Materials for Storing and Handling Commercial Grades of Aqueous Hydrofluoric Acid and Anhydrous Hydrogen Fluoride

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Foreword

Scope

This AMPP technical report presents general information on materials commonly used for storing and handling commercial grades of aqueous hydrofluoric acid (AqHF) and anhydrous hydrogen fluoride (AHF). Some materials generally avoided are also discussed. This report is intended for end users, designers, and suppliers of equipment for use with AqHF and AHF. These include, among others, workers in process industry plants, engineering and construction designers, and suppliers of equipment such as pumps, valves, and hoses. This information is useful for initial design and for cost estimates of equipment to handle most commercial AqHF and AHF. The report addresses AqHF and AHF purchased to normal commercial quality that do not contain impurities liable to affect their inherent corrosion characteristics. Testing in the service environment typically indicates a material's suitability for use with AqHF and AHF. This report does not include all materials that might be resistant and is not intended to limit the consideration and testing of other materials.

Rationale

This report replaces NACE Publication 5A171 (2007 version). This version updates information related to non-metallic performance, aligned with updates to API 751 and introduces additional corrosion rate tables.

The chemical symbol for hydrogen fluoride is HF. Throughout this report, the term "HF" is used to mean the presence of hydrogen fluoride in any form or as a component in any stream. The term "AqHF" is used to mean a solution of some percentage of HF dissolved in water. If a percentage designation is associated with the term "AqHF," it denotes the weight percentage concentration of HF in the water (aqueous) solution. The term "AHF" is used to mean a commercial grade of anhydrous HF as a liquefied gas with only specification levels of water present. The term "HF service" is used to mean AqHF and AHF services. It is recognized that both AqHF and AHF sometimes exist in streams with organics or other materials present, which would change the apparent concentrations but have only small effects on the corrosiveness of the HF. In these cases, the context provides an understanding of the resulting effects.

In this report, concentrations of solutions or alloy compositions are understood to be weight percentages unless otherwise indicated.

AMPP technical 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 recommendations for general application of this technology and must not be construed as such.