Eskom	User Requirement Specification	Nuclear Engineering

Title: **Roof and Celling Repairs of the Maintenance Service (MSB) Complex**

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Content

Page

Figures

1. Introduction

The MSB Complex is a combined maintenance workshop and office facility within ACP2 at Koeberg nuclear power station. The complex houses the following facilities:

- OPS work control
- RP office,
- Works control
- Dosimetry
- Medical centre
- RP DWS
- MMS
- Site Stores

In 2021 NSE carried out a civil structure inspection (JN864-NSE-ESKB-IR-8664). The NSE report made multiple findings related to the complex roof cladding and drainage system. The OH&S group manager invited engineering to a meeting following the audit findings of the IS0 45001 recertification. It was highlighted that personnel residing at the Maintenance Service Building (MSB) should be relocated and accommodated into an alternative building due to the numerous anomalies noted by the auditor, especially the roofing and drainage. Component Engineering-Civil was requested to investigate and recommend a suitable repair method for the MSB Complex roofing defects. Component Engineering-Civils recommendations are detailed in the attached letter “Repair of roof cladding recommendation(s) for the Maintenance Service Building complex (MSB)” [2]

2. Background

The Maintenance Services Building (MSB) is a reinforced concrete frame structure with pre-cast concrete panels supported from a concrete frame with three cladded roofs extending above the roof slab. The building houses the Mechanical Maintenance Service (MMS) Workshops, Site Stores, Decontamination Workshop, Work Control and Dosimetry Offices.

In 2010 the roof cladding was replaced. However, throughout the years, regular defects were noted on the roof cladding and by the building occupants. The main issues pointed out regarding the facility are blowing off of the roof cladding, roof water leakages, collapsing of the ceiling panels and drainage. The maintenance department has attended to the interim local roof repairs over the years, but the entire roof cladding has not been repaired as a whole since 2010. Hence, this contract seeks to restore the entire roof structure, ceiling panel and the associated roof drainage system.The following defects have been noted over the past years:

- The state of the roof cladding and fasteners has corroded beyond an acceptable condition.
- Visible water damage was observed in several ceiling panels of the complex.
- Multiple ceiling panels have caved in or collapsed due to the leaking roof cladding.
- Multiple roof gutters and downpipes are blocked, damaged and non-functional.

Figure 1: MSB Complex at Koeberg Nuclear Power Station

3. Scope of Supply

The *Contractor* is to submit a quotation for the supply of all labour, materials, equipment, and other services required to perform the work successfully.

The scope of work entails the following:

Roof Cladding:

- The *Contractor* shall Install a ASHGRID overlay cladding system above the existing roof cladding.
    - The roof consists of 3X duo-pitched structural roof structures with a total surface area of 4000m^2
    - The cladding sheet to be installed with the ASHGRID system must be resistant to coastal marine corrosive conditions. The *Contractor* must submit a technical specification of the proposed sheeting to ESKOM for review and acceptance prior to installation.
- The *Contractor* shall remove and replace all existing asbestos drainage gutters and downpipes with fibre cement drainage gutters and downpipes. The estimated linear length of the gutters is 600m with 72 x 2.8m downpipes
    - Drainage Gutters and downpipes must be resistant to coastal marine corrosive conditions. The *Contractor* must submit a technical specification of the proposed drainage gutters and downpipes to ESKOM for review and acceptance prior to installation.

- The *Contractor* shall clean all existing PVC drainage systems(gulleys and concrete embedded pipes) utilising high-pressure water jetting to enable free drainage of newly installed downpipes to the ground stormwater system.
- The *Contractor* shall sieve or clean sand particles from the aggregates stones to allow for free drainage of the concrete roof slab.
- The *Contractor* shall re-apply the water proofing on the intire concrete slab in accordance to 331-170: Requirements for Protective Coating for Use At KPNS.
- The *Contractor* shall remove and replace all existing roof ceiling panels, supports and associated fixings(i.e. ties and timbers beams)
    - All ceiling panels, supports and associated fixings are to be replaced with similar or equivalent products.
- The *Contractor* shall appoint an engineering consultant firm to provide the following services.

    - Architectural services
        - Appoint a professionally registered architect to design the required roof flashing in order to the close gaps between existing roof cladding and the newly installed ASHGRID overlay cladding system.
        - Generate new roof drawings to reflect all amended changes by the *Contractor*.
    - Engineering services
        - Appoint a professional registered structural engineer
        - The structural engineer is to analyse the existing structure and make recommendations where additional members (purlin, bracing, sag bars and rafters) are required to strengthen the roof.
        - The structural engineer is to analyse the impact of additional ASHGRID weight on the roof support beam.
        - Provide detailed calculations indicating how the roof support beams were analysed for additional ASHGRID weight.
        - Generate new roof drawings to reflect all amended changes by the Contractor.

The *Contractor* shall compile and submit a close-out report documenting/recording the replaced bolts and nuts and their interface building.

4. Purpose

This document specifies the requirements for installing an ASHGRID overlay roof cladding, replacing the ceiling panels, and replacing and cleaning the roof drainage system at the MSB complex.

5. Applicability

This document shall apply to Koeberg Operating Unit.

6. Referenced Documents

[1] JN864-NSE-ESKB-IR-8664: Civil structure inspection summary report

[2] CE -18233: Repair of roof cladding recommendation(s) for the maintenance service complex (MSB)

[3] Technical Brochure 2022: Ashgrid-spacer-support-system

[4] 331-170: Requirements for Protective Coating for Use At KPNS

7. Requirements

- The *Contractor* must be a structural steel *Contractor* with prior experience in roofing and refurbishment Works.
- The *Contractor* must be an ASHGRID certified installer or alternatively undergo the required ASHGRID certification prior to commencement of works.
- A site inspection and assessment of the structure prior to quoting is compulsory.
- The *Contractor* is to submit Eskom with a detailed method statement on how the *Contractor* will carry out the works detailed in section 3 prior to commencement of works.
- The method statement shall be accompanied by a Safety, Health and Environmental (SHE) file specific to the work scope and a quality check plan (QCP) (required after contract appointment) for acceptance by Eskom.
- The *Contractor* is required to provide a quality assurance programme to Eskom for acceptance prior to the start of the works indicating activities, responsible persons, hold and witness points
- The *Contractor* must appoint a qualified QC representative for QC approvals and site supervision.
- The *Contractor* shall take full responsibility for removing old material from the Koeberg site and the disposal.
- Structural steel works shall be performed in accordance with the SANS standard specification for Construction works Part CS1: Structural steelwork SANS 2001 CSI.
- Cladding fasteners works shall be performed in accordance with the SANS standard specification for Fasteners for roof and wall coverings in the form of sheeting SANS 1273.
- Roof and side cladding works shall be performed in accordance with the SANS standard specification for Roof and side cladding SANS 10237
- Roof support beam analysis shall be performed in accordance with the SANS standard specification Basis of Structural Design and Actions for Buildings and Industrial Structures SANS 10160 and structural use of steel SANS 10162
- Roof and side cladding works shall be performed in accordance with the SANS standard specification for Roof and side cladding SANS 10237
- All drawings shall be performed in accordance with the SANS standard specification for Building Drawing Practise SANS 10143:

- The *Contractor* is to submit a quotation to Eskom for the supply of all labour, materials and tools required to carry out works as stated in section 3.
- Eskom will provide electrical power (220v single phase) and potable water. However, Eskom takes no responsibility should these services not be available.
- The *Contractor* is to supply his own ablution facilities.
- The *Contractor* is to submit a close-out report documenting/recording the replaced parts and their interface with the building.
    - The Contractoris to supply ESKOM with all maintance manuals of all installed features(Cladding, drainage pipes, celling panels, ect) as part of the close-out report documenting/recording.
- All reports and documents submitted to Eskom should be provided in electronic format. Electronic copies of text files shall be in ‘doc’, ‘pdf’ and all drawings in ‘DWG’ format.

7.1 Asbestos handling and disposal

- Any removal and disposal of asbestos, asbestos containing materials and waste, is done by a registered asbestos *Contractor*, instructed by the *Employer* at the *Contractor*’s expense, and conducted in line with South African legislation.
- Contractor employees are required to successfully complete the required Asbestos training before access to Asbestos zones is considered.
- The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (“Asbestos Regulations”). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.
- The *Employer* ensures that the Ambient Air in the area where the *Contractor* will Provide the Services conforms to the acceptable prescribed South African standard for asbestos, as per the regulations published in GNR 155 of 10 February 2002, under the Occupational Health and Safety Act, 1993 (Act 85 of 1993) (“Asbestos Regulations”). The OEL for asbestos is 0.2 regulated asbestos fibres per millilitre of air as a 4-hour TWA, averaged over any continuous period of four hours, and the short term exposure limit of 0.6 regulated asbestos fibres per millilitre of air as a 10-minute TWA, averaged over any 10 minutes, measured in accordance with HSG248 and monitored according to HSG173 and OESSM.
- Upon written request by the Contractor, the Employer certifies that these conditions prevail. All measurements and reporting are effected by an independent, competent, and certified occupational hygiene inspection body, i.e. a SANAS accredited and Department of Employment and Labour approved AAIA. The Contractor may perform Parallel Measurements and related control measures at the Contractor’s expense. For the purposes of compliance the results generated from Parallel Measurements are evaluated only against South African statutory limits as detailed in bullet 4 above. Control measures conform to the requirements stipulated in the AAIA-approved asbestos work plan.

8. Use of the Consultant's design/reports/deliverables/drawings

- All documentation which forms part of the Scope is supplied to the Employer by the Consultant and forms part of the services which the Consultant has been compensated for.
- The Employer reserves the right to issue the Consultant's design/drawings/reports to Others for purposes of maintenance, construction, spares, verifications, modifications in future or any other purposes required by the Employer. The Employer has total rights to use the Consultant's designs as the Employer requires.
- The Consultant notes that all drawings and other documentation supplied to the Employer become the property of the Employer upon final transfer. The Consultant disclaims upfront whether the use of his Intellectual Property is required to carry out services, for which case the Employer has permission to use the information forming part of the services without incurring any royalties.

9. Attachments

a) Civil structure inspection summary report

b) Repair of roof cladding recommendation(s) for the maintenance service complex (MSB)

c) Ashgrid-spacer-support-system technical brochure

d) Requirements for Protective Coating for Use At KPNS

ATTACHMENT A

Eskom		Reference No.: KFU-042	
		Revision: 0	Page 1 of 2
		Associated Procedure:	KSA-128

TRIGRAMME	BUILDING NAME	STATUS

DATE OF LAST INSPECTION	DATE OF CURRENT INSPECTION	DATE OF NEXT INSPECTION	METHOD	EXTENT	W/O

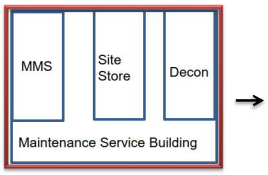
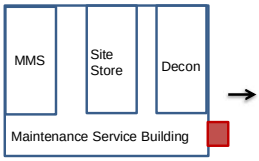
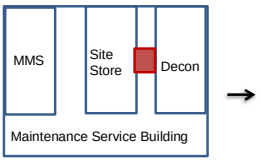
NSE performed the internal and external inspection of the Unit 6 Maintenance Service Complex.

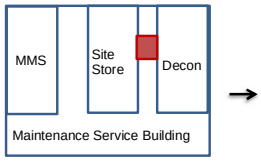
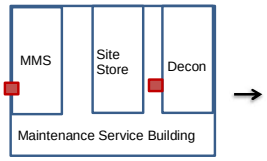
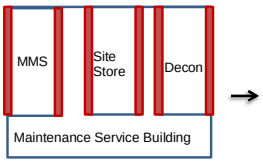
The defects and remedial actions are contained in the attached report JN864-NSE-ESKB-IR-8664 consisting of 15 pages.

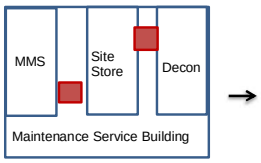
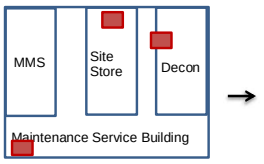
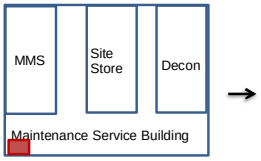
NO.	DESCRIPTION	REFERENCE Nº
1	Corrective action 6HSM-C-049 is to be addressed by MWCB.	
2	Corrective action 6HSM-C-050 is to be addressed by MWCB.	
3		
4		
5		
6		
7		
1	Corrective actions 6HSM-C-001, 6HSM-C-006, 6HSM-C-010 and 6HSM-C-012 are to be addressed by MWCB.	23994500 X-Ref 716693724
2	Corrective action 6HSM-C-004 is to be addressed by the System Engineer.	25434528
3	Corrective action 6HSM-C-005 are to be addressed by MWDR.	22757906 X-Ref 715895539
4	Corrective action 6HSM-C-011 is to be addressed by MWPT.	24586571 X-Ref 719521182
5	Corrective action 6HSM-C-014 is to be addressed by MWCB.	22895016 X-Ref 712831390
6	Corrective action 6HSM-C-015 requires no action to be taken.	N/A
7	Corrective actions 6HSM-C-016, 6HSM-C-017, 6HSM-C-018, 6HSM-C-019 and 6HSM-C-020 are to be addressed by MWCB.	23994309 X-Ref 716693158
8	Corrective action 6HSM-C-021 is to be addressed by MWPT.	24586572 X-Ref 719521176
9	Corrective action 6HSM-C-022 is to be addressed by the System Engineer.	24586573 X-Ref 719521432
10	Corrective actions 6HSM-C-023, 6HSM-C-026, 6HSM-C-028, 6HSM-C-029 and 6HSM-C-030 are to be addressed by MWCB.	23994405 X-Ref 716693489
11	Corrective action 6HSM-C-025 is to be addressed by the System Engineer.	23994410 X-Ref 716703799
12	Corrective actions 6HSM-C-027, 6HSM-C-031, 6HSM-C-033, 6HSM-C-034 and 6HSM-C-035 are to be addressed by MWPT. : MWPT only to complete corrective actions 6HSM-C-033, 6HSM-C-034 and 6HSM-C-035 once MWMM has completed its action(s). (Old notification number 23994442 closed on the 27-09-2017, CR raised).	24676601 X-Ref 719873729

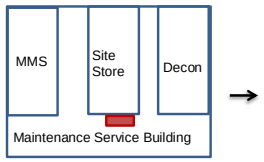
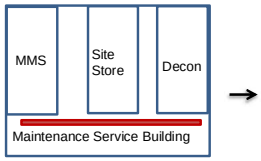
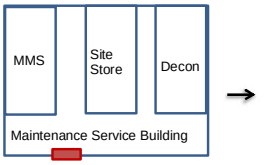
13	Corrective action 6HSM-C-032 is to be addressed by MWDR.	23791333 X-Ref 715895539
14	Corrective actions 6HSM-C-033, 6HSM-C-034 and 6HSM-C-035 are to be addressed by MWMM. (Old notification 23994443 closed 2017.09.27 X-Ref 716702670 ; re-raise 2018.12.17 to MWPT)	24676601 X-Ref 719873729
15	Corrective action 6HSM-C-037 is to be addressed by MWCB. (Old notification number 24325478 closed on the 23-08-2017, CR raised).	24676602 X-Ref 719873217
16	Corrective action 6HSM-C-039 is to be addressed by MWCB.	25004627 X-Ref 721219403
17	Corrective action 6HSM-C-040 is to be addressed by MWPT.	24890712
18	Corrective action 6HSM-C-041 is to be addressed by MWCB. (Old notification number 24325533 closed on 03-03-2018, CR raised).	24676604 X-Ref 719873216
19	Corrective actions 6HSM-C-042 and 6HSM-C-43 are to be addressed by MM9.	24507059 24509969
20	Corrective action 6HSM-C-045 is to be addressed by MWPT.	25429485
21	Corrective action 6HSM-C-048 is to be addressed by MWCB.	25429486

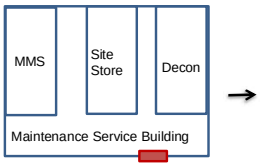
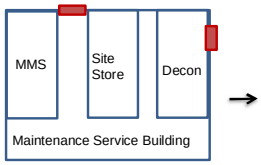
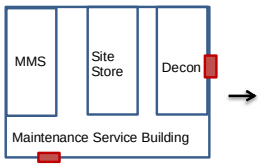
Corrective actions 6HSM-C-002, 6HSM-C-003, 6HSM-C-007, 6HSM-C-008, 6HSM-C-009, 6HSM-C-013, 6HSM-C-024, 6HSM-C-036, 6HSM-C-038, 6HSM-C-044, 6HSM-C-046 and 6HSM-C-047 have been repaired.

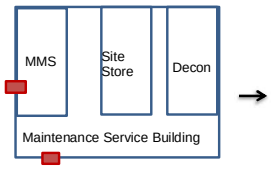
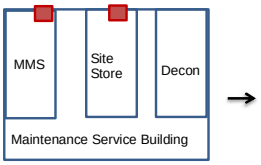
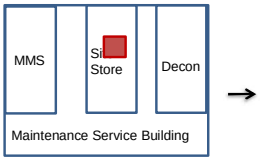
5,7					
Component defect for - Load Bearing Walls		Defect Number: 6HSM-C-001	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994500
7,4		Delamination and repair failure noted on the pre-cast concrete wall panels caused by rebar corrosion. Most delamination has been repaired. At various locations on the external façade of the Maintenance Service Complex.		IF = 8 EF = 8 DF = 10	Break out all delaminated concrete and repair in accordance with Civil Maintenance Repair manual C-02A. 
		Complexity	Moderate	ED = 30	
		Urgency	Within 1 Year	CF = 7,0	
Component defect for - Cable/Ducting/Pipes		Defect Number: 6HSM-C-004	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 25424528
6,0		Severely corroded conduit pipes. On the northern side below the staircase landing of the Maintenance Service Building.		IF = 3 EF = 8 DF = 6	For System Engineers attention. 
		Complexity	Simple	ED = 100	
		Urgency	Immediately	CF = 8,0	
Component defect for - Doors		Defect Number: 6HSM-C-005	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 22757906 Xref 715895539
7,4		Door frame is severely corroded. Ventilation structure on the roof of the Maintenance Service Building situated between Decon and Site Stores.		IF = 5 EF = 8 DF = 10	Coat in accordance with Eskom Procedure 331-170. 
		Complexity	Moderate	ED = 90	
		Urgency	Immediately	CF = 9,0	

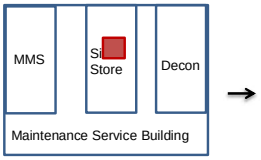
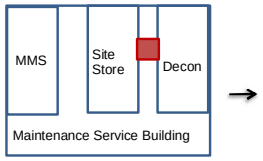
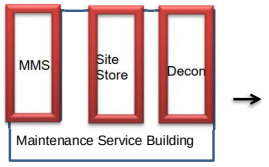
5,7				
Component defect for - Load Bearing Walls	Defect Number: 6HSM-C-006	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994500
7,4 	Large area of spalled concrete caused by rebar corrosion. The plaster covering the structure has degraded extensively in some areas. Ventilation structure on the roof of the Maintenance Service Building situated between Decon and Site Stores.		IF = 8 EF = 8 DF = 10	Break out all delaminated concrete and repair in accordance with Civil Maintenance Repair Manual C-02A. Remove degraded plaster and reinstate to original condition. 
	Complexity	Moderate	ED = 30	
	Urgency	Within 1 Year	CF = 7,0	
Component defect for - Gutters/Down Pipes/Drains & Channels	Defect Number: 6HSM-C-010	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994500
5,8 	Missing downpipes. Various locations on the Maintenance Service Complex roof.		IF = 4 EF = 8 DF = 10	Replace missing down pipes with equivalent. Ensure all stormwater is able to drain freely to catchpit areas. 
	Complexity	Simple	ED = 30	
	Urgency	Immediately	CF = 7,0	
Component defect for - Roof Structure	Defect Number: 6HSM-C-011	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24586571
9,0 	Extensive corrosion on soffit plate to which gutters are fixed. Various locations on the Maintenance Service Complex roof.		IF = 10 EF = 8 DF = 8	Remove all corrosion from repairable plates and re-coat according to Eskom Procedure 331-170. Irreparable items to be replaced with equivalent. Return gutters to original position once repairs are complete. 
	Complexity	Simple	ED = 90	
	Urgency	Immediately	CF = 8,3	

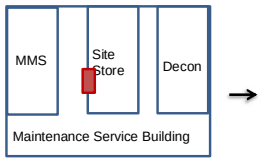
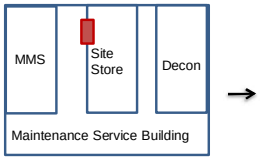
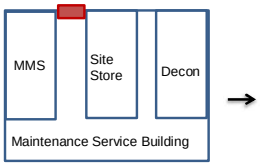
5,7				
Component defect for - Gutters/Down Pipes/Drains & Channels	Defect Number: 6HSM-C-012	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994500
5,0 	Extensive vegetation growth covering sections of the chipstone, impeding storm water flow. Various locations on the Maintenance Service Complex roof.		IF = 4 EF = 8 DF = 6	Remove all vegetation growth from the roof and ensure storm water is able to drain freely towards the catchpits. 
	Complexity	Simple	ED = 30	
	Urgency	Immediately	CF = 5,7	
Component defect for - Stairs/Platforms/Ladders	Defect Number: 6HSM-C-014	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 22895016
7,0 	Degraded coating on landing and floor due to high traffic. On the south eastern and north western sides inside the Maintenance Service Complex and Site Store.		IF = 8 EF = 6 DF = 6	Re-coat in accordance with Eskom Procedure 331-170. 
	Complexity	Simple	ED = 70	
	Urgency	Within 1 Year	CF = 6,3	
Component defect for - Load Bearing Walls	Defect Number: 6HSM-C-015	Prior to 2016	Defect Factors	Corrective Actions SAP Number: N/A
5,9 	Horizontal and vertical cracks < 0.5mm in width. On the southern side of the building, adjacent to fire door 6JFD008DF along stairwell leading down to the -2.00m level.		IF = 8 EF = 6 DF = 6	No action required. Defect does not affect structural integrity of the wall. 
	Complexity	Not Applicable	ED = 15	
	Urgency	No action required	CF = 4,5	

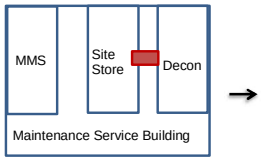
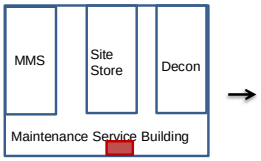
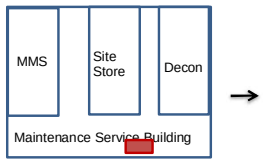
5,7				
Component defect for - Joint/Seal	Defect Number: 6HSM-C-016	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994309
5,0 	Construction joint on concrete wall has degraded. On the -2.00m level of the Maintenance Service Complex building, along the western wall of the gallery.		IF = 4 EF = 6 DF = 6	Repair according to Civil Maintenance Repair Manual J-03. 
	Complexity	Simple	ED = 50	
	Urgency	Within 1 Year	CF = 5,7	
Component defect for - Gutters/Down Pipes/Drains & Channels	Defect Number: 6HSM-C-017	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994309
5,8 	Blocked channel due to a build up of sludge. On the -2.00m level of the Maintenance Service Complex building along the western wall of the gallery.		IF = 4 EF = 6 DF = 8	Source of leakage to be identified and repaired. All sludge and debris to be removed from channel. Ensure water is able to flow freely along channel. 
	Complexity	Simple	ED = 70	
	Urgency	Immediately	CF = 7,0	
Component defect for - Joint/Seal	Defect Number: 6HSM-C-018	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994309
5,4 	Joint sealant between the pre-cast concrete wall panels has degraded. Next to the eastern entrance of the Maintenance Service Complex.		IF = 4 EF = 8 DF = 6	Degraded sealant to be removed. Joint to be resealed with Sikaflex-1a non-sag elastomeric sealant. 
	Complexity	Simple	ED = 50	
	Urgency	Within 1 Year	CF = 6,3	

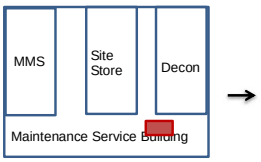
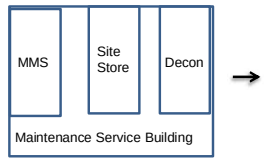
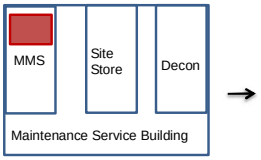
5,7				
Component defect for - Windows	Defect Number: 6HSM-C-019	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994309
6,8		Cracked window pane. Eastern side of the Maintenance Service complex, between the Medical Centre and Whole Body Count room.	IF = 5 EF = 8 DF = 8	Replace cracked window pane with equivalent and in accordance with SANS 10400 N.B.R. 
		Complexity: Simple	ED = 80	
		Urgency: Immediately	CF = 8,0	
Component defect for - Load Bearing Walls	Defect Number: 6HSM-C-020	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994309
6,8		Obsolete anchors in wall have corroded extensively. The corroded anchors could eventually cause concrete delamination. Northern and western sides of the Maintenance Service Complex.	IF = 8 EF = 8 DF = 8	Obsolete anchors to be removed and the holes to be repaired with Sika Rep LW repair mortar. 
		Complexity: Simple	ED = 20	
		Urgency: Within 1 Year	CF = 6,0	
Component defect for - Doors	Defect Number: 6HSM-C-021	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24586572
5,6		Repaired door and frame have started to corrode again. On the south eastern and northern sides of the Maintenance Service Complex.	IF = 5 EF = 8 DF = 8	Remove all corrosion and re-coat in accordance with Eskom Procedure 331-170. 
		Complexity: Simple	ED = 20	
		Urgency: Within 1 Year	CF = 6,0	

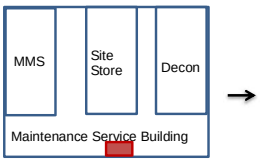
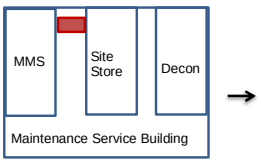
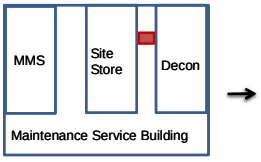
5,7				
Component defect for - Cable/Ducting/Pipes	Defect Number: 6HSM-C-022	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24586573
5,2 	Cable tray is severely corroded. Cable hanging loose outside cable tray. On the south and east sides of the Maintenance Service Complex.		IF = 3 EF = 8 DF = 6	For System Engineers attention. 
	Complexity	Simple	ED = 60	
	Urgency	Immediately	CF = 6,7	
Component defect for - Load Bearing Walls	Defect Number: 6HSM-C-023	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994405
6,8 	Previous patch repairs are cracking and delaminating. Impact damage noted in places. On the western side by the entrance to MMS and Site Store of the Maintenance Service Complex.		IF = 8 EF = 8 DF = 8	Remove all previous repair material. Repair concrete in accordance with Civil Maintenance Repair Manual C-02A. 
	Complexity	Moderate	ED = 20	
	Urgency	Within 1 Year	CF = 6,0	
Component defect for - Cable/Ducting/Pipes	Defect Number: 6HSM-C-025	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994410
8,4 	Severe localized corrosion has created holes in the steel DVA pipes allowing water to leak out . On the +3.00m level, site store area of the Maintenance Service Complex.		IF = 8 EF = 6 DF = 10	For System Engineers attention. 
	Complexity	Moderate	ED = 100	
	Urgency	Immediately	CF = 8,7	

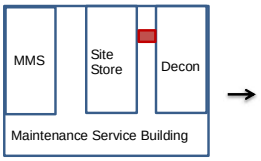
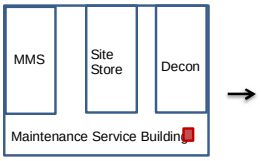
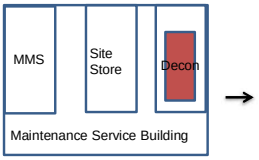
5,7				
Component defect for - Slabs Suspended	Defect Number: 6HSM-C-026	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994405
6,8 	Corrosion staining on the floor caused by corroding steel pipes overhead. On the +3.00m level, site store area of the Maintenance Service Complex.		IF = 10 EF = 6 DF = 6	Re-coat affected area in accordance with Eskom Procedure 331-170 once pipes have been repaired. 
	Complexity	Simple	ED = 20	
	Urgency	Within 1 Year	CF = 4,7	
Component defect for - Louvres/Vents	Defect Number: 6HSM-C-027	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24676601
7,2 	Extensively corroded vent exhaust and aircon unit. On the roof of the Maintenance Service Complex.		IF = 6 EF = 8 DF = 8	Remove corrosion and re-coat in accordance with Eskom Procedure 331-170. Irreparable items to be replaced with equivalent. 
	Complexity	Simple	ED = 80	
	Urgency	Immediately	CF = 8,0	
Component defect for - Gutters/Down Pipes/Drains & Channels	Defect Number: 6HSM-C-028	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994405
6,2 	Metal brackets supporting gutters are severely corroded. On the roof of the Maintenance Service Complex.		IF = 4 EF = 8 DF = 8	Remove corrosion from repairable items and re-coat in accordance with Eskom Procedure 331-170. Irreparable items to be replaced with galvanized equivalent. 
	Complexity	Simple	ED = 70	
	Urgency	Immediately	CF = 7,7	

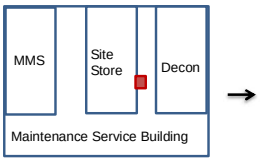
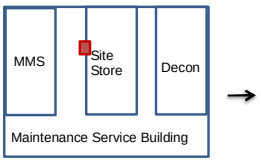
5,7				
Component defect for - Columns		Defect Number: 6HSM-C-029 Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994405
7,6		Delaminating concrete on column. On the roof of the Maintenance Service Complex. Complexity: Moderate Urgency: Immediately	IF = 10 EF = 8 DF = 8 ED = 20 CF = 6,0	Break out delaminating concrete and repair in accordance with Civil Maintenance Repair Manual C-02A. 
Component defect for - Columns		Defect Number: 6HSM-C-030 Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23994405
7,8		Spalled concrete caused by rebar corrosion. On the roof of the Maintenance Service Complex. Complexity: Moderate Urgency: Immediately	IF = 10 EF = 8 DF = 10 ED = 10 CF = 6,3	Break out loose concrete, remove corrosion from rebar and repair in accordance with Civil Maintenance Repair Manual C-02A. 
Component defect for - Stairs/Platforms/Ladders		Defect Number: 6HSM-C-031 Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24676601
7,4		Balustrade is extensively corroded. On the roof of the Maintenance Service Complex. Complexity: Simple Urgency: Immediately	IF = 8 EF = 8 DF = 8 ED = 50 CF = 7,0	Remove corrosion and re-coat in accordance with Eskom Procedure 331-170. Irreparable items to be replaced with equivalent. 

5,7				
Component defect for - Doors	Defect Number: 6HSM-C-032	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 23791333 X-Ref 715895539
6,8 	Metal door has large hole behind handle caused by corrosion. Sliding bolt corroded. On the roof of the Maintenance Service Complex.		IF = 5 EF = 8 DF = 8	Remove door handle and corrosive product from door. Weld a suitable metal plate over damaged section of the door and re-coat in accordance with Eskom Procedure 331-170. Reinstate door handle and fit new sliding bolt. 
	Complexity	Simple	ED = 80	
	Urgency	Immediately	CF = 8,0	
Component defect for - Foundation Walls/Bases/Plinths/Anchors	Defect Number: 6HSM-C-033	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24676601
8,2 	Base plate and anchor bolts supporting tank are severely corroded. On the -2.00m level of the Maintenance Service Complex along the eastern wall of the gallery.		IF = 10 EF = 6 DF = 8	Remove corrosion from base plate and re-coat in accordance with Eskom Procedure 331-170. Replace anchor bolts with equivalent and cover with denso tape. 
	Complexity	Simple	ED = 70	
	Urgency	Immediately	CF = 7,0	
Component defect for - Beams/Struts & Ties	Defect Number: 6HSM-C-034	Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24676601
7,6 	Cable tray support stanchions are severely corroded. On the -2.00m level of the Maintenance Service Complex along the eastern wall of the gallery.		IF = 10 EF = 6 DF = 8	Remove corrosion from stanchions and re-coat in accordance with Eskom Procedure 331-170. Remove one anchor bolt for inspection. Replace bolts if condition is unacceptable. 
	Complexity	Simple	ED = 40	
	Urgency	Immediately	CF = 6,0	

5,7				
Component defect for - Beams/Struts & Ties		Defect Number: 6HSM-C-035 Prior to 2016	Defect Factors	Corrective Actions SAP Number: 24676601
7,6		Halfen rails and anchor bolts supporting electrical box are corroded. On the -2.00m level of the Maintenance Service Complex along the western wall of the gallery.	IF = 10 EF = 6 DF = 8	Remove all corrosion from rails and re-coat in accordance with Eskom Procedure 331-170. Remove one anchor bolt for inspection. Replace bolts if condition is unacceptable. 
		Complexity: Simple	ED = 40	
		Urgency: Immediately	CF = 6,0	
Component defect for - Ceilings		Defect Number: 6HSM-C-037 Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 24676602
7,2		Leaking in various areas is causing extensive damage to ceilings and office equipment. Above radiation protection offices.	IF = 8 EF = 4 DF = 10	Locate source of the leaks and repair. Damaged ceiling panels to be replaced with equivalent once all leaks have been repaired. 
		Complexity: Moderate	ED = 60	
		Urgency: Immediately	CF = 6,7	
Component defect for - Ceilings		Defect Number: 6HSM-C-039 Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 25004627
8,0		Loose ceiling boards. Risk of personnel being injured and damage to equipment. Inside MMS stores, towards the western end of the building.	IF = 8 EF = 6 DF = 10	Reinstate all loose ceiling boards to original position. Damaged ceiling boards or support framework to be replaced with equivalent. 
		Complexity: Moderate	ED = 80	
		Urgency: Immediately	CF = 8,0	

5,7				
Component defect for - Other		Defect Number: 6HSM-C-040 Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 24890712
7,8		Component on top of tank is severely corroded. On the -2.00m level of the Maintenance Service Complex along the eastern wall of the gallery.	IF = 8 EF = 6 DF = 8	For System Engineers attention. 
		Complexity: Simple	ED = 90	
		Urgency: Immediately	CF = 7,7	
Component defect for - Other		Defect Number: 6HSM-C-041 Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 24676604
9,6		Poor housekeeping. Loose steel components have been left lying on the roof. Strong winds could blow the components off the roof. Risk of personnel being injured. On the roof of the Maintenance Service Complex.	IF = 10 EF = 8 DF = 10	All loose steel components and debris to be removed. 
		Complexity: Simple	ED = 100	
		Urgency: Immediately	CF = 9,3	
Component defect for - Other		Defect Number: 6HSM-C-042 Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 24507059 24509969
7,4		Motor on the cooling tower is extensively corroded. On the roof of the Maintenance Service Complex.	IF = 8 EF = 8 DF = 8	For System Engineers attention. 
		Complexity: Simple	ED = 50	
		Urgency: Immediately	CF = 7,0	

5,7					
Component defect for - Other		Defect Number: 6HSM-C-043	Identified: 2017 Q4	Defect Factors	Corrective Actions SAP Number: 24507059 24509969
7,0		Flange on the cooling Tower is severely corroded. On the roof of the Maintenance Service Complex.		IF = 6 EF = 8 DF = 8	For System Engineers attention. 
		Complexity	Simple	ED = 70	
		Urgency	Immediately	CF = 7,7	
Component defect for - Doors		Defect Number: 6HSM-C-045	Identified: 2020 Q3	Defect Factors	Corrective Actions SAP Number: 25429485
5,4		Bottom section of door is extensively corroded. On the -2.00m level of the Maintenance Service Complex, on the northern end of the gallery.		IF = 5 EF = 6 DF = 8	Remove corrosion and re-coat in accordance with Eskom Procedure 331-170. Irreparable items to be replaced with equivalent 
		Complexity	Moderate	ED = 30	
		Urgency	Immediately	CF = 5,7	
Component defect for - Slabs on Fill		Defect Number: 6HSM-C-048	Identified: 2020 Q3	Defect Factors	Corrective Actions SAP Number: 25429486
5,6		Floor Coating has deteriorated. The internal floor area of the Decon Workshop.		IF = 6 EF = 6 DF = 6	Remove degraded coating and re-coat in accordance with Eskom Procedure 331-170. 
		Complexity	Moderate	ED = 40	
		Urgency	Within 1 Year	CF = 5,3	

5,7				
Component defect for - Louvres/Vents		Defect Number: 6HSM-C-049 Identified: 2021 Q3	Defect Factors	Corrective Actions SAP Number:
8,0		Steel louvre has dislodged from original position and is damaged. This is a safety concern as strong winds could blow the louvre off the roof, endagering personnel walking below On the roof between the Site Store and Decon Workshop.	IF = 6 EF = 8 DF = 10	Reinstate louvre to original position. Irreparable items to be replaced with equivalent. 
		Complexity: Simple	ED = 100	
		Urgency: Immediately	CF = 9,3	
Component defect for - Gutters/Down Pipes/Drains & Channels		Defect Number: 6HSM-C-050 Identified: 2021 Q3	Defect Factors	Corrective Actions SAP Number:
6,4		Section of gutter is broken. On the roof between the Site Stores and the MMS Workshop.	IF = 4 EF = 8 DF = 10	Replace damaged section of gutter with equivalent. 
		Complexity: Simple	ED = 60	
		Urgency: Immediately	CF = 8,0	

ATTACHMENT B

Eskom

To: Sam Tshabalala
OH&S Manager

Date: **06 June 2022**

Enquiries:
Aluwani Maumela
Tel: +27 21 552 4166
Fax : N/A

Your reference:

Our reference:
CE -18233

REPAIR OF ROOF CLADDING RECOMMENDATION (S) FOR THE MAINTENANCE SERVICE COMPLEX (MSB)

The OH&S group manager invited engineering to a meeting following the audit findings of the IS0 45001 recertification, where it was highlighted that personnel residing at the Maintenance service building should be reallocated and accommodated to an alternative building due to the numerous anomalies found by the auditor, especially the roof cladding. Component Engineering-Civil was requested to investigate and recommend a suitable repair method for the Maintenance Service Building Complex roof cladding system.

Discussions with personnel residing in the building were conducted to understand the problem's background and history. In addition, plant walk down was carried out to determine and verify the insitu conditions such as roof cladding, roof drainage system, architectural components, etc.

This memo will primarily focus on the following building components:

- Roof cladding
- Roof drainage

The following plant systems and components are not part of the scope but have been identified as areas of concerns. The detail of the issues identified can be found in the attached report (JN864-NSE-ESKB-IR-8664):

- Fire protection systems
- Electrical systems
- Fire Detection systems
- Radiological Protection systems
- Structural components
- Civil components
- Wet services
- Architectural components

In 2021 NSE carried out a civil structure inspection (JN864-NSE-ESKB-IR-8664). The NSE report details the state and condition of various civil and structural components of the building. The report also makes recommendations and requires remedial action to mitigate the deterioration of the Maintenance Service Complex. In addition, Component Engineering-Civil carried out a plant walk down on the 1st of June 2022 to assess the existing condition of the roof cladding system.

FINDINGS

Walk down findings:

- From the walk down, it was evident that the state of the roof cladding and fixing components has corroded beyond an acceptable state.

Figure 1. The general condition of the internal roof structure

- Visible water damage was observed in several ceiling panels of the complex. Multiple ceiling panels have caved in or collapsed due to the leaking roof cladding.

Figure 2. Damaged ceiling panels

- The walk down also revealed that multiple roof gutters and downpipes are blocked or damaged and non-functional.

Figure 3. Damaged roof drainage system

- Upon assessing roof cladding and the general building conditions, it was evident that the building is in non-compliance with the KNPS Civil Preventative Maintenance Programme (KAU-029), National building regulations (SANS10400), and the Occupational Health and Safety Act.
- The general state of the building is unacceptable and poses a safety risk to the building occupants.

NSE Civil Structure Inspection (JN864-NSE-ESKB-IR-8664) report findings:

It must be noted that the below listed defects were identified before 2018. These are long outstanding defects with no corrective maintenance performed (See attached report).

- Defect Number 6HSM-C-010 - prior to 2016: identified several missing downpipes. And this further hindered the drainage system of the roof and the building.
- Defect Number: 6HSM-C-011 - prior to 2016: identified extensive corrosion on soffit plate supporting gutters at various locations.
- Defect Number: 6HSM-C-012 - prior to 2016: identified extensive vegetation growth covering sections of the chipstone, impeding stormwater flow at various locations.
- Defect Number: 6HSM-C-017 - prior to 2016: identified blocked channel due to a build-up of sludge on the -2.00m level of the Maintenance Service Complex building along the gallery's western wall.
- Defect Number: 6HSM-C-028 - prior to 2016: Metal brackets supporting gutters are severely corroded on the roof of the Maintenance Service Complex.
- Defect Number: 6HSM-C-037 identified 2017 Q4: Leaking in various areas is causing extensive damage to ceilings and office equipment above radiation protection offices.
- Defect Number: 6HSM-C-039 identified 2017 Q4: Leaking in various areas is causing extensive damage to ceilings and office equipment Inside MMS stores, towards the western end of the building.
- Defect Number: 6HSM-C-050 identified 2021 Q3: Sections of gutter is broken on the roof between the Site Stores and the MMS Workshop.

RECOMMENDATIONS:

Based on the walkdown and the inspection report findings, engineering recommends the following options:

- The below-listed options are intended to address the roof cladding system issues of the Maintenance Service Complex. However, a qualified building inspector is required to conduct a complete building inspection and confirm the compliance of the building to the national building regulations (SANS10400) and the Occupational Health and Safety Act.

- The options mentioned below are to be implemented immediately and are not intended to relieve the maintenance department of its responsibility to implement NSE recommended remedial actions as detailed in the NSE Civil Structure Inspection report (JN864-NSE-ESKB-IR-8664).

Option 1

- ASHGRID overlay cladding system is to be installed above the existing roof cladding by a ASHGRID accredited roofing contractor. An architect is to be consulted regarding required finishes and flashing schedules. It should be noted that the sheeting selection is to be appropriate cladding sheeting resistant to coastal marine corrosive conditions such as Safal Steel AZ200 or Chromadek C4/C5(See attached specifications). The ASHGRID system is an off the shelf item(see attached specification) that has been previously used at KNPS on the CAF, DWE and HWS buildings.
- Drainage systems (gutters, downpipes, catchpits, etc.) must be repaired as per recommendations detailed in NSE Civil Structure Inspection(JN864-NSE-ESKB-IR-8664)
- Complete removal and reinstallation of all water damaged ceiling panels and associated fixings components.
- This is the preferred option by engineering as a way forward.

Option 2

- Complete removal and reinstallation of the existing roof cladding with emphasis placed on selecting the appropriate cladding sheet resistant to coastal marine corrosive conditions such as Safal Steel AZ200 or Chromadek C4/C5 (See attached specification).
- Drainage systems(gutters, downpipes, catchpits, etc.) must be replaced as per recommendations detailed in NSE Civil Structure Inspection(JN864-NSE-ESKB-IR-8664)
- Complete removal and reinstallation of all water damaged ceiling panels and associated fixings components.

General

- All recommended actions as per NSE Civil Structure Inspection (JN864-NSE-ESKB-IR-8664) are to be implemented to ensure building compliance with KNPS Civil Preventative Maintenance Programme (KAU-029). A multidiscipline working group is encouraged to address these defects stemming from the report.
- All the asbestos gutter, downpipes, downpipe brackets, and fasteners are to be replaced with an equivalent corrosion-resistant material such as PVC or fibre cement.
- Discussions with personnel residing in the building also revealed a need for additional workspace. It has been previously suggested that consideration should be given to the construction of an extra level within the building. This option will require a modification to be raised with the design engineering department.

Attachments

- 6HSM00BG - JN864-NSE-ESKB-IR-8664: Civil Structure Inspection Summary Report
- Ashgrid-spacer-support-system Technical Specification
- 004807SS: SAFAL Steel Technical Brochure
- Chromadek Technical datasheet C1.4

Should you require any further information, please do not hesitate to contact CE.

Technically Reviewed by: _____
T. Moila

M Moeketsi
MANAGER: COMPONENT CIVIL ENGINEERING

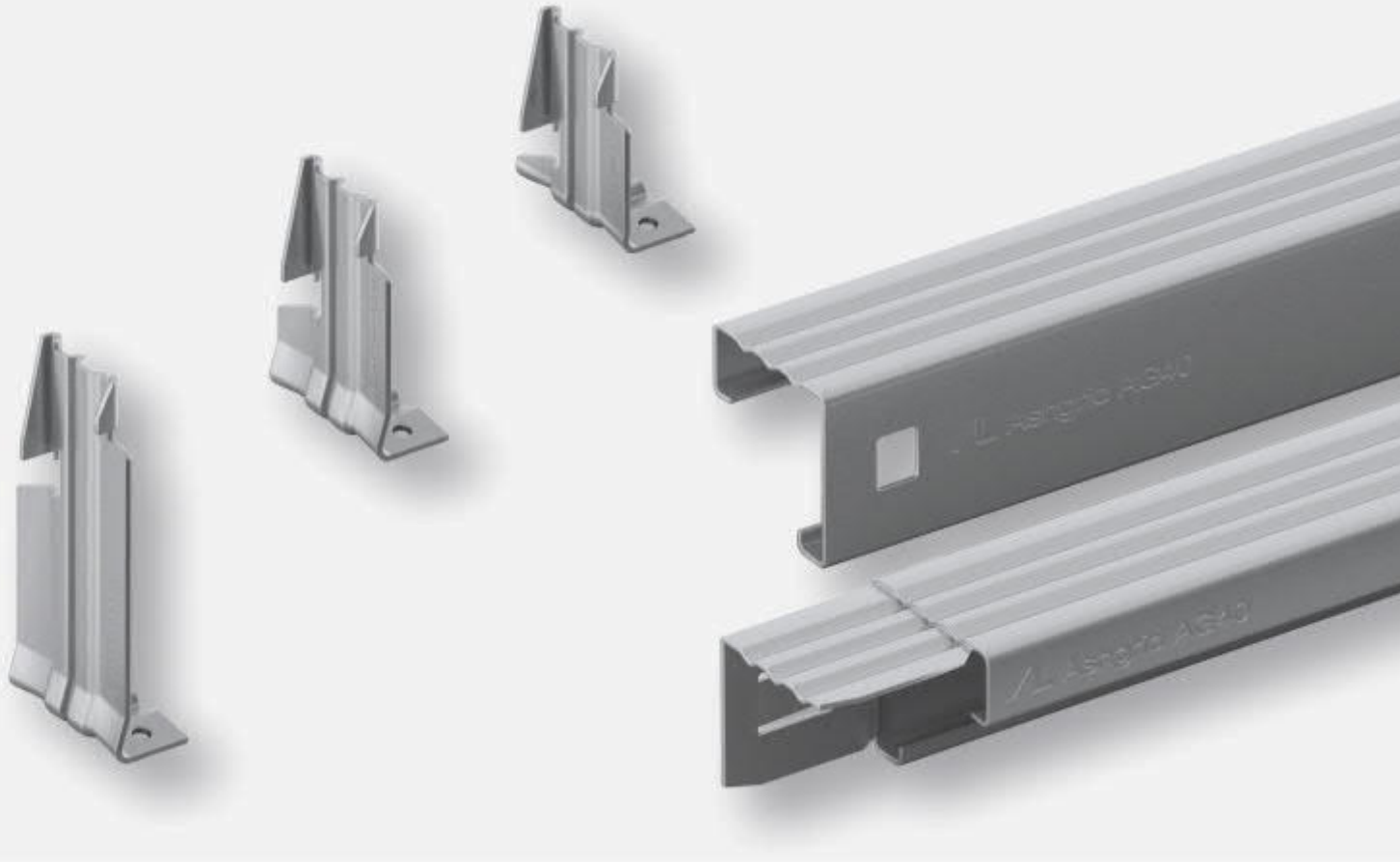
ATTACHMENT C

SAFINTRA
world class roofing systems

ASHGRID

SAFE-LOC

Spacer Support System



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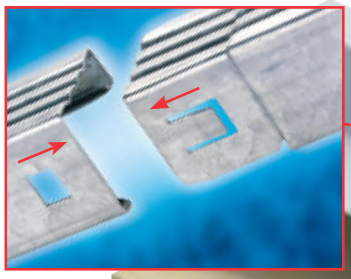
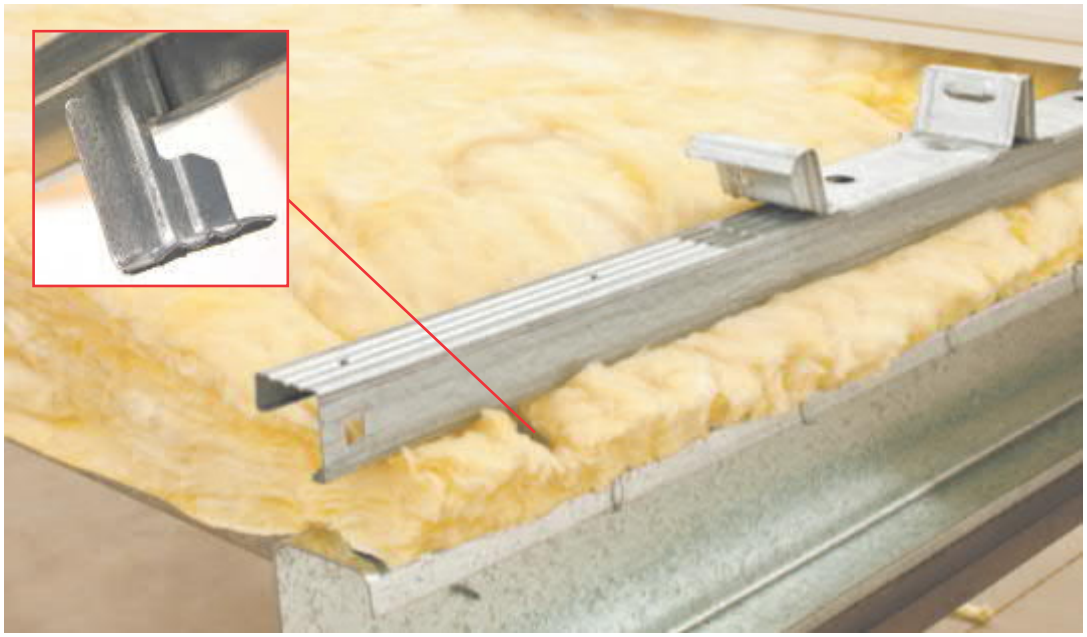
Contents

SAFE-LOC



SANS 10400XA



Introduction

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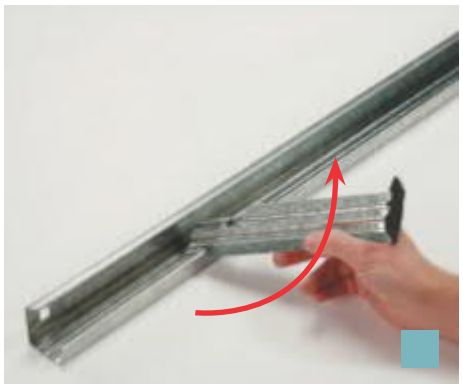
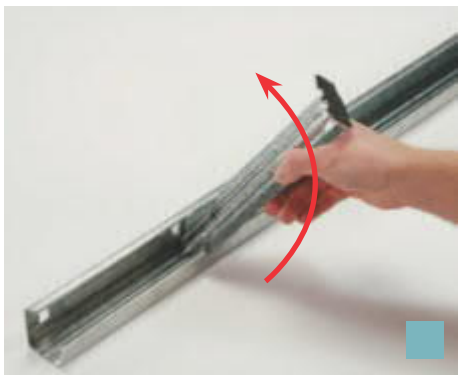
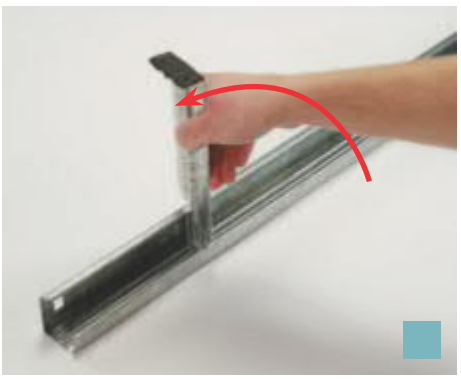
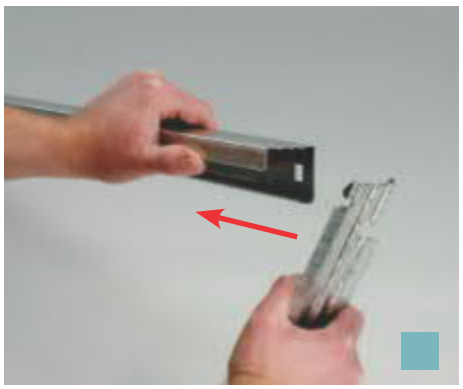
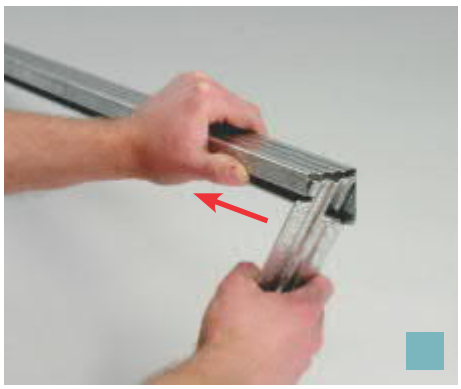
Installation

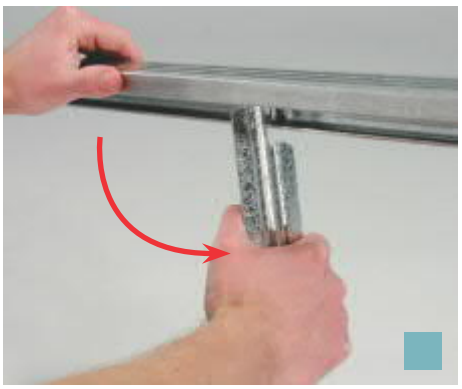




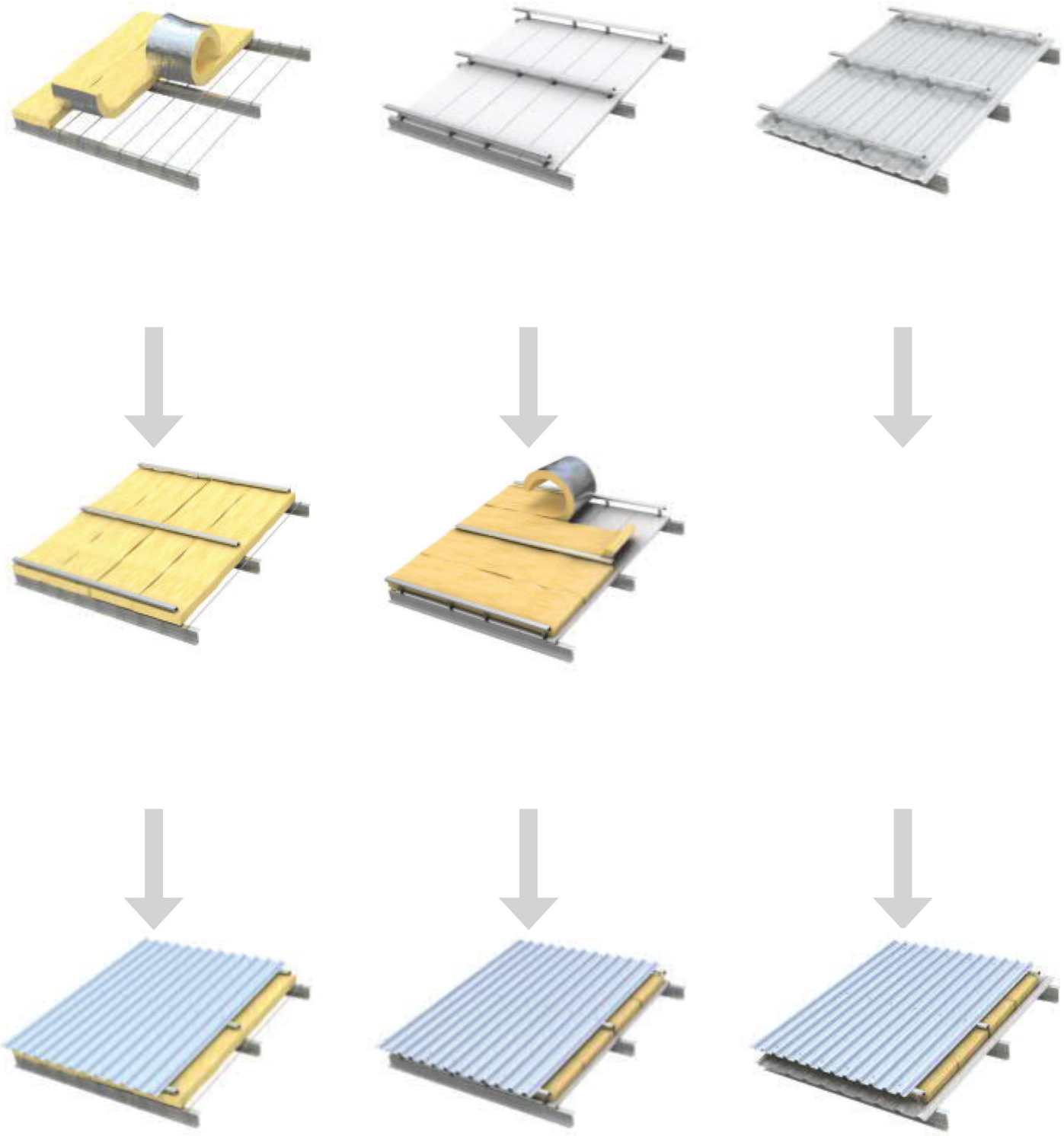




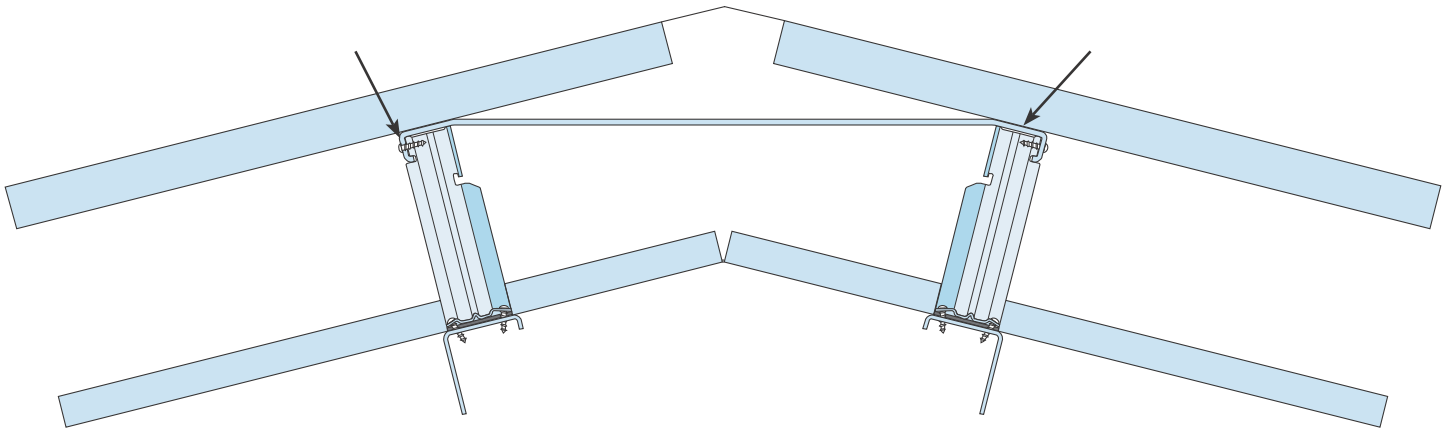




Installation



Pitched roofs



Design Data (1)

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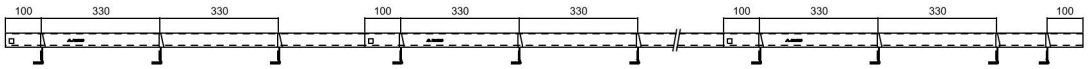
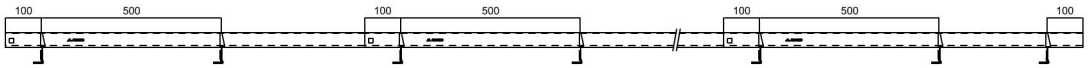
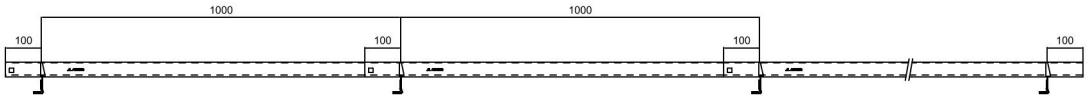
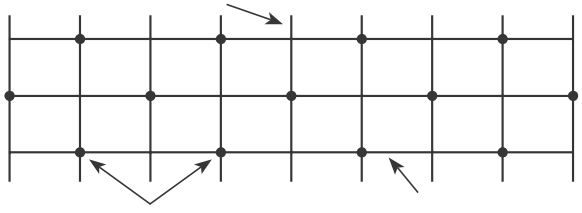
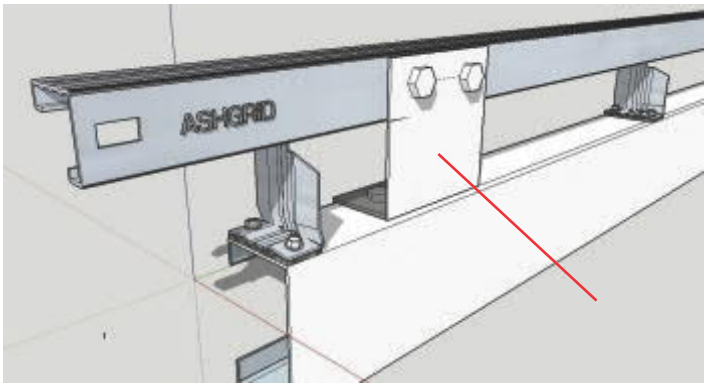
0.33m		3
0.50m		2
1.00m		1

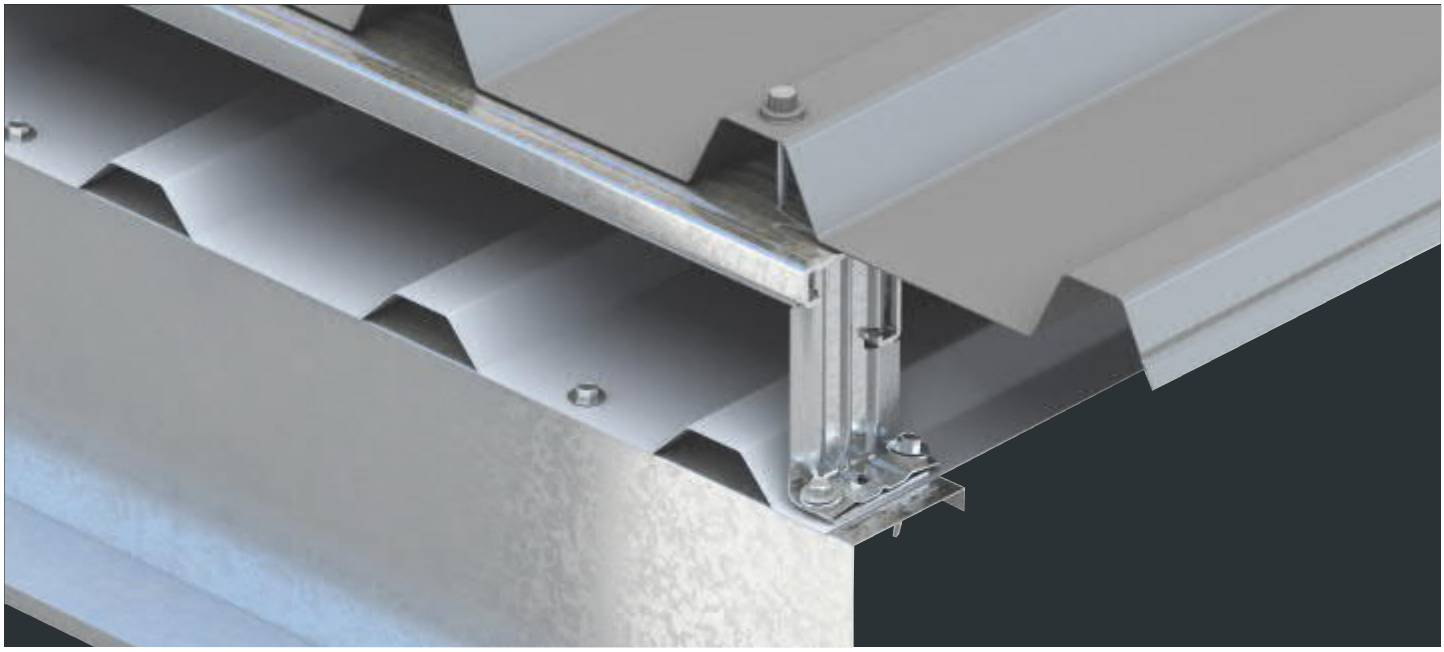
Design Data (2)

Loading out requirements





Component specification



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SAFAL GROUP

August 2014

ATTACHMENT D

Eskom	STANDARD	NUCLEAR ENGINEERING

Title: **Requirements for Protective Coatings for use at Koeberg Nuclear Power Station**

Unique Identifier:	**331-170**
Alternative Reference Number:	**KSA-106**
Area of Applicability:	**U**
Documentation Type:	**ST**
Revision:	**0**
Total Pages:	**144**
Next Review Date:	**May 2017**
Disclosure Classification:	**CONTROLLED DISCLOSURE**

Compiled by	Functional Responsibility	Authorised by
I Naidoo	AM Kotze	N Jakoet
Senior Engineer (Nuclear Engineering)	Engineering Programmes Manager (Nuclear Engineering)	Specifications, Programmes & Sciences (Nuclear Engineering)
Date: 2014-05-20	Date: 2014-05-20	Date: 2014-05-20

ADDITIONAL CLASSIFICATION INFORMATION

3

Yes

NSA

No

No

No

Engineering

CONTENTS

1. INTRODUCTION

2. SCOPE

2.1 PURPOSE

2.2 APPLICABILITY

3. NORMATIVE/INFORMATIVE REFERENCES

3.1 NORMATIVE

3.2 INFORMATIVE

4. DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS

Coat / Film:

Coating System:

Contractor

Engineering:

Generic Coating:

Supervisor:

4.2 ABBREVIATIONS

Abbreviation	Description

5. REQUIREMENTS

5.1 CLASSIFICATION OF PAINT COATING SYSTEMS

5.1.1 General

Example 1

Example 2

Example 3

5.1.2 Coating Systems for Interior Surfaces in Contact with the Atmosphere

APPLICATION	DESIGNATION			
	PIA	PIB	PIC	PID
METALLIC SUBSTRATE				
t				
t				
t				
NON FERROUS				
NON-METALLIC SUBSTRATES				

5.1.3 Coating Systems for Exterior Surfaces in Contact with the Atmosphere

	RANGE	DESIGNATION

APPLICATION	DESIGNATION
	PEC
METALLIC SUBSTRATE	
NON-FERROUS	
NON-METALLIC SUBSTRATE	

APPLICATION	DESIGNATION		
	PIA	PIB	PEC
METALLIC SUBSTRATE			

5.1.4 Coating System for Surfaces in Contact with Liquids

	RANGE OF USE	DESIGNATION

APPLICATION	DESIGNATION					
	PLA	PLB	PLC	PLD	PLE	PLF
Metallic Substrates						
Non-Metallic Substrate						

5.2 MATERIALS

5.2.1 Repair Specifications

5.2.2 Design Specifications

5.2.3 Coating Quality Control Categories

REGULATIONS CHARACTERISING THE CATEGORIES	REF.	CAT. 1 I	CAT. 2 II	CAT. 3 III	CAT. 4 IV

5.2.4 Composition of Coating Systems

5.2.5 Controls and Tests

5.2.6 Packaging

5.2.7 Storage

5.3 GENERAL CONDITIONS OF WORKMANSHIP

Equipment

Safety Precautions

Quality Assurance

Records

Quality Plan

Handling and Storage of coated components

5.4 SURFACE PREPARATION

5.4.1 General

5.4.2 Metal Surfaces

NOTE: *For nuclear related equipment and components located within the Nuclear Island the use of chlorinated organic solvents is forbidden. The use of acetone is permitted on a case by case basis subject to Engineering approval.*

SURFACES	CODE	SURFACE QUALITY

5.4.3 Concrete Surfaces

5.5 APPLICATION OF COATINGS

5.6 ACCEPTANCE CRITERIA

5.6.1 Adhesion

5.6.2 Film Thickness

5.6.3 Holiday Detection Tests

5.7 REPAIR PROCEDURES

5.7.1 Patch Painting Steelwork

5.7.2 Patch Painting Concrete and Plaster

5.7.3 Maintenance Over-coating

5.7.4 Acid Proof Tiling

5.7.5 Rubber Linings

5.7.6 Pipe Wrappings

5.7.7 Expansion Joint Sealants

5.7.8 Glass Reinforced Plastic

5.7.9 Wood Surfaces

5.7.10 Cementitious and Epoxy Linings

5.8 INSPECTION REQUIREMENTS

5.8.1 Civil Finishes

5.8.2 Structural Steelwork

5.8.3 Mechanical Equipment

5.8.4 Internal Linings of Pipework, Tanks and Vessels

5.8.5 Stainless Steel Tanks and Pipework (including CW pipe compensators)

5.8.6 Electrical Equipment

5.8.7 Cathodic Protection Installations (Sacrificial Anodes)

5.9 INSPECTION FREQUENCIES

5.10 SPECIALISED APPLICATIONS AND INSTALLATIONS

5.10.1 Metal Sprayed Coatings

5.10.2 Hot Dip Galvanising

5.10.3 Rubber Linings

5.10.4 Acid Proof Tiling

5.10.5 Glass Reinforced Plastic

5.10.6 Cathodic Protection Installations

*

5.10.7 Pipe Wrappings

5.10.8 Structural Wrappings

Do Not

Do Not

never

Do Not Stretch

5.10.9 Powder Coating Application

Coatings Applied by the Powder-coating Process

6. DEVELOPMENT TEAM

7. ACCEPTANCE AND AUTHORISATION

Name	Designation

8. ATTACHMENTS

APPENDIX 1: APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 100 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 100 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 103 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 104 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 105 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 106 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 107 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 108 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 150 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 150 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 151 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 151 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 152 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 153 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 156 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 157 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIA 159 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 100 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 103 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 104 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 105 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 106 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 107 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 108 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 150 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 151 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 152 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 153 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 156 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 157 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIB 159 3

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 100 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	—	
INTERMEDIATE COAT:		
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 103 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	___ POLYSILOXTHANE	
INTERMEDIATE COAT:		
FINAL COAT:	___ POLYSILOXTHANE	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 104 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	___ POLYSILOXTHANE	
INTERMEDIATE COAT:		
FINAL COAT:	___ POLYSILOXTHANE	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 107 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	—	
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 108 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	—	
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 153 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 156 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 157 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PIC 159 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 100 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	—	
INTERMEDIATE COAT:		
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 103 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	___ POLYSILOXTHANE	
INTERMEDIATE COAT:		
FINAL COAT:	___ POLYSILOXTHANE	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 104 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	___ POLYSILOXTHANE	
INTERMEDIATE COAT:		
FINAL COAT:	___ POLYSILOXTHANE	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 153 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 156 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 157 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PID 159 1

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 200 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
	—	
INTERMEDIATE COAT: NB.		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 200 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 200 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		
NB.		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 200 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 203 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 203 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 205 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 206 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 207 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 208 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 209 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 250 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 250 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 251 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 252 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:	—	
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PEC 258 2
HDPE, PVC, GRP, ETC.

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLA 300 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:	COAL TAR	
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 400 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 401 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 401 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 402 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 403 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLB 403 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLC 500 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 600 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:	COAL TAR	
FINAL COAT:	COAL TAR	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 600 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 600 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 600 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 601 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 650 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:	—	
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLD 650 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLE 700 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

COATING CLASSIFICATION PLE 750 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:	—	
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

PLF 800 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:	—	
INTERMEDIATE COAT:	—	
FINAL COAT:	—	

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

PLF 801 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

PLF 850 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 1 (continued)

APPROVED MANUFACTURERS AND COATING SYSTEMS

PLF 851 2

ACTIVITY	REQUIREMENTS	DFT
SURFACE PREPARATION:		
PRIMER COAT:		
INTERMEDIATE COAT:		
FINAL COAT:		

APPENDIX 2: JUSTIFICATION

Revision 0

Revision 1

Revision 331-170 Rev 0

APPENDIX 3: REVISION INFORMATION

Date	Rev.	Compiler	Remarks