In-line Inspection Systems Qualification

API STANDARD 1163
SECOND EDITION, APRIL 2013

REAFFIRMED, AUGUST 2018

AMERICAN PETROLEUM INSTITUTE

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Foreword

Pipeline operators, service providers, and the regulatory community continually strive to improve the safety and integrity of gas and liquid pipelines. In-line inspection of pipelines is a key technology utilized by the industry to help maintain systems safety and integrity.

This standard serves as an umbrella document to be used with and complement companion standards. NACE SP0102, *In-line Inspection of Pipelines* and ASNT ILI-PQ, *In-line Inspection Personnel Qualification and Certification* all have been developed enabling service providers and pipeline operators to provide rigorous processes that will consistently qualify the equipment, people, processes, and software utilized in the in-line inspection industry. The teams that have worked so diligently in the development of these three standards expect improvement in the results from in-line inspections with accompanying improvements in the safety and integrity of gas and liquid pipelines.

Appreciation is extended to the Pipeline Operators Forum for the use of their guide for in-line inspections, *Specifications and Requirements for Intelligent Pig Inspection of Pipelines*. Portions of this guide were incorporated directly into this standard.

Appreciation is also extended to the Inline Inspection Association, whose draft guide provided a running start to develop this and the companion standards referenced herein.

This standard states that performing in-line inspections requires agreements and close cooperation between service providers and operators. This standard establishes requirements of all parties for the implementation of in-line inspections, and these must be recognized by organizations utilizing the three standards. Service providers and operators must have a clear definition of assigned responsibilities to successfully apply these standards.

During the development of this standard, a number of issues of technical significance arose. A process-oriented format was adopted to incorporate the many different technologies applied in various aspects of the exploration and transportation of gas and hazardous liquids. The standard does not require specific qualification processes to accommodate the differences in the broad range of industry activities. The standard encourages the development and implementation of new and improved technologies in the future.

The definitions in this standard are taken from previously developed and accepted documents wherever possible. A significant number of definitions have been modified or clarified for this specific application. Industry is strongly encouraged to uniformly utilize these definitions so that integrity management efforts can be effectively implemented in the future. This committee recognizes the value of standardized reporting terminology.

Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the specification.

Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the specification.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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Introduction

This standard provides requirements for qualification of in-line inspection systems used in gas and hazardous liquid pipelines. The standard facilitates the following.

a) Inspection service providers make clear, uniform, and verifiable statements describing in-line inspection system performance.

b) Pipeline operators select an inspection system suitable for the conditions under which the inspection will be conducted. This includes, but is not limited to, the pipeline material characteristics, pipeline operating conditions, and types of anomalies expected to be detected and characterized.

c) The in-line inspection system operates properly under the conditions specified.

d) Inspection procedures are followed before, during, and after the inspection.

e) Anomalies are described using a common nomenclature, as described in this standard and referenced documents.

f) The reported data and inspection results provide the expected accuracy and quality in a consistent format.

Users of this standard should be aware that further or differing requirements may be needed for some applications. Nothing in this standard is intended to inhibit the use of inspection systems or engineering solutions that are not covered by the standard. This may be particularly applicable where there is innovative developing technology. Where an alternative is offered, the standard may be used, provided any and all variations from the standard are identified and documented.

Personnel and equipment used to perform in-line inspections and analyze the results shall be qualified according to this standard and its companions, ASNT ILI-PQ, *In-line Inspection Personnel Qualification and Certification* and NACE SP0102, *In-line Inspection of Pipelines*. This standard is an umbrella document covering all aspects of in-line inspection systems, incorporating the requirements of ASNT ILI-PQ and NACE SP0102 by reference.

This standard is not technology specific. It accommodates present and future technologies used for in-line inspection systems. This standard is performance based and provides requirements for qualification processes. It does not, however, define how to meet those requirements. This standard defines the documentation of processes for in-line inspection system qualifications. One objective of this standard is to foster continual improvement in the quality and accuracy of in-line inspections. Wherever possible, this standard utilizes existing terms and definitions from other applicable standards. Section 3 provides definitions of terms.

The use of an in-line inspection system to manage the integrity of pipelines requires close cooperation and interaction between the provider of the inspection service (service provider) and the beneficiary of the service (operator). This standard provides requirements that will enable service providers and operators to clearly define the areas of cooperation required and thus ensure the satisfactory outcome of the inspection process. While service providers have the responsibility to identify in-line inspection system capabilities, their proper use, and application, operators bear the ultimate responsibility to:

a) identify specific risks (threats) to be investigated,

b) choose the proper inspection technology,

c) maintain operating conditions within performance specification limits,

d) confirm inspection results.

Following the standard provides a consistent means of assessing, using, and validating results from in-line inspection systems such that acceptable inspection results are obtained.

In-line Inspection Systems Qualification

1 Scope

This standard covers the use of in-line inspection (ILI) systems for onshore and offshore gas and hazardous liquid pipelines. This includes, but is not limited to, tethered, self-propelled, or free flowing systems for detecting metal loss, cracks, mechanical damage, pipeline geometries, and pipeline location or mapping, The standard applies to both existing and developing technologies.

This standard is an umbrella document that provides performance-based requirements for ILI systems, including procedures, personnel, equipment, and associated software.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASNT ILI-PQ [1], *In-line Inspection Personnel Qualification and Certification*

NACE SP0102:2010 [2], *In-line Inspection of Pipelines*

3 Terms, Definitions, and Abbreviations

3.1 Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1.1
aboveground marker
AGM
A spatial reference point that is identifiable as a distinct feature in the ILI.

NOTE This may also include the ability to detect and record the passage of an ILI tool.

3.1.2
actionable anomaly
An anomaly that may exceed acceptable limits based on the operator's anomaly and pipeline data analysis (see Figure 1).

3.1.3
anomaly
An unexamined deviation from the norm in pipe material, coatings, or welds, which may or may not be a defect. See also **imperfection**, **defect**, and **feature** (see Figure 1).

3.1.4
anomaly and pipeline data analysis
The process through which anomaly and pipeline data are integrated and analyzed to further classify and characterize anomalies.

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1 American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, Ohio 43228, www.asnt.org.
2 NACE International (formerly the National Association of Corrosion Engineers), 1440 South Creek Drive, Houston, Texas 77218-8340, www.nace.org.