Base Load Power Hub (BLPH)

TECHNICAL INTEGRITY VERIFICATION REPORTS COLLECTION

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Document Class: 2

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Revision / Change Log

Rev.	Description
00	Issue for Review (IFR)

HOLDS LIST

No.	Description
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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

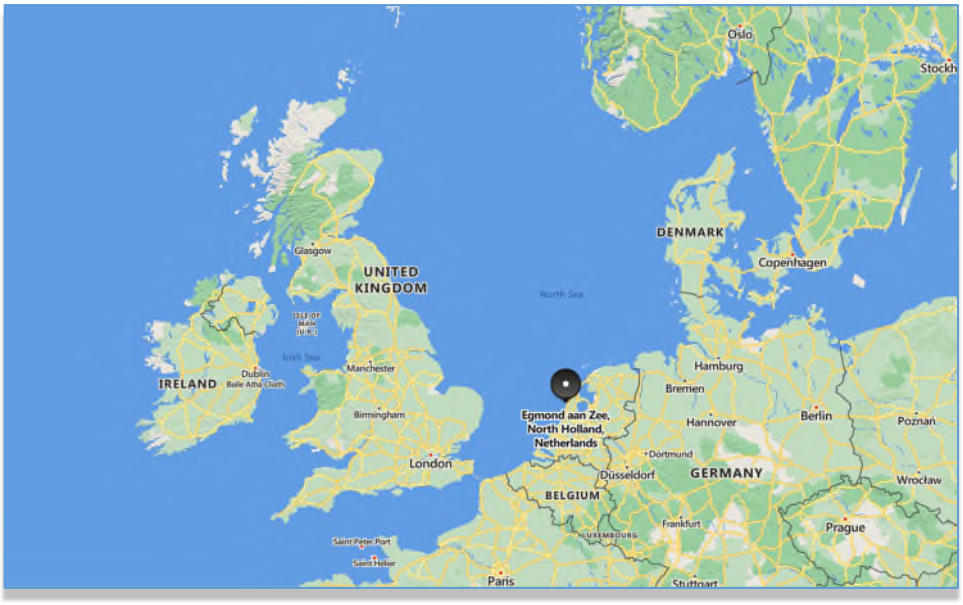


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

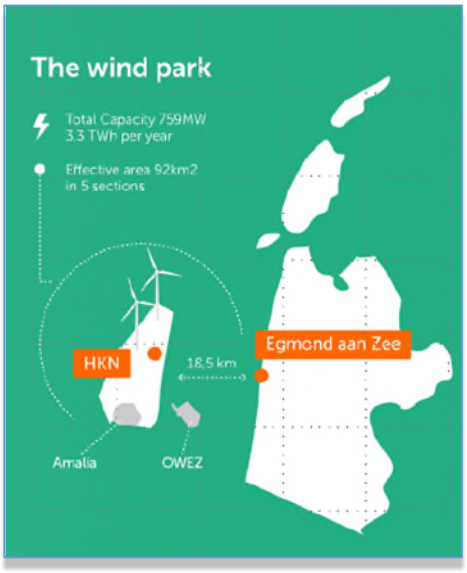


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

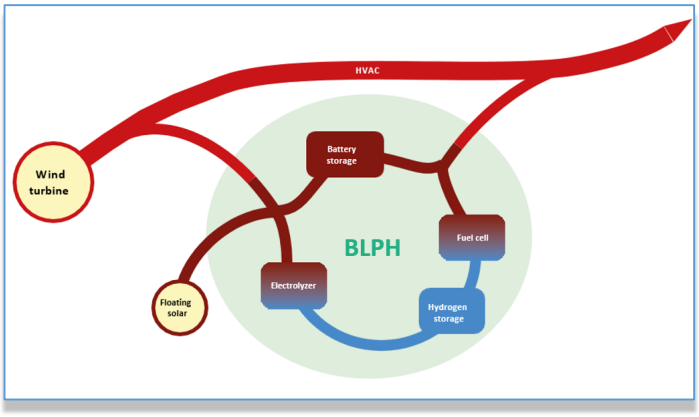


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document is intended to be a comprehensive collection of all Technical Integrity Verification Reports (TIVRs) issued for the project.

It is the formal evidence that all Technical Integrity Verification activities have been performed in compliance with the applicable project requirements.

Furthermore, the document is intended to be a tool for tracking and monitoring the status of each TIVR.

As such, it shall be considered a living document, subject to revisions that will reflect the progressive closure of open actions and the completion of the verification process.

Revisions will continue to be issued until all TIVRs have been finalized and all related actions are formally closed.

3 REFERENCE DOCUMENTS

Document Code	Document Title
123A90-DDL-MD-LIS-01010	PERFORMANCE STANDARD COLLECTION
123A90-DDL-SAF-RE-30003	SCE IDENTIFICATION
123A90-PML-QHSE-LIS-00065	TECHNICAL INTEGRITY VERIFICATION (TIV) PROGRAMME
123A90-PML-QHSE-RE-00064	SECE-DEM1-DEM2 COMPLIANCE REPORT
K559-2254-QM-PLN-001	TECHNICAL INTEGRITY VERIFICATION PLAN
K559-2254-SE-REP-018	SECE IDENTIFICATION
CONTRACT SECTION IX	QUALITY MANAGEMENT
CONTRACT SECTION X	TECHNICAL INFORMATION
CONTRACT SECTION V	SCOPE DESCRIPTION

4 ABBREVIATIONS

TIVR	Technical Integrity Verification Report

5 TIVR LIST AND STATUS

REF.	NUMBER	DESCRIPTION	REV.	DATE	STATUS
1	ER001-01	Muster Area	01	26/03/2025	First off.Issue
2	ER002-01	Emergency / Escape Lighting	01	26/03/2025	First off.Issue
3	ER003-01	Emergency / Escape Lighting	01	26/03/2025	First off.Issue
4	ER004-01	Emergency Communication System	01	26/03/2025	First off.Issue
5	DS001-01	F&G Detection System	01	26/03/2025	First off.Issue
6	ER005-01	Un-interruptible Power System (UPS)	01	26/03/2025	First off.Issue
7	IC001-01	Hazardous Area Ventilation	01	26/03/2025	First off.Issue
8	IC003-01	Certified (ex-rated) Electrical Equipment	01	26/03/2025	First off.Issue
9	IC005-01	Electrical Earthing Continuity and Earth Bonding	01	26/03/2025	First off.Issue
10	IC007-01	Inert Gas Blanket System	01	26/03/2025	First off.Issue
11	LS001-01	Personal Survival Equipment (PSE)	01	26/03/2025	First off.Issue
12	LS002-01	Alternate Means of Escape	01	26/03/2025	First off.Issue
13	PC001-01	Pressure Vessels	01	26/03/2025	First off.Issue
14	PC005-01	Piping System	01	26/03/2025	First off.Issue
15	PC007-01	Relief System	01	26/03/2025	First off.Issue
16	PS002-01	Fire and Explosion Protection	01	26/03/2025	First off.Issue
17	PS015-01	Collision Avoidance System	01	26/03/2025	First off.Issue
18	SD001-01	Emergency Shutdown System (ESD)	01	26/03/2025	First off.Issue
19	SD002-01	Blowdown Valves (BDV)	01	26/03/2025	First off.Issue
20	SD006-01	Emergency Shutdown Valves (SDV)	01	26/03/2025	First off.Issue
21	SD009-01	Utility Air	01	26/03/2025	First off.Issue
22	SI002-01	Topside Structure	01	26/03/2025	First off.Issue

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6 TIV REPORTS

TECHNICAL INTEGRITY VERIFICATION REPORT DS001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: F&G Detection System **SCE ID**: DS001 **SCE CODE:** See attachment 001

SCE Boundaries: Fire and gas detection system on platform: H2, flame detectors, Manual Fire Alarms, Beacons and Sounders

SCE Functionality Criteria: To ensure gas / flame detection in case of fire and to ensure initiation of relevant automatic actions

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: DS001-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company Verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-IN-CE-40002	Fire & Gas Cause & Effect Matrix	
123A90-DDL-IN-SP-40100	Safety System (ESD, Fire and Gas) Specification	
123A90-DDL-SAF-RE-30001	Fire Protection Philosophy	
123A90-DDL-SAF-RE-30020	Fire and Explosion Risk Analys (FERA) report	

TECHNICAL INTEGRITY VERIFICATION REPORT DS001-01

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT ER001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Muster Area **SCE ID**: ER001 **SCE CODE**: See attachment 001

SCE Boundaries: Escape Evacuation **SCE Functionality Criteria**: To ensure the emergency to be assessed and to allow the appropriate parts of the emergency response plan to be executed during a major accident event

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: ER001-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

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B = Activity undertaken, comments outstanding performance standard has not been met.

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Review layout drawings to confirm that the Muster Area boundaries are specified to enclose and effectively protect	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	N/A	
Fabr.	N/A	
Const.	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
Comm.	N/A	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-DL-30025	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings	
123A90-DDL-SAF-DL-30026	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings - upper deck	
123A90-DDL-SAF-DL-30029	Safety signs equipment layout drawings	

TECHNICAL INTEGRITY VERIFICATION REPORT ER001-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-DS-30043	Safety Sign Specifications and Datasheets	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT ER002-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Escape Routes **SCE ID**: ER002 **SCE CODE**: See attachment 001

SCE Boundaries: Escape Routes **SCE Functionality Criteria**: To provide sufficient safe and readily identifiable escape routes for all personnel to leave an area affected by an incident, reach the muster area from any part of the platform and transfer from the muster area to the evacuation and embarkation points

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: ER002-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Review layout drawings to confirm that the Muster Area boundaries are specified to enclose and effectively protect	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	N/A	
Fabr.	N/A	
Const.	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
Comm.	N/A	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-DL-30025	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings	
123A90-DDL-SAF-DL-30026	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings - upper deck	

TECHNICAL INTEGRITY VERIFICATION REPORT ER002-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-DL-30029	Safety signs equipment layout drawings	
123A90-DDL-SAF-DS-30043	Safety Sign Specifications and Datasheets	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT ER003-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Emergency / Escape Lighting **SCE ID**: ER003 **SCE CODE**: See attachment 001

SCE Boundaries: Emergency Lighting **SCE Functionality Criteria**: To provide adequate illumination at emergency response locations and escape routes in the event of a major accident event.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: ER003-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

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Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Review lighting layouts in conjunction with lighting calculations and escape route layout drawings to confirm that the emergency lighting layout specified is appropriate	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
Fabr.	N/A	
Const.	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-DL-20118	Base Load Power Hub - Lighting & Socket Layout - Top Deck	
123A90-DDL-EL-DL-20119	Base Load Power Hub - Lighting & Socket Layout - Lower Deck	
123A90-DDL-EL-DL-20120	Base Load Power Hub (BLPH) - Lighting & Socket Layout - Below Lower deck	
123A90-DDL-EL-DL-20122	Base Load Power Hub (BLPH) - Lighting & Socket Layout - HV Switchroom	

TECHNICAL INTEGRITY VERIFICATION REPORT ER003-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-DL-20123	Base Load Power Hub (BLPH) - Lighting & Socket Layout - LV Switchroom	
123A90-DDL-EL-DL-20124	Base Load Power Hub (BLPH) - Lighting & Socket Layout - UPSs & Batteries Switchroom	
123A90-DDL-EL-RE-20153	Lighting Calculation Study Report	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

CROSSWIND

ROSETTI MARINO

TECHNICAL INTEGRITY VERIFICATION REPORT ER004-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Emergency Communication System **SCE ID**: ER004 **SCE CODE**: See attachment 001

SCE Boundaries: Emergency Communication System (VHF marine portable radios, Sart, EPIRB) **SCE Functionality Criteria**: To ensure effective communication during emergency conditions

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: ER004-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Communication systems shall be fed from totally separate independent Un-interruptible Power Supplies	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Verify and review the documentation provided Suppliers Declaration of Conformity	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
K559-2254-PM-PLN-003	Basic Design Engineering Package	

TECHNICAL INTEGRITY VERIFICATION REPORT ER004-01

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT ER005-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Un-interruptible Power System (UPS) **SCE ID**: ER005 **SCE CODE**: See attachment 001

SCE Boundaries: AC / DC UPS **SCE Functionality Criteria**: To provide an uninterrupted power supply to the vital services of the facility during a Major Accident Event when normal power fails.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: ER005-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	UPS system equipment shall be designed and manufactured in accordance with the EMC directive 2014/30/EU.	
	Company review and approval of the design documents are aligned with project requirements	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify and review the documentation provided Suppliers Declaration of Conformity	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
K559-2254-PM-PLN-003	Basic Design Engineering Package	
123A90-PML-COM-PRO-03050	OTP - DC UPS System 10kVA UP-200F1	
123A90-PML-COM-PRO-03059	OTP - UPS System UP-200F3 35kVA	

TECHNICAL INTEGRITY VERIFICATION REPORT ER005-01

Documents Reviewed

Document No.	Title	Rev.
123A90-PML-COM-PRO-03060	OTP - AC UPS System 15kVA UP-200F4	
123A90-DDL-AR-SP-10021	Supply Specification for AC UPS fitted with UPS system Equipment Room B-300	
123A90-DDL-AR-DL-10022	BASE LOAD POWER HUB (LBPH) - AC UPS fitted with UPS system Equipment Room B-300 - ARCHITECTURAL GENERAL LAYOUT - PLAN, VIEW, SECT. AND TYP. DET	
123A90-DDL-AR-MR-10026	MR - AC UPS fitted with UPS system Equipment Room B-300	
123A90-DDL-EL-MR-20030	MR - AC UPS Systems	
123A90-DDL-EL-SP-20031	Technical Specification, IDS and DDS for AC UPS Systems	
123A90-DDL-EL-DL-20106	Base Load Power Hub (BLPH) - Electrical Equipment Layout - UPSs & Batteries Switchroom	
123A90-DDL-EL-DL-20113	BASE LOAD POWER HUB (BLPH) - Electrical Cable Routing Layout - UPSs & Batteries Switchroom	
123A90-DDL-EL-DL-20124	Base Load Power Hub (BLPH) - Lighting & Socket Layout - UPSs & Batteries Switchroom	
123A90-DDL-EL-DL-20138	BASE LOAD POWER HUB (BLPH) - Earthing & Lightining Layout - UPSs & Batteries Switchroom	
123A90-DDL-EL-RE-20155	UPS & Battery Sizing Calculations	
123A90-DDL-EL-DG-20163	BASE LOAD POWER HUB (BLPH) - Electrical Typical Schematic Diagrams (Distribution Boards, AC UPS, DC UPS, etc)	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT IC001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Hazardous Area Ventilation **SCE ID**: IC001 **SCE CODE**: See attachment 001

SCE Boundaries: Ventilation Systems in Hazardous Area **SCE Functionality Criteria**: To prevent the formation of potentially hazardous concentration of flammable and/or toxic gas mixtures in hazardous areas by providing adequate ventilation to dilute, disperse and remove such mixtures to a suitable location.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: IC001-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Layout based on natural ventiliation of open areas	
	Hazard Area Classification	
	Company review and approval of the design documents are aligned with project requirements (HVAC on under/over pressure)	
	Company review and approval of the design documents are aligned with project requirements (Areas identified in datasheet)	
	Company review and approval of the design documents are aligned with project requirements (loss of pressurization)	
	Layout based on natural ventiliation of open areas	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Review and approve Manufacturer Record Book	
Const.	Ready For Commissioning Certificate issued	
	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

TECHNICAL INTEGRITY VERIFICATION REPORT IC001-01

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-RPT-00033	Hazardous Area Classification Schedule	
ROSMA-INN-BPH-DWG-00155	Hazardous Area Classification Layout - lower deck	
ROSMA-INN-BPH-DWG-00156	Hazardous Area Classification Layout - section	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

CROSSWIND

ROSETTI MARINO

TECHNICAL INTEGRITY VERIFICATION REPORT IC003-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description:	Certified (ex-rated) Electrical Equipment	**SCE ID:** IC003		**SCE CODE:**	See attachment 001
SCE Boundaries:	Electrical Equipment, Instrumentation	**SCE Functionality Criteria:**	No ignition source formation probability inside the concerned hazardous area (Ex-d, Ex-e, Ex-n equipment apparatus).		

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: IC003-01

Criteria

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Hazardous Area Classification	
	ATEX 2014/34/UE	
	Company Verify and approve the design.	
	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	Compliance of the vendor to the material requisition by preparing a technical bid evaluation.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order / Suppliers Declaration of Conformity	
	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Verify the material certificates.	
	Verify completion of ATEX register	
	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Review and approve Manufacturer Record Book	
Constr.	Ready For Commissioning Certificate issued	
Comm.	Compliance to OTPs.	

Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector according EEHA and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the certified equipment portion of the platform.

Documents Reviewed

Document No.	Title	Rev.
1724000204-IN-CA-00003	ACTUATOR SIZING AND TORQUE TABLE	
1724000204-IN-CA-00017	ACTUATOR SIZING AND TORQUE TABLE-50-XV-005	
1724000204-IN-DA-00004	VALVE, ACTUATOR AND ASSEMBLY GENERAL ARRANGEMENTS DRAWING AND NAMEPLATE DRAWING	
1724000204-IN-DA-00018	ACTUATOR GENERAL ARRANGEMENTS and NAMEPLATE DRAWINGS-50-XV-005	
1724000204-IN-DG-00006	PNEUMATIC DIAGRAM and WIRING	
1724000204-IN-DG-00019	PNEUMATIC DIAGRAM and WIRING-50-XV-005	
1724000204-IN-DS-00007	INSTRUMENT AND VALVES DATA SHEETS	
1724000204-IN-LIS-00013	ATEX REGISTER	
1724000204-IN-MAN-00014	SDV - BDV AND TIGHT SHUT-OFF XV VALVES - TECHNICAL OPERATING AND MAINTENANCE MANUAL – COMPLETE	
1724000204-QC-ITP-00002	INSPECTION AND TEST PLAN	
1724000979-IN-DA-00003	GENERAL ARRANGEMENT DRAWINGS (INCLUDING TW CALCULATIONS)	
1724000979-IN-DS-00004	INSTRUMENT DATA SHEETS-PT,PDT,TT,LT RADAR	
1724000979-IN-LIS-00009	ATEX REGISTER-PT,PDT,TT,LT RADAR	
1724000979-IN-LIS-00010	VENDOR ASSET AND TAG REGISTER-PT,PDT,TT,LT RADAR	
1724000979-IN-MAN-00008	INSTALLATION, OPERATION AND MAINTENANCE MANUAL	
1724000979-QC-ITP-00002	INSPECTION AND TEST PLAN -PT,PDT,TT,LT RADAR	
1724000979-QC-PRO-00005	FACTORY ACCEPTANCE TEST PROCEDURE	
1724001690-IN-CA-00005	CALCULATION SHEETS-RESTRICTION ORIFICE	
1724001690-IN-DA-00003	GENERAL ARRANGEMENT DRAWINGS-RESTRICTION ORIFICE	
1724001690-IN-DS-00004	INSTRUMENT DATA SHEETS-RESTRICTION ORIFICE	
1724001690-IN-LIS-000010	VENDOR ASSET REGISTER-RESTRICTION ORIFICE	
1724001690-QC-ITP-00002	INSPECTION AND TEST PLAN-RESTRICTION ORIFICE	
1724001690-QC-PRO-00006	FACTORY ACCEPTANCE TEST PROCEDURE-RESTRICTION ORIFICE	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT IC005-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Electrical earthing continuity and earth bonding **SCE ID**: IC005 **SCE CODE**: See attachment 001

SCE Boundaries: Lighting protection system **SCE Functionality Criteria**: To minimise the likelihood of ignition from lightning and static discharge in hazardous areas

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: IC005-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Company review and approval of the design documents are aligned with project requirements	
	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector according EEHA	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-SP-20006	Technical Specification, IDS and DDS for Neutral Earthing Resistor (NER)	
123A90-DDL-EL-MR-20075	MR - for Earthing and Lightning Materials	
123A90-DDL-EL-DS-20076	TDS - Earthing and Lightning Materials	
123A90-DDL-EL-DD-20090	Electrical Typical Installation Details - Earthing System	
123A90-DDL-EL-DL-20132	Base Load Power Hub (BLPH) - Earthing & Lightining Layout - Top Deck	

TECHNICAL INTEGRITY VERIFICATION REPORT IC005-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-DL-20133	Base Load Power Hub (BLPH) - Earthing & Lightining Layout - Lower Deck	
123A90-DDL-EL-DL-20134	Base Load Power Hub - Earthing & Lightining Layout - Below Lower deck	
123A90-DDL-EL-DL-20136	BASE LOAD POWER HUB (BLPH) - Earthing & Lightining Layout - HV Switchroom	
123A90-DDL-EL-DL-20137	BASE LOAD POWER HUB (BLPH) - Earthing & Lightining Layout - LV Switchroom	
123A90-DDL-EL-DL-20138	BASE LOAD POWER HUB (BLPH) - Earthing & Lightining Layout - UPSs & Batteries Switchroom	
123A90-DDL-IN-DL-40013	Earthing layouts drawings (Onshore CCR, Offshore ITER)	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT IC007-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Inert gas blanket system **SCE ID**: IC007 **SCE CODE**: See attachment 001

SCE Boundaries: Nitrogen blanketing for Hydrogen vent system **SCE Functionality Criteria**: To provide an inert atmosphere within enclosed process systems in order to prevent ignition of flammable inventory.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: IC007-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company review and approval of the design documents by suitable qualified personnel according EEHA	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Verification that all ITP activities are included in the Material Requisition	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	
	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No. **Title** **Rev.**

TECHNICAL INTEGRITY VERIFICATION REPORT IC007-01

Documents Reviewed

Document No.	Title	Rev.

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT LS001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Personal Survival Equipment (PSE) **SCE ID**: LS001 **SCE CODE**: See attachment 001

SCE Boundaries: Personal Survival equipment
- Safety Cabinet (With Immersion Suit, Life Jacket)
- First Aid Kit
- Resuscitation Unit
- Escape Masks
- Evacuation Stretcher
- Liferaft
- Lifebuoy

SCE Functionality Criteria: To provide all personnel escaping from a Major Accident Event with suitable protective clothing and equipment.

To provide personnel with emergency response roles with suitable protective equipment.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: LS001-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Compliance with SOLAS (Safety of Life at Sea), Lifesaving Appliances Code requirements.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify and review the documentation provided	
Fabr.	Verify and review the documentation provided	
Const.	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
Comm.	N/A	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
K559-2254-PM-PLN-003	Basic Design Engineering Package	

TECHNICAL INTEGRITY VERIFICATION REPORT LS001-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-DL-30025	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings	
123A90-DDL-SAF-DL-30026	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings - upper deck	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT LS002-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Alternate Means of Escape **SCE ID**: LS002 **SCE CODE**: See attachment 001

SCE Boundaries: Alternate Means of Escape
Liferaft

SCE Functionality Criteria: To provide for the safe escape of all persons from the installation in case arrangements for evacuation fail.

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: LS002-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Class Approval Letter for sufficient number of life raft places and suitable distribution of type and sizes of life rafts	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify and review the documentation provided	
Fabr.	Verify and review the documentation provided	
Const.	Mechancial completion checks and compilation of related ITRs	
	Mechancial completion checks and compilation of related ITRs	
Comm.	N/A	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
K559-2254-PM-PLN-003	Basic Design Engineering Package	
123A90-DDL-SAF-DL-30025	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings	
123A90-DDL-SAF-DL-30026	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings - upper deck	

Outstanding Issues / Comments

TECHNICAL INTEGRITY VERIFICATION REPORT LS002-01

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT PC001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document:	Safety Critical Elements (SCE) and Performance Standard	Doc. No.	123A90-DDL-SAF-RE-30003	Rev.01
	Performance Standards Collection	Doc. No.	123A90-DDL-MD-LIS-01010	Rev.00

SCE Description: Pressure Vessels **SCE ID: PC001** **SCE CODE:** PC001-V-25001A, PC001-V-25001B, PC001-V-25001C, PC001-V-25001D, PC001-V-25001E, PC001-V-25001F, PC001-V-43001, PC001-Q-43004

SCE Boundaries: Pressure Vessels **SCE Functionality Criteria:** Ensure containment of gas during normal operation through the design life of the facility

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: PC001-01

Criteria

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Assurance

Assurance activities **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Basic Design Engineering Package	
	Notified Body and ASME AI to verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
	Compliance of the vendor to the material requisition by preparing a technical bid evaluation.	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP.	
	Verify the material certificates.	
	Witnessing of the Factory Acceptance test	
Const.	Review and approve Manufacturer Record Book & Design Examination Certificates	

Const.	Verification of the Inspection test report	
Comm.	Compliance to OTPs.	
	Issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to pressure-containing vessels. The suppliers of the Tags are Brembana & Rolle under purchase order no. 1723001756, C.A.M.P.I. under the purchase order no. 1724000163, and Encore under the purchase order no. 1724000887.

The tags covered by this verification activities are listed below:

PC001 VESSELS

V-25001A	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001A	PC001	PC001-V-25001A
V-25001B	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001B	PC001	PC001-V-25001B
V-25001C	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001C	PC001	PC001-V-25001C
V-25001D	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001D	PC001	PC001-V-25001D
V-25001E	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001E	PC001	PC001-V-25001E
V-25001F	HYDROGEN HORIZONTAL STORAGE VESSEL V-25001F	PC001	PC001-V-25001F
V-43001	HYDROGEN VENT KO DRUM	PC001	PC001-V-43001
Q-43004	HYDROGEN VENT	PC001	PC001-Q-43004

Documents Reviewed

Document No.	Title	Rev.
1723001756-COM-LIS-00018	SPARE PART INDEX REGISTER (COMMISSIONING, OPERATION) - H2 STORAGE VESSEL	
1723001756-MAC-CAL-00003	PRESSURE VESSEL MECHANICAL CALCULATION - H2 STORAGE VESSEL	
1723001756-MAC-DD-00005	DETAILED DRAWING INCLUDING CROSS-SECTION-EXPLODED VIEW DRAWING - H2 STORAGE VESSEL ITEM V-25001A-F	
1723001756-MAC-DD-00006	NAMEPLATE DRAWING - H2 STORAGE VESSEL ITEM V-25001A-F	
1723001756-MAC-DD-00023	DETAILED DRAWING - MANHOLE DAVIT - H2 STORAGE VESSEL ITEM V-25001A-F	
1723001756-MAC-DD-00024	DETAILED DRAWING - BILL OF MATERIAL- H2 STORAGE VESSEL - ITEM V-25001A-F	
1723001756-MAC-DS-00007	EQUIPMENT DATA SHEETS INCLUDING WEIGHT DATA SHEETS - H2 STORAGE VESSEL	
1723001756-MAC-MAN-00019	INSTALLATION AND OPERATING MAINTENANCE MANUAL (PED) - H2 STORAGE VESSEL - H2 STORAGE VESSEL	
1723001756-MAT-PRO-00008	PAINTING PROCEDURE (INCLUDING SURFACE PREPARATION)- H2 STORAGE VESSEL	
1723001756-MD-LIS-00001	SUPPLIER MASTER INDEX REGISTER (SMIR) - H2 STORAGE VESSEL	
1723001756-NDT-LIS-00010	NDE OPERATORS LIST AND QUALIFICATIONS - H2 STORAGE VESSEL	
1723001756-NDT-PRO-00009	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) - H2 STORAGE VESSEL	
1723001756-QC-DB-00017	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL	
1723001756-QC-DB-00017-B	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL ITEM V-25001B	
1723001756-QC-DB-00017-C	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL ITEM V-25001C	
1723001756-QC-DB-00017-D	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL ITEM V-25001D	
1723001756-QC-DB-00017-E	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL ITEM V-25001E	
1723001756-QC-DB-00017-F	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE - H2 STORAGE VESSEL ITEM V-25001F	
1723001756-QC-ITP-00002	INSPECTION AND TEST PLAN - H2 STORAGE VESSEL	
1723001756-QC-LIS-00016	EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX ITEM V25001 A F - H2 STORAGE VESSEL	
1723001756-QC-LIS-00016	EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX ITEM V25001 A F - H2 STORAGE VESSEL	
1723001756-QC-PRO-00011	HEAT TREATMENT PROCEDURES (INC. PWHT) - H2 STORAGE VESSEL	
1723001756-QC-PRO-00012	HYDROSTATIC TEST PROCEDURES (FAT PROCEDURE) - H2 STORAGE VESSEL	
1723001756-QC-PRO-00020	SHIPPING, PACKING, HANDLING AND STORAGE AND PRESERVATIONS, PROCEDURES - H2 STORAGE VESSEL	
1723001756-TI-DD-00021	TRANSPORTATION DRAWINGS - H2 STORAGE VESSEL	
1723001756-WEL-DD-00014	WELDING DETAIL DRAWINGS - HYDROGEN STORAGE VESSEL ITEM V-25001A-F	
1723001756-WEL-DD-00014	WELDING DETAIL DRAWINGS - HYDROGEN STORAGE VESSEL ITEM V-25001A-F	
1723001756-WEL-LIS-00015	WELDING OPERATORS LIST AND WELDER QUALIFICATIONS RECORDS (WPQ) - H2 STORAGE VESSEL	
1723001756-WEL-PRO-00013	WELDING PROCEDURE SPECIFICATION (WPS) AND QUALIFICATIONS (PQR) RECORDS - H2 STORAGE VESSEL	

TECHNICAL INTEGRITY VERIFICATION REPORT PC001-01

Documents Reviewed

Document No.	Title	Rev.
1724000163-MAC-CA-00003	MECHANICAL CALCULATION FOR HYDROGEN KO DRUM	
1724000163-MAC-DA-00004	GENERAL ARRANGEMENT DRAWINGS AND FOUNDATION LOADING	
1724000163-MAC-DS-00006	TECHNICAL DATA SHEET - Hydrogen Vent KO Drum - V-43001	
1724000163-NDT-PRO-00008	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) INCLUDING PMI - Hydrogen Vent KO Drum - V-43001	
1724000163-QC-ITP-00002	INSPECTION AND TEST PLAN	
1724000163-QC-PRO-00010	HYDROSTATIC TEST PROCEDURES and PNEUMATIC TEST PROCEDURE (FAT PROCEDURE)	
1724000163-WEL-LIS-00011	WELDING PROCEDURE SPECIFICATION (WPS) AND QUALIFICATIONS (PQR) RECORDS, WELDING OPERATORS LIST and WELDER QUALIFICATIONS RECORDS (WPQ) and WELDING MAP	
1724000887-MAC-CA-00004	MECHANICAL CALCULATION - HYDROGEN VENT	
1724000887-MAC-DA-00003	GENERAL ARRANGEMENTS DRAWINGS, INCLUDING FOUNDATION LOADS-HYDROGEN VENT	
1724000887-MAC-DD-00005	DETAILED DRAWING WITH PART LIST - HYDROGEN VENT	
1724000887-NDT-PRO-00008	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) AND OPERATORS LIST AND QUALIFICATIONS	
1724000887-QC-ITP-00002	INSPECTION AND TEST PLAN - HYDROGEN VENT Q-43004	
1724000887-QC-PRO-00009	HYDROSTATIC TEST PROCEDURES -HYDROGEN VENT	
23096-SNA/B/C/D/E/F/CON	Brembana & Rolle Declaration of Conformity	
TBA	Campi Declaration of Conformity	
416041-40751-B.03-0001	DEM 1 Requirements	
K559-2254-PM-PLN-003	Basic Design Engineering Package	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT PC005-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Piping System **SCE ID**: PC005 **SCE CODE**: See attachment 001

SCE Boundaries: Piping System **SCE Functionality Criteria**: Ensure containment of gas during normal operation of the facility

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: PC005-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Flange Management Strategy 123A90-PML-CON-RE-04006	
	Notified Body to verify and approve the design (Only for Cat.III piping)	
	Company review and approval of the design documents are aligned with project requirements	
	Compliance to the material requisition by preparing a technical bid evaluation.	
	Perform cross check verification against P&Ids and Line List	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines	
	Verify the material certificates.	
	Verification of approved DR and fabrication.	
	Review and approve Manufacturer Record Book (shop fabrication related) Design Examination Certificates (Cat.III only)	
Const.	Ready For Commissioning Certificate issued	
	Verification of test packs and attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines.	
	Verification of flange management and associated records	
	Issuance of RFCC (ready for commissioning certificate)	
	Review and approve Manufacturer Record Book (constuction related)	
Comm.	Attendance of the tests and verification of the reports.	

TECHNICAL INTEGRITY VERIFICATION REPORT PC005-01

Tags

Rosetti has performed the above-listed verification activities, which apply to the structural portion of the platform.

Documents Reviewed

Document No.	Title	Rev.
123A90-PML-QHSE-ITP-00076	Inspection And Test Plan for Piping	
123A90-PML-QHSE-PRO-00092	PIPING FLUSHING, TESTING, DRYING AND REINSTATEMENT PROCEDURE	
123A90-PML-WEL-LIS-05000	Welder List - Piping	
123A90-PML-WEL-PRO-05003	Welding Book - Piping	
123A90-PML-WEL-PRO-05005	Weld procedure qualification records (WPQRs & PQRs) - Piping	
123A90-DDL-PP-SP-70000	Piping Material Classes	
123A90-DDL-PP-SP-70029	Technical Specification for Piping materials narrative	
123A90-DDL-PP-DA-70049	Piping General Arrangement - Below Lower Deck (El.+16500 to El.+22310)	
123A90-DDL-PP-DA-70050	Piping General Arrangement - Above Lower Deck (El.+22310 to El.+28170)	
123A90-DDL-PP-DA-70051	Piping General Arrangement - Below Upper Deck (El.+28170 to El.+30310)	
123A90-DDL-PP-DA-70052	Piping General Arrangement - Above Upper Deck (El.+30310 to El.+33990)	
123A90-DDL-PP-DA-70053	Piping general arrangement above upper deck (EL. +33990 to EL. 46.900)	
123A90-DDL-PP-DD-70055	Base Load Power Hub (BLPH) - Piping floor penetration Lower and Upper deck EL. +23.310m & el. +30.310m	
123A90-DDL-PP-DD-70056	Base Load Power Hub (BLPH) - Piping floor penetration - EL. +31.410m to el. +36.210. - Typical and detail	
123A90-DDL-PP-DD-70059	Typical Piping Assembly	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT PC007-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Relief System **SCE ID**: PC007 **SCE CODE**: See attachment 001

SCE Boundaries: Protection system against overpressure (PSV) **SCE Functionality Criteria**: To prevent uncontrolled loss of containment under extreme process conditions through service life

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: PC005-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package (loss of containment)	
	Basic Design Engineering Package (functional criteria)	
	Notified Body to verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
	Compliance to the material requisition by preparing a technical bid evaluation.	
	Company review and approval of the design documents by suitable qualified personnel according EEHA	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Vendor's Declaration of Conformity to ATEX Vendor's ATEX EC Examination Certification	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP. Perform hydrotest and fugitive emission tests and verify related report	
	Verify the material certificates.	
	Stamp of nameplates and issuance of Declaration fo Conformities.	
	Review and approve Manufacturer Record Book including calibration certificate validity.	
Const.	Ready For Commissioning Certificate issued	
	Re-certification will be performed at an accredited laboratory (ISO 17025)	
	Verification of the Inspection test report	
	Verification of the Inspection test report	
Comm.	Attendance of the tests and verification of the reports.	

Tags

TECHNICAL INTEGRITY VERIFICATION REPORT PC007-01

Rosetti has performed the above-listed verification activities, which apply to the piping portion of the platform.

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-ITP-00024	INSPECTION AND TEST PLAN - PRESSURE SAFETY VALVES	
ROSMA-INN-BPH-PRD-00050	FACTORY ACCEPTANCE TEST PROCEDURE including HYDROSTATIC TEST PROCEDURE - PRESSURE SAFETY VALVES	
ROSMA-INN-BPH-RPT-00113	MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX - PRESSURE SAFETY VALVES	
ROSMA-INN-BPH-PRD-00084	FUGITIVE EMISSION PROCEDURE	
ROSMA-INN-BPH-PRD-00055	NON-DESTRUCTIVE EXAMINATIONS PROCEDURES (NDE) including PMI TEST PROCEDURE, NDE OPERATORS LIST and QUALIFICATIONS	
ROSMA-INN-BPH-DWG-00189	GENERAL ARRANGEMENTS INCLUDING NAMEPLATE DRAWING - PRESSURE SAFETY VALVES	
ROSMA-INN-BPH-DTS-00053	INSTRUMENTS DATA SHEETS (INCLUDING SIZING CALCULATION SHEETS) - PRESSURE SAFETY VALVES	
ROSMA-INN-BPH-MAN-00007	INSTALLATION, OPERATION AND MAINTENANCE MANUAL - PRESSURE SAFETY VALVES	
	ATEX DOCUMENTATION	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT PS002-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Fire and explosion protection **SCE ID**: PS002 **SCE CODE**: See attachment 001

SCE Boundaries: Deck plating / Fire Extinguisher **SCE Functionality Criteria**: To protect personnel and SCEs explosion effects by way of shielding

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: PS002-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company Verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	See references in the Dependencies and Interaction section.	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	N/A	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-SAF-RE-30020	Fire and Explosion Risk Analys (FERA) report	
123A90-DDL-SAF-DL-30025	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings	
123A90-DDL-SAF-DL-30026	Escape Routes, Fire Fighting, Life Saving Equipment and Safety Equipment Layouts Drawings - upper deck	

Outstanding Issues / Comments

TECHNICAL INTEGRITY VERIFICATION REPORT PS002-01

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT PS015-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Collision avoidance system **SCE ID**: PS015 **SCE CODE**: See attachment 001

SCE Boundaries: Collision avoidance system: radar transponding beacon, visual navigation aids, marine acoustic aids

SCE Functionality Criteria: To alert marine vessels of the position of the installation, taking enough time to avoid the area and preventing any collision

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: PS015-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Collision Avoidance Systems shall have an uninterruptible power supply that allows continued operation	
	Company Verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Vendor's Declaration of Conformity to ATEX / Vendor's ATEX EC Examination Certification	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Witnessing of the Factory Acceptance test by suitable qualified inspector	
	Review and approve Manufacturer Record Book	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-SP-20087	Technical Specification, IDS and DDS for Navigation Aid System	
123A90-DDL-EL-MR-20086	MR - for Navigation Aid System	
123A90-DDL-EL-DS-20088	TDS - Navigation Aid System	

TECHNICAL INTEGRITY VERIFICATION REPORT PS015-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-EL-DL-20139	Navigation Aid System General Layouts	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
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Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT SD001-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Emergency shutdown system (ESD) **SCE ID**: SD001 **SCE CODE**: See attachment 001

SCE Boundaries: Safety control loop including the transmitter with sensor for parameter (pressure, temperature, level) and logic solver (interlock, analogical or digital input/output modules, interposing relay, pulse barrier)

SCE Functionality Criteria: To ensure platform shutdown in safe conditions

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: SD001-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company Verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	N/A	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-DWG-00179	VALVE, ACTUATOR AND ASSEMBLY GENERAL ARRANGEMENTS DRAWING AND NAMEPLATE DRAWING	
ROSMA-INN-BPH-DWG-00393	ACTUATOR GENERAL ARRANGEMENTS and NAMEPLATE DRAWINGS-50-XV-005	
ROSMA-INN-BPH-RPT-00265	ACTUATOR SIZING AND TORQUE TABLE-50-XV-005	

TECHNICAL INTEGRITY VERIFICATION REPORT SD001-01

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-MAN-00009	SDV - BDV AND TIGHT SHUT-OFF XV VALVES - TECHNICAL OPERATING AND MAINTENANCE MANUAL – COMPLETE	
ROSMA-INN-BPH-ITP-00016	INSPECTION AND TEST PLAN	
ROSMA-INN-BPH-PRD-00087	FACTORY ACCEPTANCE TEST PROCEDURE AND REPORT	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT SD002-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Blowdown Valves (BDV) **SCE ID**: SD002 **SCE CODE**: See attachment 001

SCE Boundaries: Blowdown Valves **SCE Functionality Criteria**: To prevent escalation during a major accident event ensuring a rapid reduction in the size of inventory

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: SD002-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Company Verify and approve the design.	
	Company review and approval of the design documents are aligned with project requirements	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	N/A	
Const.	Mechancial completion checks and compilation of related ITRs	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-DWG-00179	VALVE, ACTUATOR AND ASSEMBLY GENERAL ARRANGEMENTS DRAWING AND NAMEPLATE DRAWING	
ROSMA-INN-BPH-DWG-00393	ACTUATOR GENERAL ARRANGEMENTS and NAMEPLATE DRAWINGS-50-XV-005	
ROSMA-INN-BPH-RPT-00265	ACTUATOR SIZING AND TORQUE TABLE-50-XV-005	
ROSMA-INN-BPH-MAN-00009	SDV - BDV AND TIGHT SHUT-OFF XV VALVES - TECHNICAL OPERATING AND MAINTENANCE MANUAL – COMPLETE	
ROSMA-INN-BPH-ITP-00016	INSPECTION AND TEST PLAN	
ROSMA-INN-BPH-PRD-00087	FACTORY ACCEPTANCE TEST PROCEDURE AND REPORT	

TECHNICAL INTEGRITY VERIFICATION REPORT SD002-01

Documents Reviewed

Document No.	Title	Rev.

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT SD006-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Emergency Shutdown Valves (SDV) **SCE ID**: SD006 **SCE CODE**: See attachment 001

SCE Boundaries: Emergency Shutdown Valves (SDV) **SCE Functionality Criteria**: To ensure platform shutdown in safe conditions

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: SD006-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

A = Activity closed, it has been demonstrated that the performance standard has been met.

B = Activity undertaken, comments outstanding performance standard has not been met.

B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Review P&IDs and Cause & Effect Diagrams in conjunction with HAZOP Reports to confirm that shutdown valve is sized correctly	
	Basic Design Engineering Package	
	Notified Body to verify and approve the design (Only for Cat.III)	
	Company review and approval of the design documents are aligned with project requirements	
	Compliance to the material requisition by preparing a technical bid evaluation.	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo	
	Verify the material certificates.	
	Review and approve Manufacturer Record Book (shop fabrication related)	
Const.	Ready For Commissioning Certificate issued	
	Issuance of RFCC (ready for commissioning certificate)	
	Review and approve Manufacturer Record Book (constuction related)	
Comm.	Witnessing of the Site Acceptance test by suitable qualified inspector and issuance of commissioning reports	

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-DWG-00179	VALVE, ACTUATOR AND ASSEMBLY GENERAL ARRANGEMENTS DRAWING AND NAMEPLATE DRAWING	

TECHNICAL INTEGRITY VERIFICATION REPORT SD006-01

Documents Reviewed

Document No.	Title	Rev.
ROSMA-INN-BPH-DWG-00393	ACTUATOR GENERAL ARRANGEMENTS and NAMEPLATE DRAWINGS-50-XV-005	
ROSMA-INN-BPH-RPT-00265	ACTUATOR SIZING AND TORQUE TABLE-50-XV-005	
ROSMA-INN-BPH-MAN-00009	SDV - BDV AND TIGHT SHUT-OFF XV VALVES - TECHNICAL OPERATING AND MAINTENANCE MANUAL – COMPLETE	
ROSMA-INN-BPH-ITP-00016	INSPECTION AND TEST PLAN	
ROSMA-INN-BPH-PRD-00087	FACTORY ACCEPTANCE TEST PROCEDURE AND REPORT	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT SD009-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Utility Air **SCE ID**: SD009 **SCE CODE**: See attachment 001

SCE Boundaries: Instrument Air **SCE Functionality Criteria**: To prevent an unplanned and/or out of sequence operation of safety critical air-controlled equipment, such as emergency shutdown valves

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: SD009-01

Criteria **Description**

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.

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B* = Activity is not in compliance with Performance Standard. A documented review of the technical solution has been completed by Duty Holder/Owner, and the review has concluded that the current solution is acceptable and has an equivalent level of safety. No further action is required by Verifier.

C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package	
	Notified Body to verify and approve the design (Only for Cat.III piping)	
	Company review and approval of the design documents are aligned with project requirements	
	Compliance to the material requisition by preparing a technical bid evaluation.	
	Perform cross check verification against P&Ids and Line List	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order Suppliers Declaration of Conformity	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP and test packs. Attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines	
	Verify the material certificates.	
	Verification of approved DR and fabrication.	
	Review and approve Manufacturer Record Book (shop fabrication related)	
Const.	Ready For Commissioning Certificate issued	
	Verification of test packs and attendance of pressure testing by No.Bo for Cat. II (10%) III (100%) lines.	
	Issuance of RFCC (ready for commissioning certificate)	
	Review and approve Manufacturer Record Book (constuction related)	
Comm.	Attendance of the tests and verification of the reports.	

TECHNICAL INTEGRITY VERIFICATION REPORT SD009-01

Tags

Rosetti has performed the above-listed verification activities, which apply to the platform

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-PR-UFD-80006	BLPH UTILITY FLOW DIAGRAM WATER TREATMENT PLANT	
123A90-DDL-PR-UFD-80007	BLPH UTILITY FLOW DIAGRAM INSTRUMENT AIR AND NITROGEN SYSTEMS	
123A90-DDL-PR-UFD-80008	BLPH UTILITY FLOW DIAGRAM VENT SYSTEMS	
123A90-DDL-PR-RE-80037	Chemicals / Utility Consumption report	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.

TECHNICAL INTEGRITY VERIFICATION REPORT SI002-01

Client: **Crosswind**

Project: **HOLLANDSE KUST NOORD WIND PARK Project - Contract No. CW-I-WP4-2023-05**

Installation: **Base Load Power Hub (BLPH)**

SCE Performance Standard

Reference document: Safety Critical Elements (SCE) and Performance Standard Doc. No. 123A90-DDL-SAF-RE-30003 Rev.01

SCE Description: Topside Structure **SCE ID: SI002** **SCE CODE:** See attachment 001

SCE Boundaries: Platform Structural Elements **SCE Functionality Criteria:** Ensure platform structural integrity through the design life of the facility

PHASE: Design / Procurement / Fabrication / Construction / Commissioning

Performance Standard: SI002-01

Criteria

The criteria selected for design, procurement, fabrication, construction, and commissioning are based on projects and safety technical standards, industry best practices, and regulatory requirements. These ensure the platform's safety, reliability, and compliance at every stage, focusing on quality, integrity, and performance across the project lifecycle.

Detailed criterias are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

Technical Integrity Verification Activities

Activity **Details**

Assurance is the processes that ensures a consistent meet of the performance criteria. It involves checks, audits, and monitoring to verify that operations remain within required parameters, identifying and mitigating risks to maintain safety and efficiency.

Detailed assurance activities are as listed in the Performance Standard Collection 123A90-DDL-MD-LIS-01010 Rev.0

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C = Activity cannot be completed, further information required, see comments below.

Phase	Assurance	Status
Design	Basic Design Engineering Package (Design Life)	
	Basic Design Engineering Package (Fatigue Loads)	
	Notified Body (DNV) to verify and approve the design. Issuance of design IRC. (BDEP & DEM1)	
	Notified Body (DNV) to verify and approve the design. Issuance of design IRC. (Specific Requirement)	
	Notified Body (DNV) to verify and approve the design. Issuance of design IRC. (Material Selection Plan)	
	Verification of painting specification and procedure according to NORSOK Std. (Corrosion and Erosion)	
Proc.	Verify that the material requisition and the technical bid evaluation are attached to the purchase order	
	Perform audits based on the criticality rating of the supply and new suppliers.	
Fabr.	Perform intervention points as per approved ITP. Internal audits performed on key activities.	
	Verify the material certificates.	
	Review and approve Manufacturer Record Book	
Constr.	Verification of the Inspection test report	

Tags

Rosetti has performed the above-listed verification activities, which apply to the structural portion of the platform.

Documents Reviewed

Document No.	Title	Rev.
123A90-FDL-ST-DD-90000	TOPSIDE - PRIMARY PLAN AT EL. +23310	
123A90-FDL-ST-DD-90049	TOPSIDE - NODE PLAN AT EL. +23310	
123A90-FDL-ST-DD-90136	TOPSIDE - PRIMARY PLAN AT EL. +30310	
123A90-FDL-ST-DD-90067	TOPSIDE - SECONDARY PLAN AT EL. +23310	
123A90-FDL-ST-DD-90092	TOPSIDE - SECONDARY PLAN AT EL. +30310	
123A90-FDL-ST-DD-90173	TOPSIDE - TERTIARY PLAN AT EL. +30310	

TECHNICAL INTEGRITY VERIFICATION REPORT SI002-01

Documents Reviewed

Document No.	Title	Rev.
123A90-DDL-ST-RE-90005	BLPH PLATFORM - JOINT CHECK DESIGN REPORT	
123A90-DDL-ST-RE-90006	BLPH PLATFORM - SECONDARY STRUCTURES DESIGN REPORT	
123A90-DDL-ST-RE-90012	TP - JOINT CHECK DESIGN REPORT	
123A90-DDL-ST-SP-90017	STRUCTURAL DESIGN BASIS	
123A90-DDL-MO-RE-91023	Basis of Design for Installation	
123A90-PML-PM-PL-00003	Schedule of Design Reviews, Studies and Workshops	
123A90-PML-PM-PRO-00082	Detail Design and Shop Drawing Site Modification Procedure (Red Line Mark-Up)	

Outstanding Issues / Comments

Date Issued	Issued by [PQM]	Verified by [PEM]	Approved by [PM]
DD/MM/YYYY			

Verification

There are no deviations from code, standards or specified requirements identified.