

CERTIFICATE NUMBER EFFECTIVE DATE EXPIRY DATE ABS TECHNICAL OFFICE 25-00T2536136-PDA 16-Dec-2025 15-Dec-2030 London Engineering Department

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

KONGSBERG MARITIME AS

located at

POSTBOKS 483, , KONGSBERG, Norway, NO-3601

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: Dynamic Positioning Control System, Position Mooring System ...

Model: K-Pos DP/PM/DPM and cJoy with compliance with "Cyber Resilience" MVR 4-9-14 (2025) (IACS

UR E27 Rev.1)

Endorsements: CyberSecurity

Tier: 5 - Unit Certification Required

This Product Design Assessment (PDA) Certificate remains valid until 15/Dec/2030 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

Siddharth Barua, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

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Tier: 5 - Unit Certification Required

Dynamic Positioning Control System, Position Mooring System and

Product: Independent Joystick Control System

Model: K-Pos DP/PM/DPM and cJoy with compliance with "Cyber Resilience" MVR 4-9-14 (2025)

(IACS UR E27 Rev.1)

Endorsements: CyberSecurity

Intended Service:

ABS Classed Vessels and Offshore Facilities in accordance with the listed ABS Rules.

Description:

Dynamic positioning control system, Position mooring control systems, independent joystick control system, Remote Control Systems for Thrusters, Propulsion and Steering, Navigation System (e.g. Heading Control System (HCS)), Control and monitoring Systems and Automation Systems for vessels and offshore units.

DP operational modes: Joystick, Joystick High-Speed, Auto Heading, Auto Position, Mixed Joystick/Auto, Follow

Target, Auto Track, Track Line, Seismic Track, Dredge and Modes related to Offshore Loading.

PM operational modes: Joystick, Mixed Joystick/Auto, Anchor Handling, Position Mooring.

DP system is composed:

K-Pos OS: Operator Station.

K-Pos DP controller: control cabinet composed of Main processor – RCU601, RCU602, I/O bus - RHUB200-5, I/O units – RMP-208, RMP201-8, Serial lines - RSER200-4.

cJoy DP Operator Terminal MK3 & MK4: remote joystick with automatic heading and position capability for DP operation.

cWing Terminal: remote joystick with automatic heading capability

-K-Master as alternative OS/Workstation.

Available configurations:

DP-11: Single stand-alone DP control system composed of one DP controller unit (DPC-1) and one K-Pos OS, single network communication. Direct interface to the thrusters and includes the necessary interfaces to power plant, position-reference systems and sensors.

DP-12: Integrated single DP control system composed of one DP controller unit (DPC-1) and one K-Pos OS, double network communication. DP system can be integrated with the KONGSBERG K-Thrust and K-Chief systems.

DP-21: Stand-alone dual-redundant DP control system composed dual-redundant DP controller unit (DCP-2) and two identical K-Pos OS, dual high speed data network communication. Direct interface to the thrusters and includes the necessary interfaces to power plant, position-reference systems and sensors.

DP-22: Integrated dual-redundant DP control system composed of dual-redundant DP controller unit (DCP-2) and two identical K-Pos OS, dual high speed data network communication. DP system can be integrated with the KONGSBERG K-Thrust and K-Chief systems.

DP-31: Stand-alone triple-redundant DP control system composed of triple-redundant DP controller unit (DPC-3) and three identical K-Pos OS, dual high speed data network communication. Direct interface to the thrusters and includes the necessary interfaces to power plant, position-reference systems and sensors.

DP-32: Integrated triple-redundant DP control system composed of triple-redundant DP controller unit (DPC-3) and three identical K-Pos OS, dual high speed data network communication. DP system can be integrated with the KONGSBERG K-Thrust and K-Chief systems.

Ratings

Power supply: 115 / 230 VAC (+10%, -15%), (DP controller (cC-1, DPC-1, DPC-2, DPC-3) - 24 VDC version available for cC-1)

Enclosure protection: Cabinet - IP 22, cWing - IP56, DP Controller - IP44 Operating temperature: -15 Deg. C to 55 Deg. C, cWing -25 to 70 Deg. C

Digital Printer:

Display 15" FHD XT Mk1 Input Voltage: 18-36 VDC

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Power Consumption: Typical: 17.5 W/Max.: 21.5 W Ingress protection: IP65 front side - IP22 for rear side

Service Restriction:

- 1. Unit Certification is required for this product. According to ABS MVR 4-9-14/19.1.6 and ABS MVR 4-9-3/8.3.7, a FAT must be conducted for the system and should be witnessed by an ABS Surveyor. Additionally, as outlined in ABS MVR 4-9-3/8.5.6, a SAT is to be conducted on board the vessel, also witnessed by an ABS Surveyor.
- 2. If the manufacturer or purchaser requests an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards must be clearly defined.
- 3. This PDA is issued to demonstrate that the subject control monitoring systems meet the IACS UR E27 "Cyber resilience of on-board systems and equipment" requirements and ABS MVR 4-9-14/15.1 Table 1.
- 4. During installation, defence-in-depth measures are expected to be provided by the external environment, such as physical arrangement, policies and procedures, to prevent unauthorised access and manipulation of hardware, software, cables, and data, as well as changing the network topology.
- 5. Recommended configuration settings of the security capabilities and specific default values need to be provided during the installation.
- 6. This PDA is issued on the contingent that the end user follows the Kongsberg Cybersecurity Guidelines.
- 7. When using the WebUI, the web browser in use must be up to date and be the latest version.
- 8. At the first installation, the default password for the administrator must be changed to conform with ABS MVR 4-9-14/15.1 Table 1 item 6.
- 9. When delivering the control system using this PDA, the following documents must be submitted to ABS engineering for review as per ABS MVR 4-9-14/19.1.6.
- a. Asset inventory, demonstrating consistency with type-approved asset inventory.
- b. System topology, demonstrating system architecture and interfaces with other systems and equipment as per type-approved topology.
- c. Test report or declaration demonstrating configuration of security capabilities as per the type-approved configuration document
- d. Relevant description of any differences in the delivered system compared with the type-approved system.

 10. Any modification to the approved asset inventory, network topology, software or firmware that might have a significant impact on the performance of the cyber resilience capabilities must be reviewed by ABS Engineering.
- 11. The K-POS system utilises components that are not approved as part of this ABS PDA regarding compliance with eviromental and EMC performance. Therefore, this PDA does not cover those components of the K-POS system. Instead, compliance for those components must be demonstrated through either an engineering review or an ABS PDA. If an ABS PDA is used to demonstrate compliance, all conditions and service restrictions outlined in that PDA must be followed to use this PDA. Please see the attachment for the components in question.
- 12. The Dynamic Positioning control system is categorised as a computer-based system of Category II or III, depending on the project. Documentation stated in 4-9-1/7.3.9 of 2025 ABS MVR must be submitted accordingly to ABS for every project.
- 13. Documentation as stated in 4-9-3/15 Table 3 of 2025 MVR must be presented accordingly of the assigned system category.
- 14. Test and evidence as indicated in 4-9-3/17 Table 5 of 2025 MVR must be followed accordingly of the assigned system category.
- 15. Documentation stated on subsection 1/7.7 of 2025 ABS Guide for Dynamic Positioning Systems must be submitted according to the requested DPS notation.

Comments:

- 1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
- 2. An ABS Surveyor has witnessed the testing of the required secured capabilities dated 08 July 2024. Relevant report WO Number 6493937

Notes/Drawing/Documentation:

Dwg No. 482249,ENV KM-module test status table IACS E10 rev 8,Rev. A1,Pg: 14

Dwg No. 210112R-E301230001, MOXA EDS - Type Testing, Dekra Lab, 18 January 2021, Rev. 1, Pg. 36

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Tier: 5 - Unit Certification Required

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Dwg No. 210226R-E301230001,MOXA EDS - Type Testing,Dekra Lab,18 January 2021,Rev. 1,Pg: 36
Dwg No. 1750450R-ITCEP16V00,MOXA EDS - Type Testing,Dekra Lab,14 July 2017,Rev. 1,Pg: 88
Dwg No. 110-0114013,EDR-G9010 Series-Datasheet, Pg: 9
Dwg No. REP0014681,110-0040379-Test Report,Nemko,16 March 2023,Rev. A,Pg: 95
Dwg No. 416665, Test Report-Moxa Nport, in house testing witness by an IACS member, 18 June 2016, Rev. A, Pg: 4
Dwg No. 469729, Test Report-Flame Retardant, Nemko, 27 October 2021, Rev. 01, Pg. 27
Dwg No. 448540,K-Pos Hardware List,Rev. K,Pg: 2
Dwg No. 178001,178001 -EDS-308 Series-Datasheet, Rev. F, Pg: 5
Dwg No. 21C0426R-E3012300003-1, Moxa Nport -Type Testing, Dekra Lab, 11 January 2022, Rev. A, Pg. 21
Dwg No. 383971, Test Report- RCU602 & RMC-ST, Nemko, 28 April 2017, Rev. B, Pg: 54
Dwg No. 110-0039194, Test Report-Cjoy, Nemko, 12 March 2024, Rev. B, Pg: 97
Dwg No. 2110234R-E3012300001, Test Report-Moxa EDS, Dekra Lab, 18 January 2021, Rev. 1, Pg. 19 Dwg No. 312741, RSER200-4-Serial Line Converter-Datasheet, Rev. C, Pg. 2
Dwg No. 464983,464983-Test Report-C,,,Rev. C,Pg:
Dwg No. 300977, Hardware Module Description - COP-05 ALC Panel, Rev. B, Pg: 18
Dwg No. 300984, Hardware Module Description-COP-05 Input Panel, Rev. E, Pg. 22
Dwg No. D/22/4888/01,EMC - test report, AMETEK CTS Europe, 04 May 2022, Rev. A,Pg: 56
Dwg No. 352676,EDS-316 Series - Datasheet,Rev. E,Pg: 5
Dwg No. 494498,494498 - Certificate of Product Assessment - REV.A,PDA
Dwg No. 492309, Cisco 1000 - Datasheet, Rev. A, Pg: 34
Dwg No. 5358788, Class Approval Manual: K-Pos HW List, Rev. D, Pg: 14
Dwg No. 17A0322R-ITCEP16V00,Test Report - EMC - EDS-408A,Dekra Lab,16 July 2018,Rev. A,Pg: 119
Dwg No. 22-17667, Type Test Report - USB Extender, Aucoteam, 20 October 2022, Rev. A, Pg. 20
Dwg No. E21240.01, Type Test Report - cWing Mk3, Nemko, 18 November 2022, Rev. B,Pg: 102 Dwg No. 110-0066844, K-Pos DP Recorder Operator Manual Release 8.5, Rev. A,Pg: 62
Dwg No. 494547,494547 - Certificate of Product Assessment - REV.A1,PDA
Dwg No. E21088.03, Type Test Report-Various KM Moudles, Nemko, 28 October 2021, Rev. 03, Pg. 122
Dwg No. 318636, Moxa NPort 5200 Serial Device Servers - Datasheet, Rev. E, Pg: 12
Dwg No. 110-0061805, EDR-8010 Series - Datasheet, Rev. A, Pg: 8
Dwg No. 307003, Hardware Module Description-Kwant Controls KC 06-K Joysticks, Rev. B, Pg: 18
Dwg No. 400360,"Hardware Module Description - cJoy Operator Terminal Junction Box MK3", Rev. C,Pg: 18
Dwg No. 472200,EDS-408A Series - Datasheet,Rev. B,Pg: 6
Dwg No. 300983, Hardware Module Description - COP-05 BU-DP Panel, Rev. B, Pg: 20
Dwg No. 463286, Adapter USB to 4x RS232 DB9M - Datasheet, Rev. A, Pg: 6
Dwg No. DANAK-198508, Test Report- Various KM Modules, Delta, 17 October 2006, Rev. A, Pg: 63
Dwg No. 494600,494600 - Certificate of Product Design Assessment- REV.A,PDA
Dwg No. 110-0000794, Digital Printer - Datasheet, Rev. D, Pg. 2
Dwg No. E21229.00, Type Test Report- HN C1000-24T-4G-L and HN C1000-24T-4X-L, Nemko, 04 March
2022, Rev. A, Pg: 84
Dwg No. 110-0028959, Lexmark CS431dw - Datasheet, Rev. A1, Pg: 4
Dwg No. 479219, Statement by Manufacturer - MC340, Rev. B, Pg: 1
Dwg No. 418371,RCU602 - Remote Controller Unit - Datasheet, Rev. C,Pg: 2
Dwg No. 488466,488466 - Certificate of Product Assessment - REV.B,PDA
Dwg No. 338108, Type Testing - Tracker Ball , Delta, 15 September 2009, Rev. B, Pg: 61
Dwg No. E21059.03, Type Testing - RHUB200-5 Module, Nemko, 04 June 2021, Rev. 03, Pg. 68
Dwg No. 2110118R-E3012100075, Test Report -IEC 60945-EDR-G9010, Dekra Lab, 19 January 2021, Rev. A, Pg:
Dwg No. 110-0129391,MST HUB - Datasheet,Rev. A,Pg: 4
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Dwg No. E21236.00, Type Test Report - HN C1121X-8P with AC-adapter ADP-66CR, Nemko, 01 June 2022, Rev.

Dwg No. 482250,KM module Declaration of Identity (DoI) with statements for ENV test report,Rev. A,Pg: 12

Dwg No. 110-0018781,cJoy Operator Terminal - Datasheet,Rev. C,Pg: 2

Dwg No. 494598,494598 - Certificate of Product Design Assessment - REV.A,PDA

Dwg No. 312740,RHUB200-5 Communication HUB and repeater - Datasheet,Rev. C,Pg: 2

B,Pg: 74

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Tier: 5 - Unit Certification Required

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Dwg No. 110-0022770,RCU601 - Datasheet,Rev. B,Pg: 2
Dwg No. 412374, Type Test Report - L2C, Delta, 15 February 2016, Rev. A, Pg: 71
Dwg No. 449192, Adapter USB to 4x RS232 DB9M - Datasheet, Rev. A, Pg: 9
Dwg No. 493277, System Test Report - CISCO_WS-C1000-24T-4G-L, Rev. A, Pg: 12
Dwg No. 463482, Adapter USB to 1 serial RS422 - Datasheet, Rev. A, Pg: 5
Dwg No. 409453,LAN to CAN Gateway - Datasheet,Rev. D,Pg: 2
Dwg No. 351489,RMP201-8 - Datasheet,Rev. A,Pg: 2
Dwg No. 463483, Adapter USB to 1 serial RS422 - Datasheet, Rev. A, Pg: 5
Dwg No. 1012070,K-Pos - Functional Test Report,Rev. B,Pg: 47
Dwg No. 110-0092898, Hardware Module Description - FortiGate, Rev. A, Pg: 8
Dwg No. DANAK-198195, Type Test Report - KM Common Opperator Panels, Delta, 15 June 2007, Rev. 1, Pg: 135
Dwg No. REP019643, Type Test Report - Panel Input MK3 COP 05, Nemko, 17 January 2024, Rev. A, Pg: 72
Dwg No. 110-0041406,110-0041406 -Certificate-REV.A,PDA
Dwg No. 110-0117159, Lenovo Display Port Datasheet, Rev. A, Pg: 1
Dwg No. 486670,cWing Mk3 - Datasheet,Rev. A,Pg: 2
Dwg No. 22A0686R-0E3012300018-1, Type Test Report - EDS, Dekra Lab, 09 November 2022, Rev. B, Pg: 59
Dwg No. 415630, Statement by Manufacturer - KM RCUxxx/RIO4/RIO2xx, Rev. C, Pg: 4
Dwg No. 489196, CISCO Catalyst 100 Series Switches - Datasheet, Rev. D, Pg. 23
Dwg No. 2110223R-E3012300001, Test Result - EDS 316, Dekra Lab, 18 January 2021, Rev. A, Pg: 36
Dwg No. REP014885, Test Report - EMC - Lexmark, Nemko, 24 August 2023, Rev. A, Pg: 27
Dwg No. 110-0043970, Veinland - USB Extender - Datasheet, Rev. A, Pg: 4
Dwg No. 300985, Hardware Module Description-COP-05 Heading Wheel Panel, Rev. B, Pg: 16
Dwg No. 338386, Hardware Module Description - COP-05 Standalone Trackball , Rev. A, Pg. 16
Dwg No. 2330521R-E30123100075-A, Test Report Result - EDR 8010, Dekra Lab, 02 May 2023, Rev. A, Pg: 88
Dwg No. 178007, Hardware Module Description - cWing Junction Box for Wing Terminal, Rev. F,Pg: 18 Dwg No. 110-0047736, Statement by Manufacturer -MC360 i3, Rev. A,Pg: 1
Dwg No. 110-0062855, Asset Inventory, Rev. D, Pg: 19
Dwg No. 5351078,HW List - K-POS DP-2 & IJS,Rev. A,Pg: 4
Dwg No. 110-0066730,K-Pos Offshore Loading Application Operator Manual,Rev. B,Pg: 130
Dwg No. 458313,K-Pos DP - IMO DP Equipment Class 1,Rev. A,Pg: 2
Dwg No. 110-0066726,K-Pos Autopilot Mode Operator Manual, Rev. A,Pg: 50
Dwg No. 300966,K-Pos Serial lines Interface specification,Rev. F,Pg: 16
Dwg No. 110-0107044, Update Notes DP Basis 8.5.3, Rev. A, Pg: 46
Dwg No. 110-0071432,cWing Remote Wing Terminal-Operator Manual, Rev. A, Pg. 34
Dwg No. 110-0066738,K-Pos DP Analyses-Operator Manual, Rev. A,Pg: 74
Dwg No. KM-PRO-0120, Configuration Management Procedure, Rev. A, Pg: 14
Dwg No. 110-0066843,K-Pos Chart Server Application-Operator Manual, Rev. A,Pg: 22
Dwg No. 110-0066862,K-Pos Heavy Lift Application-Operator Manual,Rev. A,Pg: 30 Dwg No. 110-0066864,cJoy DP-OT DP Operator Terminal-Operator Manual,Rev. B,Pg: 162 Dwg No. 110-0066737,K-Pos Dredging Application-Operator Manual,Rev. B,Pg: 18
Dwg No. 110-0066722,K-Pos Follow Target Mode-Operator Manual,Rev. E,Pg: 56
Dwg No. 110-0066721,K-Pos DP Dynamic Positioning System-Operator Manual,Rev. D,Pg: 476
Dwg No. 5351079,K-POS DP2 Typical Layout,Rev. A,Pg: 1
Dwg No. 110-0066731,K-Pos Drilling Application-Operator Manual, Rev. B, Pg: 72
Dwg No. KM-PROC-0080, Change management, Rev. A, Pg: 16
Dwg No. 110-0066841,K-Pos Advanced Trainer-Operator Manual, Rev. A,Pg: 82
Dwg No. 472294,K-Pos DP - IMO DP Equipment Class 2,Rev. A,Pg: 6
Dwg No. KM-GUI-6015, Kongsberg Maritime-Patch Management, "Rev. A, Pg. 9
Dwg No. 110-0066727, K-Pos Auto Track Mode-Operator Manual, Rev. B, Pg: 122
Dwg No. 110-0066743,K-Pos PM Position Mooring System -Operator Manual,Rev. D,Pg: 516
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Dwg No. 110-0010936,K-Pos DP - IMO DP Equipment Class 3,Rev. A,Pg: 2

Dwg No. 110-0066732,K-Pos Pipelaying Application-Operator Manual,Rev. C,Pg: 42 Dwg No. 110-0066788,K-Pos Built-in Simulator-Operator Manual,Rev. A,Pg: 68

Dwg No. 481031, System Config Manual-MC340, Rev. A, Pg. 13

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Dwg No. 300967,K-Pos Interface Manual,Rev. H,Pg: 6

Dwg No. 110-0066739,K-Pos Backup DP System- Operator Manual,Rev. A,Pg: 28

Dwg No. 110-0062857, Description of Security Capabilities, Rev. D, Pg: 68

Dwg No. 110-0066729,K-Pos Seismic Track Mode-Operator Manual, Rev. A,Pg: 50 Dwg No. 110-0066794,K-Pos Stand-alone Simulator-Operator Manual, Rev. A,Pg: 74

Dwg No. 110-0066728,K-Pos Track Line Mode-Operator Manual, Rev. A,Pg: 50

Dwg No. 110-0062858, Test Procedure, Rev. F, Pg: 70

Dwg No. 110-0066744,K-Pos DPM Dynamic Positioning and Position Mooring System-Operator Manual,Rev.

D,Pg: 578

Dwg No. 5351076,IO Specification DPC-2,Rev. A,Pg: 10

Dwg No. KM-TMPL-0218, Change Management Plan - template, Rev. A, Pg: 6

Dwg No. KM-GUI-0118, Guideline for Secure Development Lifecycle (SDLC), Rev. A, Pg. 21

Dwg No. 110-0001425, Digital Printer-Operator manual, Rev. B, Pg. 14

Dwg No. 110-0062856, System Topology, Rev. D, Pg: 8

Dwg No. 5351077,IO Specification cJoy cC-1,Rev. A,Pg: 3

Dwg No. KM-PRO-2025, KM Alerts and Notifications, Rev. A, Pg: 17

Dwg No. 110-0072298,K-Pos DP Status Application-Operator Manual,Rev. B,Pg: 12

Dwg No. 110-0066740,K-Pos Alternative DP System-Operator Manual,Rev. A,Pg: 18

Dwg No. 110-0048488,MC360 System Configuration Manual, Rev. C, Pg: 16

Dwg No. 110-0066742,K-Pos Power Applications-Operator Manual,Rev. A,Pg: 32

Dwg No. 110-0059786,DP Release Notes - APPENDIX,Rev. B,Pg: 65

Dwg No. 5351080,IJS Typical System Layout,Rev. A,Pg: 1

Dwg No. 110-0066863, IJS Independent Joystick System- Operator Manual, Rev. B, Pg: 140

Dwg No. 110-0068347, Paragon - Hard Disk Manager, Rev. C, Pg: 101

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 15/Dec/2030 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

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STANDARDS

ABS Rules:

2025 Rules for Condition of Classification 1A-1-4/7.7, 1A-1-A3 and 1A-1-A4, which cover the following: 2025 Rules for Building and Classing Marine Vessel Rules: 4-8-3/1.3, 4-8-3/1.7, 4-8-3/1.17, 4-8-3/Table 2, 4-9-3/5, 4-9-15/Table 3, 4-9-9/Table 1, 4-9-14

2025 Rules for Conditions of Classification - Offshore Units and Structures 1B-1-4/9.7, 1B-1-A2 and 1B-1-A3, which cover the following:

2025 Rules for Building and Classing Mobile Offshore Unit Rules: 4-1-2/3, 4-3-1/11, 4-3-1/17, 4-3-3/Table 1, 4-3-4/5, 4-3-4/6

2025 ABS Guide for Dynamic Positioning Systems: 2/Table 1(Control System), 5/5.5, 5/5.7 and 5/9

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Tier: 5 - Unit Certification Required

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International:

IACS E27 2023 (Rev 1)

Government:

EUMED:

NA

OTHERS:

NA