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Protection of Receptacle Outlets in Wet Locations According to the National Electrical Code® (NEC®)

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Foreword

This is an update to the NEMA white paper *Protection of Receptacle Outlets in Wet Locations According to the National Electrical Code*® (NEC®). To ensure that a meaningful publication was developed, draft copies were sent to a number of groups within NEMA having an interest in this topic. Their resulting comments and suggestions provided vital input prior to final NEMA approval and resulted in a number of substantive changes to this publication. This publication will be periodically reviewed by the Joint Conduit Fittings and Outlet & Switch Boxes Group of the NEMA Commercial Products Division, so that it stays up to date with advancing technology. Proposed or recommended revisions should be submitted to:

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1 Introduction

Receptacle outlets are required to be installed in many outdoor locations, according to the *National Electrical Code*® (NEC) Section 210.52(E). Even when the NEC does not require it, many receptacle outlets, for the purpose of convenience, are installed in outdoor locations or in areas the NEC defines as a "wet location" or refers to as "exposed to weather."

The proven life-saving benefits of ground-fault circuit-interrupter (GFCI) technology have prompted steady advances in the required applications for GFCI-protected circuits or GFCI-protected receptacles (Section 210.8). Not coincidentally, the attention brought about through the introduction and well-publicized safety record of GFCI technology may very well have increased the number and placements of convenience receptacle outlets in wet locations, and their acceptance by authorities having jurisdiction (AHJ).

Looking back to 1981, the NEC (presently Section 406.9) required that "a receptacle installed outdoors where exposed to weather or in other wet locations shall be in a weatherproof enclosure." Also recognizing that the degree of protection from elements found in a typical wet location can vary depending on whether or not the receptacle was "in use," the 1981 NEC went further to require that the integrity of the weatherproof enclosure shall "not be affected when the receptacle is in use (attachment plug cap inserted)." Since then, beginning with the 1993 NEC, these requirements have progressively evolved, as have the product standards and technologies for providing protection for receptacle outlets in wet locations. With each change, the fundamental principle of ensuring receptacle outlets are protected from exposure to weather and wet locations has stayed the same, and the greatest focus of the changes has been associated with 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles. Indeed, with the 2008 NEC, these receptacles that were used in wet locations are now required to be "listed weather-resistant type." This will be our focus as we summarize the evolution of these requirements and the drivers behind the changes.

The annex to this paper includes relevant requirements taken from the NEC that are referred to throughout the document.

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2 Weatherproof Enclosures for Receptacle Outlets in Wet Locations

15- and 20-ampere, 125- and 250-volt nonlocking-type receptacle outlets in wet locations are typically installed in a surface- or pedestal-mounted enclosure or an enclosure that positions the face of the receptacle outlet flush or recessed with respect to the finished surface of a building or other structure (see photos below). The enclosure for these ratings and types of receptacle outlets usually consists of a box, cover plate, an "extra duty" outlet box hood, and cover plate back gaskets.

Other means of achieving wet locations "in-use" compliance includes cover plates incorporating circumferential gaskets to surround mated plugs; watertight elastomeric cover plates (sometimes integral with the receptacle) that seal against watertight elastomeric plugs; and receptacles integrally incorporating covers that achieve labyrinth seals with mating shrouded plugs.