



MIDDLE EAST UNITED CO FOR MAINTENANCE OF OIL FACILITIES, WELLS, REFINERIES, AND PETROCHEMICALS  
COMPANY, KUWAIT WLL  
(MEMOC)

**INTERNAL CORROSION DIRECT ASSESSEMENT OF PIPELINES (ICDA)**

**Introduction:**

Internal Direct Assessment (IDA) is a comprehensive assessment technique used to evaluate the condition of pipelines from the inside. It involves the use of specialized tools and inspection techniques to identify and assess various threats and vulnerabilities that may affect the integrity of the pipeline. IDA is an essential component of pipeline integrity management systems and plays a crucial role in ensuring the safe and reliable operation of pipelines.

The application is carried out through proprietary software developed by various companies. Most of the companies do not license their software. But work on service contracts with the clients and submit technical reports on the same.

**Objective:**

The primary objective of Internal Direct Assessment is to identify and evaluate the presence and severity of threats to pipeline integrity, including corrosion, cracking, and other forms of degradation. By conducting a thorough assessment of the pipeline's internal condition, operators can make informed decisions regarding maintenance, repair, and replacement activities, thereby minimizing the risk of failures and accidents.

**Process Overview:**

The Internal Direct Assessment process typically involves the following key steps:

**Pre-Assessment Planning:** This step involves gathering relevant information about the pipeline, such as design specifications, operating conditions, and historical inspection data. It also includes identifying the specific threats that need to be assessed and determining the appropriate assessment tools and techniques to be used.

**Cleaning and Preparation:** Before conducting the assessment, the pipeline is cleaned using various methods, such as scraping or pigging, to remove debris, scale, and other contaminants that could hinder the inspection process. The pipeline is then prepared for inspection by ensuring proper access points and installing necessary monitoring devices.

**Inspection and Data Collection:** In this step, specialized tools and techniques are used to inspect the internal surfaces of the pipeline. This may include the deployment of smart pigs, robotic crawlers, or remotely operated vehicles (ROVs) equipped with cameras, sensors, and other inspection instruments. The tools collect data on various parameters, such as metal loss, crack dimensions, and wall thickness, which are crucial for assessing the integrity of the pipeline.

**Data Analysis and Interpretation:** The collected inspection data is analyzed to evaluate the severity and extent of any identified threats or anomalies. This may involve applying advanced data processing algorithms, corrosion modeling, and fitness-for-service assessments. The results are interpreted to determine the remaining strength and expected service life of the pipeline.



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**Risk Assessment and Decision Making:** Based on the analysis and interpretation of the assessment data, a risk assessment is conducted to prioritize potential threats and establish appropriate

mitigation measures. The results guide decision-making processes, such as determining the need for repair, remediation, or replacement of the pipeline segment.

**Reporting and Documentation:** A comprehensive report is generated, documenting the findings, assessment results, and recommended actions. The report serves as a vital reference for regulatory compliance, internal auditing, and ongoing integrity management of the pipeline.

**Key Benefits:**

Internal Direct Assessment offers several benefits for pipeline operators, including:

**Enhanced Safety:** By identifying and addressing potential threats to pipeline integrity, IDA helps prevent accidents, leaks, and failures, thus ensuring the safety of personnel, the environment, and surrounding communities.

**Improved Maintenance Strategies:** The assessment results enable operators to develop more targeted and cost-effective maintenance strategies, such as prioritizing repairs, optimizing inspection intervals, and implementing corrosion control measures.

**Regulatory Compliance:** IDA is often a regulatory requirement to demonstrate compliance with pipeline safety regulations and standards. Conducting regular assessments and maintaining proper documentation helps operators meet these compliance obligations.

**Extended Service Life:** By identifying and mitigating integrity issues at an early stage, IDA can extend the service life of pipelines, reducing the need for premature replacement and associated costs.

Refer next section for standards used in this methodology



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**ICDA Standards by ASSOCIATION OF MATERIAL PERFORMANCE AND PROPERTIES (AMPP)**

AMPP has developed and published standards on the ICDA methodology. AMPP offers various documents and resources that address corrosion control and assessment strategies, including:

**NACE SP0206:** Internal Corrosion Control in Oil and Gas Production Systems: This standard provides guidance on managing internal corrosion in oil and gas production systems, including methods for corrosion monitoring and mitigation.

**NACE SP0101:** Standard on Voltage-Based Internal Corrosion Direct Assessment (VICDA) of Pipelines: This standard focuses on the application of voltage-based techniques for the assessment of internal corrosion in pipelines.

**NACE SP0207:** Aluminum-Bronze Alloys: Corrosion Resistance Guide: This guide provides information on the corrosion resistance of aluminum-bronze alloys, helping to select appropriate materials for specific applications.

*The following standard is for External Corrosion Direct Assessment*

**NACE RP0193:** External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms: This recommended practice covers the design, installation, and monitoring of cathodic protection systems for the external surfaces of on-grade carbon steel storage tank bottoms.

**NOTE:** It's worth noting that standards and guidelines may be subject to updates and revisions. Therefore, it is recommended to consult the latest versions of AMPP documents or visit their official website for the most up-to-date information on internal corrosion assessment and related standards.