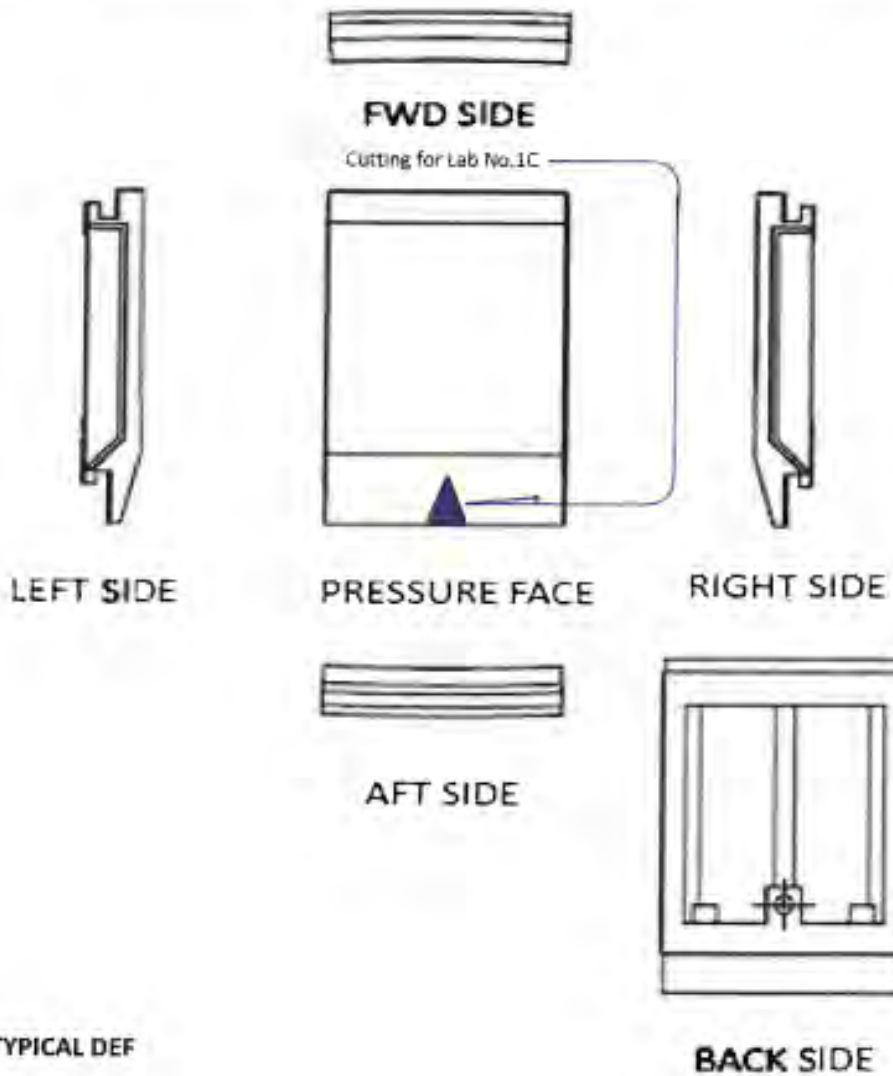
Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

INSPECTION AND PROCESS RECORD SHEET	MS6001FA STAGE 1 SHROUD BLOCK	IPRS NO.	3068-40
	PART NUMBER : GESB01M6FA	REV.	00
CUSTOMER :	Nghi San Refinery &	CUSTOMER PO :	WO02232026-TP-LN-5H
JOB NUMBER :	825092	OP.	0120
INSPECTED BY :	Methee	DATE :	04/04/2026

Mapping of FPI and Visual Inspection

Crack (mm)
 Porosity (Spot Diameter (L/WH))
 Porosity (L/WH)
 Oxidation (mm²)
 Corrosion (L/WH)
 Missing Material (mm²)



Unit: mm

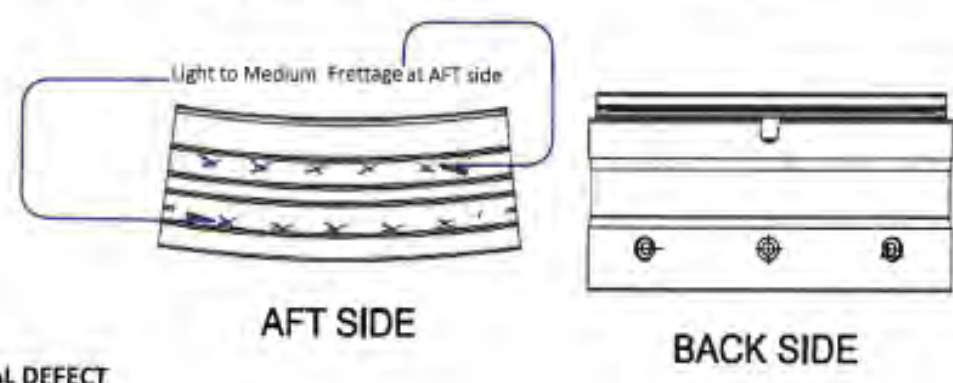
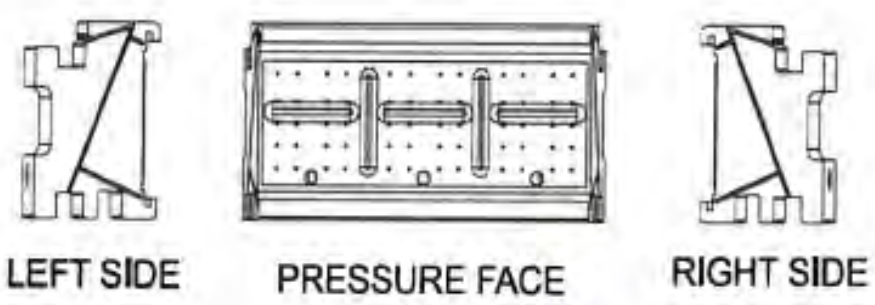
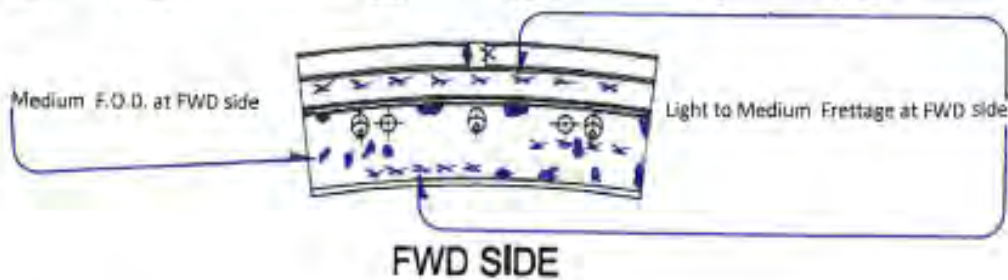
Work Order: 825092	MS6001FA 1st STAGE SHROUD BLOCK
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INCOMING INSPECTION REPORT

INSPECTION AND PROCESS RECORD SHEET	MS6001FA STAGE 1 SHROUD BLOCK		IPRS NO. 3068-40
	PART NUMBER : GESB01M6FA		REV. 00
CUSTOMER :	Nghi San Refinery &	CUSTOMER PO :	WO02232026-TP-LN-SH
JOB NUMBER :	825092	OP.	
INSPECTED BY :	Methee	DATE :	01/04/2026

Mapping of FPI and Visual Inspection

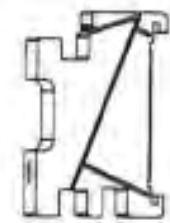
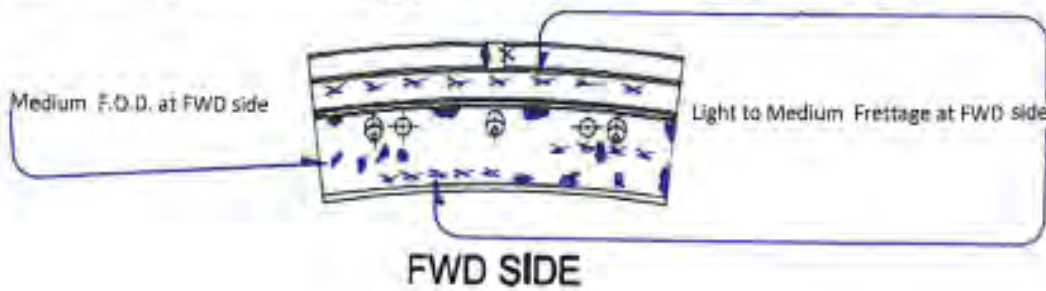
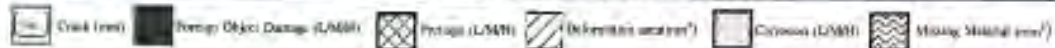
- Crack (mm)
- Foreign Object Damage (LMM)
- Fretting (LMM)
- Abrasion (LMM)
- Corrosion (LMM)
- Missing Material (mm²)



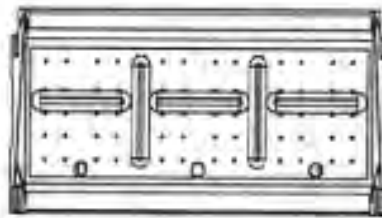
INCOMING INSPECTION REPORT

INSPECTION AND PROCESS RECORD SHEET	MS6001FA STAGE 1 SHROUD BLOCK		IPRS NO. 3068-40
	PART NUMBER : GESB01M6FA		REV. 00
CUSTOMER :	Nghi Son Refinery &	CUSTOMER PO :	WO02232026-TP-LN-SH
JOB NUMBER :	825092	OP.	
INSPECTED BY :	Methee	DATE :	01/04/2026

Mapping of FPI and Visual Inspection



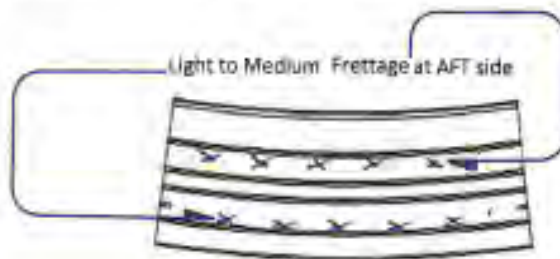
LEFT SIDE



PRESSURE FACE

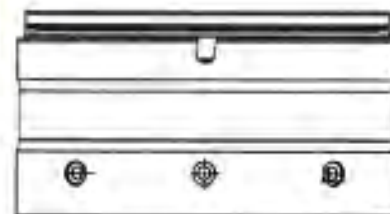


RIGHT SIDE



AFT SIDE

TYPICAL DEFECT



BACK SIDE



Subject: Refurbishment Incoming Inspection Reports and Capital Parts Condition

Dear NSRP Team,

UNEW is submitting the incoming inspection reports for the capital parts received for refurbishment. Our comments and concerns are based not only on the parts covered in the attached reports but also on components recently received by UNEW and parts visually observed during the recent outage. Across all these groups, we have consistently seen a pattern of **severe deterioration, heavy repair requirements, and limited remaining repair life.**

Based on our inspection results and field observations, many capital parts are in poor condition and require heavy repair. We must be transparent that some of these parts have reached a condition where they would normally be recommended for retirement and replacement with new components. However, we fully understand that NSRP may not have sufficient spare parts available in the warehouse for immediate replacement or for the upcoming inspection and outage requirements. For this reason, UNEW has made every effort to evaluate and save these parts where technically possible, so that NSRP has components available to continue operating the units. Some parts may be repairable for **one more service cycle only**, and this should be carefully factored into future outage planning and spare parts strategy.

The deteriorated condition of these parts is caused by several combined factors, including:

1. Operation under severe thermal and mechanical loading conditions, with frequent starts, shutdowns, emergency trips, and load changes. Each unplanned event subjects components to intense thermal cycling that accelerates wear, cracking, and material degradation over time.
2. Long service history with a high number of accumulated operating hours and repeated refurbishment cycles beyond the original design expectation.
3. Previous repairs were carried out with the primary objective of returning the parts to service for the next operating interval only, rather than fully restoring them to their original design condition. While this approach keeps the unit running in the short term, it means that each successive repair cycle starts from a lower baseline, and the useful life of the parts becomes progressively shorter with every overhaul.
4. Many of the original parts are generic OEM components designed for a broad fleet operating range and are not fully optimised for NSRP's specific fuel composition, refinery environment, and operating profile. Over time, this mismatch accelerates coating breakdown, oxidation, fretting, and dimensional distortion.

For the current refurbishment scope, UNEW will continue to repair and save the existing parts to the maximum extent technically possible. At the same time, we respectfully recommend that NSRP consider the following long-term strategy:

5. Maintain sufficient spare parts inventory for outage and emergency readiness, and plan for the retirement of parts that have reached the end of their practical repair life.
6. For new replacement parts, consider components that are better suited to NSRP's actual operating environment, fuel properties, and thermal cycling conditions rather than standard generic OEM variants.
7. Require future refurbishment work to restore parts to the best technically achievable condition and as close as practical to the original design specification, rather than accepting a minimum standard that only supports the next interval.



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8. Track the repair history and remaining repair life of each major capital part to reduce unexpected outage risk and support more effective long-term maintenance planning.

UNEW appreciates NSRP's continued trust and remains available to discuss individual part conditions, repair recommendations, and future replacement planning. We believe it is important to share this technical advice now so that NSRP can plan future refurbishment, replacement, and spare parts requirements more effectively. Please review the attached incoming inspection reports at your earliest convenience.