NACE SP21416-2020
Item No. SP21416-2020
Approved: 2020-10-13

Application Process for Optimum Paint and Coating Systems' Performance for Navy Ships

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ABSTRACT

This NACE/EFC standard is considered as the basis for the cleaning, surface preparation, and application of paint and coating systems to Navy ships used in marine environments for New Build, and during Life Cycle maintenance and permanent repair. It is intended for use by naval corrosion control personnel, coating applicators, and coating manufacturers. It covers coating materials, coating test protocol and acceptance criteria, surface preparation, coating application, quality assurance and control, and repair methods. Its purpose is to facilitate more effective corrosion protection of Navy ships and support inter-operability requirements by presenting reliable information and providing guidelines for coating manufacturers and shipyards to develop more durable specifications.

This standard replaces NATO Allied Engineering Publication (AEP) 59.

KEYWORDS

NATO, AEP, surface preparation, coating application, quality assurance, quality control

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Foreword

In the late nineties, the North Atlantic Treaty Organization (NATO)[1] navies were considering approaches to improve the durability and maintainability of major assets. The importance of surface preparation, application processes and qualified coatings was clear. There was also a confluence of enhanced operational capabilities (health, safety, security, etc.), environmental regulation compliance and increasing cost during ship life cycle (acquisition and maintenance). It was resolved that there was a need for internationally recognized performance standards and interest in standard documents such as NATO Allied Engineering Publications (AEP) to suit the unique requirements of military ships.

Navy ships represent large capital investments and are present worldwide. Moreover, control of corrosion on Navy ships is necessary to sustain operational availability and inter-operability, provide safe working and living areas, and limit total ownership cost during a ship's life cycle.

NATO established a working group comprised of experts from eleven countries to create international performance standards. Through contacts with various navies, shared objectives were established; in particular:

- Increasing the length of time between dry-dockings (up to 10 years),
- Reduction of maintenance, including reducing crew labor.

The working group used the period from 2002-2008 to complete four AEPs. In 2010, participating NATO member nations accepted the AEPs via an overarching Standardization Agreement (STANAG 4698).[1] The four AEPs developed under STANAG 4698 are:

- AEP 59: Application process for optimum paint and coatings system's performance
- AEP 60: Performance requirements for exterior topsides coatings
- AEP 61: Performance requirements for underwater hull paint systems
- AEP 63: Performance requirements for non-skid coating systems

In 2012, it was realized that the community of experts within NATO had diminished and this limited NATO's ability to manage and update the AEPs. A plan was developed to transfer the documents to a Joint NATO/NACE International (NACE)/European Federation of Corrosion (EFC)[2] working party. Under this plan, NATO maintains control of the STANAG and oversees the maintenance of the AEPs by the NACE/EFC working party.

This NACE/EFC standard is intended for use by naval corrosion control personnel, coating applicators, and coating manufacturers. It covers coating materials, coating test protocol and acceptance criteria, surface preparation, coating application, quality assurance and control, and repair methods. Its purpose is to facilitate more effective corrosion protection of Navy ships and support inter-operability requirements by presenting reliable information and providing guidelines for coating manufacturers and shipyards to develop more durable specifications.

Higher durability coatings provide the corrosion protection and durability required to meet these goals; however, proper application of the coatings is critical to achieve the maximum life expectancy of these coating products.

The aim of this standard is to establish acceptance of paint and coating application processes and quality control procedures that have been demonstrated to optimize product/system performance. This standard establishes baseline requirements of best industrial practices for paints and coatings.

This standard was prepared in 2020 by the joint working party of NACE, EFC, and NATO representatives and referred to by NATO under STANAG 4698.

This standard replaces AEP 59.

In NACE standards, the terms ***shall, must, should,*** and ***may*** are used in accordance with the definitions of these terms in the NACE Publications Style Manual. The terms ***shall*** and ***must*** are used to state a requirement, and are considered mandatory. The term ***should*** is used to state something good and is recommended, but is not considered mandatory. The term ***may*** is used to state something considered optional.

[1] North Atlantic Treaty Organization (NATO), Boulevard Leopold III, Brussels, Belgium.
[2] European Federation of Corrosion (EFC), 1 Carlton House Terrace, London SW1Y 5DB, U.K.

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Section 1: General

This publication describes the lowest risk approach for the application of high performance paints and coatings. It represents the best industrial practices necessary to ensure optimal service life of marine coatings and achieve the most cost effective corrosion control. Users should alter or reduce the steps defined within this publication through a rigorous business case and risk analysis methodology. It is well understood that a reduction in quality assurance and process oversight represents increased risk and may require efforts to mitigate the long term effects.

Section 2: Scope

This standard is considered as the basis for the cleaning, surface preparation, and application of paint and coating systems to Navy ships used in marine environments for New Build, and during Life Cycle maintenance and permanent repair. Each user shall specify critical areas for application of these guidelines which will be followed on projects.

Section 3: Definitions

For the purposes of this standard, the following terms and definitions apply.

3.1 TECHNICAL AUTHORITY (TA)

Organization deciding method, process and material to achieve performance requirements.

3.2 DESIGNATED OWNER REPRESENTATIVE (DOR)

Entity with delegated technical authority to establish minimum requirements, process inspections, approve coatings selection and process changes. Specifically designated by the formal assignment of authority to represent the government on matters of application process.

3.3 CONTRACTOR (CTR)

Surface preparation and coating application service provider. The CTR is responsible for all coating processes specified in the standard.

3.4 QUALITY CONTROL PLAN (QCP)

Document developed by the CTR and used by inspectors in-process to ensure that the requirements of each checkpoint are successfully met.

3.5 PROCESS CONTROL PROCEDURE (PCP)

A detailed written description of the production process used by the CTR to perform surface preparation and coating application.

3.6 PERSONNEL QUALIFICATION/CERTIFICATION

Defined by TA or DOR.

3.7 COATING INSPECTOR

A dedicated and competent individual with the necessary combination of training, expertise and experience as defined by each TA or DOR (for example NACE CIP, FROSIO, SSPC…). In some cases, the DOR and the Coating Inspector may be the same entity or individual.

Section 4: Safety

Accomplish the safety precautions as specified in local safety, health, and environmental governing specifications / regulations, applicable Safety Data Sheets, and the Job Order during surface preparation and the application of marine coatings.

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