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Water Analysis for Corrosion Prediction – Sampling Analysis and Interpretation

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Foreword

The purpose of this document is to provide guidance on water analysis for internal corrosion prediction including sampling analysis and data interpretation during the corrosion risk assessment of pipelines and facilities in the oil and gas industry. It is used as a guide to help identify gaps in water analysis data, use the right water analysis data, and provide a best practice for estimation when lacking data. References are also made to other relevant documents and standards.

Scope

This Guide focuses on those water chemistry parameters that are key for corrosion prediction. Additional parameters may be required for other materials and corrosion evaluations and decisions. This Guide does not provide a procedure for how, when, and where to take water samples or how to preserve samples.

Rationale

Water sample analysis and data interpretation are critical to internal corrosion prediction, especially with respect to CO_2/H_2S and organic acid corrosion. Misunderstanding of the water data is a frequent source of error in corrosion prediction. This Guide provides guidelines on using water chemistry data for corrosion prediction, in particular the issue of how to deal with organic acids and alkalinity including sampling analysis and interpretation.

Referenced Standards and Other Consensus Documents

Unless specifically dated, the latest edition, revision, or amendment of the documents listed in the table below shall apply.

AMPP/NACE/SSPC, www.ampp.org:	
NACE SP21469	Corrosion Inhibition Selection and Management for Oil and Gas Production
NACE/ASTM G193	Standard Terminology and Acronyms Relating to Corrosion
NACE Publication 21413	Prediction of Internal Corrosion in Oilfield Systems from System Conditions
American Petroleum Institute (API), www.api.org:	
API RP 45	Recommended Practice for Analysis of Oilfield Waters
ASTM International, www.astm.org:	
ASTM D3875	Standard Test Method for Alkalinity In Brackish Water, Seawater, And Brines
ASTM D1067	Standard Test Methods for Acidity or Alkalinity of Water
ASTM D4327	Standard Test Method for Anions in Water by Suppressed Ion Chromatography
International Organization for Standardization (ISO), www.iso.org:	
ISO 5667-3	Water quality – sampling – Part 3: Guidance on the preservation and handling of water samples
ISO 9963-1	Determination of alkalinity – Part 1: determination of total and composite alkalinity
ISO 6107	Water quality — Vocabulary
Standard Methods Committee of APHA (American Public Health Association), AWWA (American Water Works Association), and WEF (Water Environment Federation), www.standardmethods.org/aboutsm:	
APHA 2320 B	Standard Methods for the Examination of Water and Wastewater: Alkalinity by Titration
APHA 1060 B	Standard Methods for the Examination of Water and Wastewater: Collection and Sampling
APHA 4110	Standard Methods for the Examination of Water and Wastewater: Determination of Anions by Ion Chromatography