



# FREQUENTLY ASKED QUESTIONS

## SMART Notations for Owners and Operators

### QUESTION 1

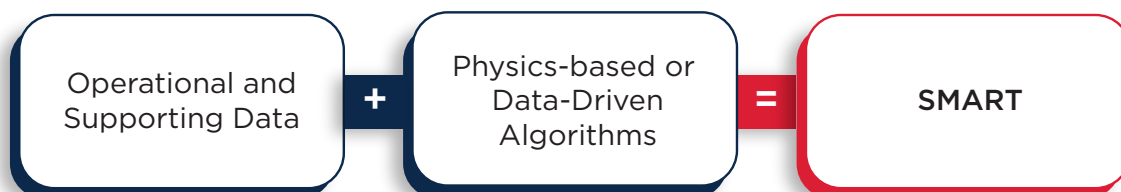
#### WHAT ARE THE MAIN STEPS INVOLVED IN OBTAINING SMART NOTATIONS, ONCE A VENDOR WITH ABS APPROVED PRODUCT DESIGN ASSESSMENT (PDA) IS SELECTED?

1. The operator/owner requesting the SMART notation provides the documentation listed in ABS Guide for Smart Function for Marine and Offshore Units, Section 1, Table 6 to the ABS engineering office.
2. The vendor and owner/operator must assess the requirements for installing and commissioning the Smart functions as per the PDA. The PDA service restrictions/comments may necessitate unit-specific reviews for each installation. In such cases, the owner/operator is responsible for initiating the process by contacting the ABS engineering office. ABS engineering will determine if any additional material needs to be reviewed.
3. The ABS engineering office involved issues the approval letter.
4. The owner/designer advises vendors requiring unit certification to arrange surveys with the local port office.
5. The owner/operator notifies ABS to schedule the Installation, Integration and Commissioning Survey per the Smart Function Operations and Maintenance Manual and/or other supporting documentation.
6. The Installation and Commissioning Survey is carried out on board. This includes verifying the details in the ABS approval documentation, any technical comments are resolved, and the system is installed and tested on board per approved letters.
7. The ABS surveyor assigns the notation to the vessel.

### QUESTION 2

#### DOES AN OWNER/OPERATOR NEED TO PROVIDE OPERATING DATA TO IMPLEMENT SMART FUNCTIONS BEFORE THE INSTALLATION?

It is important to note that the key building blocks of a Smart Function are the leveraging of operational and supporting data combined with physics-based or data-driven algorithms to derive insights for decision-making.



During Smart Function implementation, asset-specific data may be required to properly develop or train these Smart Function models. While the data may be obtained from design specifications or simulated operation and not require owner/operator input, actual operational data or measurements may provide additional accuracy. The PDA vendor can provide specific requirements and recommendations for their Smart Function.

### QUESTION 3

#### **ARE CYBER REQUIREMENTS NEEDED FOR SMART NOTATION? IF YES, IS THERE ANY EQUIVALENCY WITH IACS UR E27?**

ABS requires a minimum set of computer-based systems cyber resilience capabilities as highlighted in *ABS Guide for Smart Function for Marine and Offshore Units*, Section 6/2.3 (Cyber Security). The cybersecurity requirements align with IACS UR E22, E26 and E27 requirements.

### QUESTION 4

#### **DOES THE CREW ON BOARD NEED TO BE TRAINED IN SMART FUNCTIONS?**

Yes. Onboard personnel should be trained and able to be notified of any alarms or alerts from the Smart system.

During the Implementation, Integration and Commissioning Survey it will be verified that all parties involved (onboard personnel, onshore datacenter, management, etc.) have clear and established roles. Each party should have clear procedures for actions to be taken as a result of any alerts from the Smart Function system. These roles and procedures should be detailed in the Smart Function Operations and Maintenance Manual, which should be kept on board. The owner/operator is responsible for notifying ABS of any major changes and submitting the updated Operations and Maintenance Manual for review to ensure compliance with the approved Smart system.

### QUESTION 5

#### **FOR THE SMART STRUCTURAL HEALTH MONITORING (SHM) NOTATION, ARE THERE ANY SPECIFIC STRUCTURES THAT ARE REQUIRED TO BE MONITORED AND ANALYZED?**

The flexibility of the SMART (SHM) notation allows the owner/operator to assess the structural health of the global and/or local structures of interest. This consideration is applicable for all three of the Smart SHM tiers. Hence, the coverage of the SMART (SHM) Notation shall reflect the specific structural elements being covered, after ensuring that they are consistent with the capabilities of the vendor provided Smart Function. The coverage of the Smart SHM system will be indicated in the vessel's Record Comment.

ABS recommends that the owner discuss these details with the Vendor offering the proposed Smart SHM functions to ensure alignment of Smart system capabilities with the owner's expectations.

### QUESTION 6

#### **DOES AN OPERATOR/OWNER OF A VESSEL NEED TO EMBED ADDITIONAL EQUIPMENT TO ENABLE THE IMPLEMENTATION AND USE OF SMART FUNCTIONS?**

This will depend on the proposed Smart Function. However, please note that a key enabler for Smart Functions will be the availability of operational data. As such, for functions which will require tapping of operational data not already available, additional sensors may be required.

In many instances, the vendor which has obtained the SMART PDA can provide the needed equipment. However, ABS recommends discussing this with the vendors to confirm this information for the specific Smart system being considered in the approved PDA under "Ratings" section.

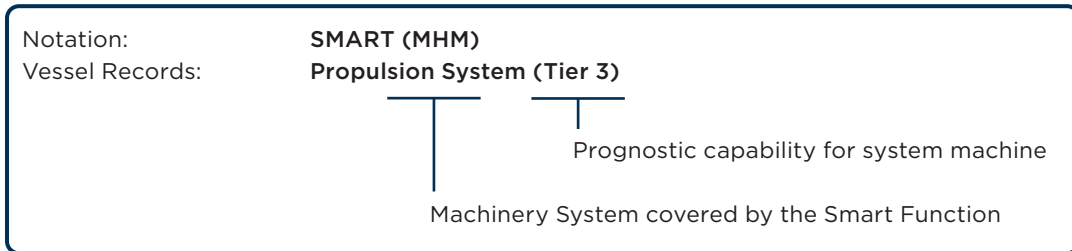
### QUESTION 7

#### **WHAT TYPE OF SYSTEMS OR EQUIPMENT CAN BE COVERED UNDER THE SMART MACHINERY HEALTH MONITORING (MHM) NOTATION? CAN IT ONLY BE ONE TYPE OF EQUIPMENT?**

The SMART (MHM) notation can cover either a single type or piece of equipment, or it can include several types. ABS requirements for SMART (MHM) does not limit the type of systems or equipment which is eligible to request for this notation.

The specific mapping of Smart Function Category to Vessel Function, Structure and System is highlighted in ABS *Guide for Smart Function for Marine and Offshore Units*, Section1/Table 2.

The vessel Record Comments will identify the system or equipment covered in the notation as well as the Tier. Please see below an example:



## QUESTION 8

### WHAT DATA IS REQUIRED FOR A SMART SHM TIER 1 SYSTEM?

Vessel-specific loading history indicating the relevant operational and other environmental loads that the monitored structure has experienced. Examples of this include wave and wind loading determined from data sources such as metocean hindcast data. The data can be obtained either from direct measurements, such as onboard wave radar or onsite buoy, or from public or commercially available AIS and metocean data services.

## QUESTION 9

### WHERE CAN I GET MORE INFORMATION ABOUT APPROVED SMART FUNCTIONS?

Please refer to the below link:

[Type Approval Database Search \(eagle.org\)](https://eagle.org)

Enter Keyword: "SMART FUNCTIONS"

**SEARCH CRITERIA**

<input style="width: 90%; height: 20px;" type="text"/>	<input style="width: 90%; height: 20px;" type="text"/>	<input style="width: 90%; height: 20px;" type="text"/>
<small>Product</small>	<small>Certificate Number</small>	<small>Keyword (Include Rules &amp; Specifications)</small>
<input style="width: 90%; height: 20px;" type="text"/>	<input style="width: 90%; height: 20px;" type="text" value="All"/>	<input style="width: 90%; height: 20px;" type="text" value="All"/>
<small>Company</small>	<small>Country/Region</small>	<small>City</small>

**Help Assistance**  
For all the free text fields,

- Enter "EC" in Certificate Number for all EU MED certificates
- Enter "EU Mutual Recognition" in Keyword for products conforming to Article 10.1 of Regulation (EC) No.391/2009

x Cancel
UPDATE SEARCH

## QUESTION 10

### WHAT IS THE ADDED VALUE OF SMART FUNCTIONS AND SMART NOTATIONS?

Smart Functions may provide the following added value for the operators/owners:

- I. Increase health state awareness in order to enhance safety and asset integrity and to minimize downtime associated with failures and maintenance.

- II. Improve asset efficiency and operational performance in order to reduce fuel consumption, emissions and operational expenses (opex).
- III. Assist and augment crew with vessel operations related to navigation bridge management, practices, and compliance reporting in order to enhance vessel situational awareness and navigation safety, reduce crew workload, and minimize potential human error.
- IV. Less intrusive surveys of hull and machinery systems through alternative means of verification of compliance to specific survey requirements. In this case, the SMART notation is to be integrated with a Preventive Maintenance Program (PMP) per 7-A1-14 of the ABS *Marine Vessel Rules* and annotated in the vessels record as PMP SMART (MHM) for example. An annual report by a recognized Service Supplier (SS) is also required.

The ABS *Guide for Smart Functions for Marine Vessels and Offshore Units*, accompanied with the ABS *Guidance Notes on Smart Function Implementation* provide an engineered approach for the effective implementation of Smart Functions. ABS notations provide recognition to stakeholders that a Smart Function has been installed on the subject vessel and that its implementation follows the rigorous engineered implementation as laid out in the Guide and Guidance Notes.

## QUESTION 11

### IF SYSTEMS ON BOARD A VESSEL HAVE SOME SMART CAPABILITIES, CAN A SMART NOTATION BE ISSUED?

ABS defines Smart Functions as a function which is implemented by systems installed and services deployed to continuously collect, transmit, manage, analyze and report data for enhanced health and condition awareness, operational assistance, operational optimization and decision-making support.

The two key elements of a smart function are:

- It leverages on operational data
- The data is analyzed using physics-based or data-driven algorithms

The Smart function definition is outlined in ABS *Guide for Smart Functions for Marine and Offshore Units*, Section 1 / 31.

There are two possible pathways to obtain a SMART notation for a vessel:

**The first option** is to first obtain a PDA for the Smart Function of interest. This involves an engineering review of the required submittal documents to understand the function and system capabilities. Additionally, a demo of the system capabilities to the ABS engineering and surveyors is required. Once the PDA is issued, all vessels with that recognized Smart Function installed will be eligible for the SMART notation after completion of the commissioning survey.

**The second option** is to only review the implementation of the Smart Function for the specific asset. This requires all of the same engineering and survey review processes as the PDA process described above but the SMART notation will only be applicable to the specific asset being considered.

## QUESTION 12

### ONCE A VESSEL RECEIVES THE SMART NOTATION, HOW IS IT MAINTAINED?

To maintain the Smart Function notations:

The Smart Function system is to be properly maintained and remain operational. The survey after construction requirements described in Section 9 of the ABS *Guide for Smart Function for Marine and Offshore Assets* are to be met and the survey is to be conducted to the satisfaction of the attending surveyor. This includes:

- Verification that the approved Smart Function Operations Manual is available.
- Confirmation with the vessel's crew that any modifications, replacements, or changes made to the Smart Function system hardware and software are in accordance with the Smart Function Operations Manual and are documented and kept on board.
- Confirmation that the Smart Function system hardware and software are functioning and calibrated.
- Verification that the health reports and/or other user feedback (e.g., user-interface, alert emails, etc.), are current and comply with the approved Smart Function Operations Manual. This includes reviewing the prior alarms generated by the system, examining the responses and resolutions, and evaluating the crew's competency in

managing and troubleshooting Smart Function systems to ensure the equipment is in satisfactory condition for continued service.

- Verification of alert mechanisms to ensure timely notification of system issues and proper crew response.
- Verification of the Smart Function system automatic resumption following a simulated blackout.
- Verification of availability of emergency power.
- Verification that data backup as per approved Smart Function Operations Manual are working in satisfactory condition.
- Check user access controls and authentication methods to ensure only authorized personnel can access the Smart Function system.

In addition, for SMART Notations (MHM) used in conjunction with the Preventative Maintenance Program (PMP) Notation will additionally follow the survey after construction requirements found in the ABS Marine Vessel Rules Section 7-A1-14.



### WORLD HEADQUARTERS

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