

NACE Publication 11100

Reference Electrodes for

Atmospherically Exposed Reinforced

Concrete Structures

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Foreword

NACE technical committee reports are intended to convey technical information or state-of-the-art knowledge regarding corrosion. In many cases, they discuss specific applications of corrosion mitigation technology, whether considered successful or not. Statements used to convey this information are factual and are provided to the reader as input and guidance for consideration when applying this technology in the future. However, these statements are not intended to be requirements or recommendations for general application of this technology, and must not be construed as such.

The objective of this technical committee report is to provide a state-of-the-art overview of the characteristics of and the installation method for reference electrodes commonly used in atmospherically exposed reinforced concrete structures. It is intended as a technical resource for engineers responsible for assessment of reinforced concrete structures or the corrosion control design for such structures. It is also useful to owners involved in these decisions. It is beyond the scope of this report to fully address all factors associated with the selection and use of reference electrodes in steel-reinforced concrete. Additional reference electrodes are being developed by several manufacturers for use in this application.

This technical committee report was prepared in 2000 by Work Group T-11-4,* a component of Task Group (TG) T-11-4 on Cathodic Protection of Reinforcing Steel in Concrete. This TG was subsequently replaced by TG 921,* "Use of Reference Electrodes for Atmospherically Exposed Reinforced Concrete Structures," which is administered by Specific Technology Group (STG) 01, "Reinforced Concrete," and sponsored by STG 05, "Cathodic/Anodic Protection." This report was reaffirmed with additional changes by STG 01 in 2018. It is issued by NACE International under the auspices of STG 01.

Description

Provides a state-of-the-art overview of the characteristics of and the installation method for reference electrodes commonly used in atmospherically exposed reinforced concrete structures. This report is intended as a technical resource for engineers responsible for assessment of reinforced concrete structures or the corrosion control design for such structures. It is also useful to owners involved in these decisions.

Key Words

Reinforced concrete, reference electrodes, TG 921

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Introduction

The costs of damage due to corrosion of reinforced concrete continue to increase. Concrete structures such as bridges, parking garages, buildings, and marine docks exposed to chlorides from either deicing salts or the local environment are subject to deterioration due to corrosion.

Chlorides that are introduced into the reinforced concrete structure initiate corrosion by destroying the passive film that is naturally formed on steel in concrete. The corrosion products of steel occupy several times the volume of the steel itself and exert tensile stresses on the surrounding concrete. Cracking of the concrete develops, and, ultimately, spalling of the concrete takes place. This can render the structure unsound for use.

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