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Corrosion Prevention and Control Planning

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ABSTRACT

This new standard on corrosion prevention and control (CPC) planning is intended to support future CPC improvements to national acquisition and sustainment of equipment, systems, facilities, and infrastructure at an acceptable cost. It provides a standardized framework for a supplier's plan to control corrosion of supplied products and structures. The standard is intended for use by public and private facility owners/acquisition agencies that require their suppliers to provide corrosion prevention and control procedures as a deliverable provided with the purchased product, installation, or system. The standard includes:

- *Attributes of the supplied product, system or facility that require planning for CPC;*
- *Considerations for material selection and design of a product, system or facility to minimize corrosion;*
- *Items or topics that should be addressed in a CPC plan;*
- *Items or topics that should be addressed in CPC planning which affect CPC in design, fabrication and construction, operation and use, and maintenance and sustainability.*

KEYWORDS

Corrosion prevention and control, CPC, planning, design, material selection, JTG 527.

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Foreword

In NACE/SSPC standards, the terms shall, must, should, and may are used in accordance with Paragraph 2.2.1.8 of the Agreement between NACE International and SSPC: The Society for Protective Coatings. The terms shall and must are used to state mandatory requirements. The term should is used to state something that is considered good and is recommended but is not mandatory. The term may is used to state something that is considered optional.

Corrosion costs the United States of America an estimated $451B annually. While guidance existed for corrosion prevention and control (CPC) planning, there wasn't a published standard that defined the key elements/composition of CPC planning for all public and private sector users as well as the suppliers of Products (all equipment, systems, platforms, vehicles, support equipment and items necessary to perform a specific function or mission including all components of such items) and Facilities (all buildings, structures, airfields, port facilities, surface and subterranean utility systems, heating and cooling systems, fuel tanks, pavements and bridges). A new standard on CPC planning is needed to support future CPC improvements in procurement/contracting and sustainability of products and facilities at an acceptable cost. Inclusion of the appropriate levels of CPC requirements in individual statements of work, contracts and agreements is inconsistent across the enormous number of products and facilities projects acquired and sustained in both the public and private sectors. Referencing an approved standard that defines deterioration of materials, CPC planning characteristics and the appropriate application of CPC technologies and practices provides uniformity; is a more practical and reliable method to influence acquisition and sustainability programs; and is of benefit to all stakeholders.

SSPC and NACE have developed this joint standard for corrosion prevention and control planning. This document provides a standardized framework for a supplier's plan to control corrosion in products and facilities. The standard is intended for use by public and private owners and purchasing agencies that require their suppliers or facility owners to address corrosion prevention and control as an aspect of their purchased product or facility deliverable. The standard includes such items as:

Attributes that impact planning for CPC
Considerations for material selection and design to minimize corrosion

- Items or topics that should be addressed in corrosion prevention and control planning which affect CPC in design, fabrication and construction, operation and use, and maintenance and sustainability.

This standard was prepared in 2016 by Joint Task Group (JTG) 527, Corrosion Prevention and Control Planning Standard, a task group comprised of representatives from NACE and SSPC. Within NACE, JTG 527 is administered by Specific Technology Group (STG) 08 on Corrosion Management and sponsored by STG 40 on Military and Aerospace Systems and Facilities. Within SSPC, JTG 527 is administered as a task group within the SSPC C.4.10 committee on Corrosion Prevention and Control Planning. This standard is published by NACE under the auspices of STG 08, and by SSPC under Committee C.4.11.

Corrosion Prevention and Control Planning

Tables

Section 1: General

1.1 Background

Corrosion costs the United States an estimated $451B annually;[1] and specifically for the Department of Defense (DoD), this cost exceeds $20B annually.[2] For the purpose of this standard, the Congressional definition of corrosion cited in Title 10 United States Code (USC) §2228 will be used, which states that "Corrosion is the deterioration of a material or its properties due to a reaction of that material with its chemical environment."[3]

The most efficient method to address this staggering impact is to execute CPC planning as a fundamental management tool for effectively addressing and reducing the impact of corrosion at every succeeding stage throughout the product or facility's life. Program and Project Managers should tailor their CPC approach to fit the specific needs of their acquisition program or project. CPC planning requires the participation of all stakeholders. Cost effective material sustainability is best accomplished through inclusion of CPC during initial design, rather than re-engineering or retro-fitting fielded products and constructed facilities, so it is especially important to ensure that CPC is addressed as early in the cycle as possible.

The creation of a new joint standard for corrosion prevention and control planning supports better business practices for procurement/contracting. Typically, the current practice relies on detailing the requirements for each element of corrosion prevention and control planning in individual documents, such as the statements of work (SOW). This standard provides for a more uniform, efficient and cost effective application of CPC principles, technologies and best practices over the lifespan of a product or facility and should lead to lower life cycle costs.

1.2 Scope and Limitations

This standard defines the key elements/composition of what corrosion prevention and control planning encompasses for design, manufacturing, construction, operation and sustainability of products and facilities. It is designed for use by U.S. federal agencies, but may also be used by other governmental bodies and other industries where appropriate. Failure to provide a joint standard limits the ability to influence change in the prevention and mitigation of corrosion in procurement/contracting and sustainability projects where investment in proper corrosion prevention and control planning is beneficial. While products and facilities follow different processes and requirements, this standard attempts to provide both areas with assistance in determining the best approach for CPC Planning with the desired outcome of realizing the useable service life consistent with the investment and expectations.

1.3 Overview of Topics Covered by this Standard

- Generic CPC Planning Matrices/Checklist
- Elements of CPC Planning
- Attributes that contribute to or affect CPC Planning considerations for material selection and design
- Miscellaneous issues that affect CPC in the design, fabrication and construction, operation and use, and maintenance and sustainability
- Definitions relevant to this standard

Section 2: Checklists for Corrosion Prevention and Control (CPC) Planning

CPC Planning consists of the application of various elements and aspects that can be used to establish a standardized approach towards managing CPC for products and facilities across their life cycle. CPC planning should include program management, engineering (including systems engineering), logistics, test and evaluation, budget/funding and procurement/contracting. The following checklists (Tables 1 and 2) provide a listing of the basic elements of CPC planning which should be considered during any program/project and should be tailored to meet the requirements of the specific need. The user may select some or all of the elements for the specific program/project using this standard. For example, if warranties are not part of the subject program/project, don't include that as part of the checklist. These checklist tables include a hot link for each element to its corresponding requirement statement. Each requirement statement is subsequently hot linked to details and guidance specific to that element contained in Appendix A (nonmandatory).