

September 30, 2025

National Maritime Research Institute,
National Institute of Maritime, Port and Aviation Technology

International Standard on Performance Evaluation of Antifouling Paints is Published, Led by NMRI Researcher

ISO/TC8/SC2 (International Organization for Standardization/ Technical Committee on Ships and Marine Technology/ Sub-Committee on Marine Environment Protection) officially announced the publication of ISO 21716-4:2025 (Ships and marine technology - Bioassay methods for screening anti-fouling paints - Part 4: Algae).

Development of this standard was led by Dr. Ryuji Kojima, Principal Researcher at the National Maritime Research Institute (hereinafter referred to as NMRI, Director General: Dr. Koichi Hirata). Dr. Kojima served as project leader at working group under ISO/TC 8/SC 2. He led the development of this new standard with his scientific knowledge and technological evidence based on his research.

On 15 August 2025, ISO/TC8/SC2 (Chair: Dr. Chiori Takahashi (NMRI)) officially announced the publication of ISO 21716-4:2025, a new international standard proposed and led by Japan. This is the world's first standard to define a bioassay method for screening anti-fouling paints using brown algae under laboratory-controlled conditions, establishing as a scientifically validated test protocol.

Biofouling on ships' hull can lead to significant economic and environmental impacts, including reduced maneuverability and fuel efficiency of vessels, as well as introduction of non-native species through biofouling. Anti-fouling paints to ships' hull have been widely applied as a solution to this problem. However, there has been no internationally standardized test method to evaluate their efficacy quantitatively and scientifically, and there has been a strong demand for the standardization of testing protocols.

In response to this situation, the ISO 21716 series was developed as a set of international standards for bioassay methods for screening anti-fouling paints with laboratory test conditions, under the leadership of Dr. Kojima as project leader at the working group. Following the previously published Part 1: General Requirements, Part 2: Barnacles and Part 3: Mussels, a newly added Part 4: Algae has now been published. This new standard specifies a test method for evaluating the growth-inhibiting effect of anti-fouling paints using the parameters of color space on the brown algae (*Ectocarpus* sp.) before and after the bioassay.

The publication of ISO 21716-4: 2025 marks the culmination of the initial four parts of the ISO 21716 series, thereby bringing the international standardization of bioassay methods for screening anti-fouling paints to a conclusion. This milestone is expected to contribute to addressing the wide range of problems caused by biofouling on ship hulls.



Dr. Kojima, Principal Researcher at NMRI serves as Project leader of the working group (third from right)

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