



Infrastructure Quality Vocabulary Standard

IQI STANDARD VOC1

Second Draft Edition - June 2026

Aligned with WQI Foundational Articles 1-3 and IQI Context Guides MNT1 and LDN1

INFRASTRUCTURE QUALITY INITIATIVE

Foreword

Energy and critical infrastructure shape daily life. They deliver heat, power, mobility, industrial capability, and essential services to communities and the economy. These systems are often described in parts - pipelines, compressors, storage, terminals, plants, grids - each with its own technical standards, codes, and regulatory requirements.

Yet infrastructure successes and failures rarely originate from a single part. They emerge from how many elements interact over time, under changing conditions, across complex networks and interfaces. Integrity margins, operability, maintainability, resilience, consequence behavior, public impact, and environmental interaction exist at the level of the assembled infrastructure asset and its lifecycle, not at the level of individual components alone.

Across organizations and jurisdictions, there is no single shared language for describing infrastructure quality at this asset level. Similar quality concerns may be described differently depending on sector, owner practices, project boundaries, regulatory categories, or engineering discipline. When vocabulary is inconsistent, quality claims cannot be compared, evidence cannot be aligned, and system-level risks remain fragmented across documents and lifecycle stages.

IQI developed this Vocabulary Standard to address that gap.

This Second Draft Edition updates the February 2026 draft to align IQI vocabulary with the Whole-Quality Institute foundational vocabulary and with the first IQI natural gas Context Guides: MNT1, Natural Gas Main Pipeline Transportation Infrastructure, and LDN1, Natural Gas Local Distribution Network Infrastructure. The update does not change IQI into a regulatory, engineering, or certification body. It clarifies the vocabulary needed to describe infrastructure quality as a bounded, evidence-supported quality state of a defined infrastructure quality object.

This Standard provides a neutral, foundational vocabulary for describing infrastructure assets, infrastructure work, infrastructure outcomes, infrastructure functions, infrastructure quality, evidence, context interpretation, and quality claims in consistent terms across energy and critical infrastructure systems.

This is not an engineering code, and it does not establish technical design requirements. It does not replace laws, regulations, permits, contracts, or industry standards. It does not create compliance obligations. It is designed to support clearer communication and more consistent quality evaluation without imposing a single technology, project model, or regulatory approach.

IQI standards are voluntary. Their purpose is to make infrastructure quality explicit, discussable, and comparable across the full lifecycle - from concept and design through construction, commissioning, operation, major change, conservation, recommissioning, repurposing, decommissioning, and post-decommissioning evidence where relevant.

A shared vocabulary is the starting point. Without it, infrastructure quality cannot be described consistently, evaluated transparently, or improved coherently across stakeholders.

IQI is a public initiative. This Standard is offered as a foundation for clearer communication, better alignment of evidence, and development of infrastructure quality standards and guides that can be understood and used by owners, operators, engineers, regulators, investors, communities, workers, and other interested parties.

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Revision Note

This Second Draft Edition is a controlled vocabulary update. It preserves the February 2026 structure of IQI_VOC1 while incorporating vocabulary relationships that became stable after publication of WQI Foundational Articles 1-3 and IQI Context Guides MNT1 and LDN1.

The principal updates are:

- alignment of infrastructure asset language with the WQI term Quality Object;
- addition of Infrastructure Quality Object, Quality State, Quality Determination, Reference Layer, Core Standard, Context-Specific Interpretation, Critical Condition, Evidence Sufficiency, Boundary Transparency, Assumption Drift, Unresolved Condition, Absence of Observed Failure, and Quality Claim Boundary;
- stronger distinction between evidence, data, documentation, compliance, conformity, and quality;
- stronger boundary and lifecycle language for Quality Claim Statements; and
- clearer treatment of Context Guides as context-specific interpretation documents that do not create new Core Quality Factors or Core Indicators.

This edition remains a vocabulary standard. It does not add technical design requirements, performance thresholds, certification requirements, audit methods, or context-specific Quality Outcome Criteria.

1 Introduction

1.1 Role of This Standard in the IQI Document Set

This Standard occupies the foundational vocabulary layer of the Infrastructure Quality Initiative (IQI) document set. Its role is to establish shared terms and conceptual reference points for describing infrastructure assets, infrastructure work, infrastructure outcomes, infrastructure functions, infrastructure quality, infrastructure quality states, evidence, context interpretation, and Quality Claim Statements in a consistent, neutral, and asset-level manner.

Within the IQI structure, this Standard precedes and informs the Infrastructure Quality Standard - Core, IQI Foundational Guidance, and IQI Context Guides. By separating shared vocabulary from quality architecture, requirements, and context-specific application, IQI supports clarity, consistency, and comparability across different infrastructure types, technologies, organizational models, and regulatory environments.

This Standard is intended to remain stable enough to support comparison, but not frozen against necessary refinement. As IQI and WQI documents develop, this vocabulary may be revised by controlled edition updates.

1.2 Voluntary, Non-Regulatory Foundation

This Standard is a voluntary, non-regulatory reference document. It is not a law, regulation, permit requirement, engineering code, procurement specification, certification scheme, or conformity-assessment program. It does not establish mandatory technical requirements, performance thresholds, or compliance obligations, and it does not replace or supersede applicable laws, regulations, contracts, or industry standards.

Use of this Standard does not imply IQI approval, certification, endorsement, or verification of an infrastructure asset, organization, project, product, activity, or claim.

1.3 Relationship to WQI Umbrella Vocabulary

IQI operates under the broader Whole-Quality Institute (WQI) logic. WQI provides umbrella terms such as Quality, Quality Object, Quality State, Quality Determination, Evidence, Reference Layer, Core Standard, Context Guide, and Quality Claim.

In IQI, the infrastructure asset or infrastructure system-of-systems is the applied infrastructure form of the WQI Quality Object. IQI does not copy WQI terms mechanically. It interprets them for infrastructure quality, where the object is physical, technical, operational, environmental, social, long-lived, and often high-consequence.

This relationship allows IQI to remain connected to the broader WQI method while preserving infrastructure-specific vocabulary.

1.4 Asset-Level Anchoring

IQI vocabulary is anchored at the infrastructure asset or infrastructure system-of-systems level. Individual components, materials, documents, inspections, and activities may be relevant evidence, but they do not by themselves define infrastructure quality at the assembled asset level.

An infrastructure asset may include physical elements, functional relationships, operating media, control systems, monitoring systems, organizational interfaces, lifecycle records, environmental interactions, public-consequence interfaces, and other conditions necessary for realization of intended infrastructure functions.

1.5 System-of-Systems and Lifecycle Reality

Infrastructure quality is interpreted across system-of-systems behavior and lifecycle reality. Infrastructure assets may remain in service for decades, interact with changing environments and communities, pass through multiple ownership or responsibility arrangements, and depend on evidence generated at different lifecycle stages.

Quality interpretation therefore requires attention to boundary evolution, interface behavior, assumption drift, degradation and aging, modification and reconstruction, data interpretation, monitoring visibility, evidence continuity, and unresolved conditions transferred across lifecycle gates.

1.6 Relationship to the Infrastructure Quality Standard - Core

The Infrastructure Quality Standard - Core defines the stable quality architecture for infrastructure assets, including Core Quality Factors, Core Indicators, evidence principles, non-substitutability, and bounded Quality Claim logic.

This Vocabulary Standard defines the words needed to interpret the Core consistently. It does not replace the Core Standard and does not itself define all Quality Outcome Criteria.

1.7 Relationship to Foundational Articles and Context Guides

IQI Foundational Articles explain the method and logic behind the IQI and WQI approach. IQI Context Guides interpret the Core architecture for defined infrastructure contexts, lifecycle conditions, operating environments, and interface conditions.

Context Guides do not create new Core Quality Factors or Core Indicators. They explain how the invariant Core is interpreted in a specific infrastructure context, including relevant boundaries, interfaces, lifecycle conditions, critical conditions, Reference Layer anchors, evidence limits, and Quality Claim boundaries.

1.8 Intended Use

This Standard may be used to support consistent communication, drafting of IQI standards and guides, interpretation of infrastructure quality claims, alignment of evidence with quality concepts, and comparison of infrastructure-quality discussions across sectors.

Users should apply this Standard together with the relevant Core Standard, Context Guide, applicable Reference Layer, and evidence available for the declared infrastructure boundary and lifecycle condition.

2 Reference Sources

2.1 IQI and WQI Foundational Documents

- IQI_VOC1 - Infrastructure Quality Vocabulary Standard (this document).
- IQI_IQC1 - Infrastructure Quality Standard - Core.
- WQI Foundational Article 1 - The Whole-Quality Structure.
- WQI Foundational Article 2 - Foundational Vocabulary for Whole Quality.
- WQI Foundational Article 3 - Why Whole-Quality Structure Matters in Real Life.
- IQI Context Guide MNT1 - Natural Gas Main Pipeline Transportation Infrastructure.
- IQI Context Guide LDN1 - Natural Gas Local Distribution Network Infrastructure.

2.2 Reference Codes, Regulations, and Industry Standards

- Reference codes, regulations, and industry standards may be used as part of the Reference Layer where relevant to a defined infrastructure context, Indicator, Quality Outcome Criterion, evidence interpretation, or Quality Claim Statement.
- Such references are informative within this Vocabulary Standard unless a separate IQI document expressly states otherwise.
- This Standard does not reproduce, replace, or modify any external reference.

2.3 General Vocabulary and Evaluation Terms

- General vocabulary terms from quality management, conformity assessment, systems engineering, risk management, safety, infrastructure regulation, and technical standards may be relevant where they support interpretation of infrastructure quality.
- Where external terminology conflicts with IQI terms, IQI terms govern the meaning within IQI documents unless a Context Guide states a specific contextual use.

3 Normative Conceptual Framework and Vocabulary Scope

3.1 Normative Reference to the IQI Foundational Architecture

This Standard is interpreted within the IQI foundational architecture: infrastructure quality is determined in relation to a defined infrastructure quality object, its intended functions and results, boundaries, interfaces, lifecycle conditions, Quality Factors, Indicators, Quality Outcome Criteria, Evidence, Reference Layer, and Quality Claim Statement.

3.2 Core Conceptual Dependency

The principal dependency is: Infrastructure Quality Object -> Boundaries and Interfaces -> Intended Functions and Results -> Failure-Mode Families -> Core Quality Factors -> Core Indicators -> Context-Specific Quality Outcome Criteria -> Evidence -> Quality State -> Quality Claim Statement.

3.3 Infrastructure Quality Object as the Primary Reference Point

An infrastructure asset, subsystem, network, facility, program, or defined infrastructure system-of-systems may serve as the infrastructure quality object where its quality state is being determined. The declared object controls what is included, what is excluded, what evidence is relevant, and what claim can responsibly be made.

3.4 Infrastructure Work, Outcome, Function, Quality State, and Claim

Infrastructure work produces, modifies, preserves, operates, monitors, repairs, decommissions, or otherwise affects an infrastructure quality object. Infrastructure outcomes are the realized or affected conditions produced by such work. Infrastructure functions describe what the object is intended to do, preserve, prevent, support, or make possible. A quality state is the interpreted condition of the object in relation to those functions, boundaries, criteria, and evidence. A Quality Claim Statement communicates that interpretation within a declared scope.

3.5 Scale Transition and System Boundaries

IQI vocabulary is invariant to scale, but quality claims are not boundary-free. The same vocabulary may be applied to a whole network, facility, pipeline segment, pressure zone, station, component population, lifecycle program, or interface condition if the quality object, boundaries, evidence, and claim limits are declared.

3.6 Scope of Vocabulary Defined in This Standard

This Standard defines terms used to describe infrastructure quality. It does not define all technical evaluation methods, asset-specific requirements, regulatory obligations, or context-specific Quality Outcome Criteria.

3.7 Relationship to Infrastructure Quality Evaluation

Vocabulary enables evaluation but is not itself evaluation. Infrastructure quality evaluation requires applying relevant terms, Core Indicators, context-specific interpretation, evidence, and Reference Layer anchors to the declared quality object and claim boundary.

4 Terms and Definitions

4.1 Quality

The degree to which a defined Quality Object realizes its intended functions, purposes, or results within declared boundaries and interfaces, as evaluated against defined Quality Outcome Criteria and supported by sufficient evidence.

Notes:

1. Within IQI, this term is interpreted as infrastructure quality when the Quality Object is an infrastructure asset or infrastructure system-of-systems.

2. Quality is not the same as activity, documentation, compliance, inspection, certification, data volume, or absence of known failure.

4.2 Quality Object

The defined object, system, service, process, condition, arrangement, asset, or system-of-systems whose quality is being determined.

Notes:

1. In IQI, the Quality Object is commonly an infrastructure asset, infrastructure subsystem, infrastructure network, infrastructure program, or defined infrastructure system-of-systems.
2. The Quality Object determines the relevant boundaries, interfaces, functions, factors, indicators, criteria, evidence, and claim scope.

4.3 Infrastructure Quality Object

A defined infrastructure asset, subsystem, network, facility, lifecycle program, interface condition, or infrastructure system-of-systems whose infrastructure quality state is being determined.

Notes:

1. Infrastructure Quality Object is the IQI-specific form of the WQI term Quality Object.
2. The object may be broad or narrow, but its boundary must be declared.
3. Examples include a natural gas main pipeline transportation system, a local distribution network, a pressure zone, a compressor station interface, a material population, or a defined replacement program.

4.4 Infrastructure Asset

A physical, functional, and lifecycle-based infrastructure system or system-of-systems intended to realize defined infrastructure functions over time.

Notes:

1. An infrastructure asset may include components, assemblies, controls, operating media, information systems, records, interfaces, and environmental or public-consequence conditions.
2. An infrastructure asset is not reduced to a single component unless the quality claim is specifically bounded to that component as the quality object.

4.5 Infrastructure Element / Component

A distinguishable part, item, material, assembly, subsystem, document, control, or other constituent that forms part of or supports an infrastructure asset.

Notes:

1. Conformity of a component may be evidence relevant to infrastructure quality.
2. Component conformity does not by itself establish the quality state of the whole infrastructure asset.

4.6 Boundary

The stated separation between two sides of a quality interpretation.

Notes:

1. A boundary may be physical, functional, organizational, lifecycle-based, regulatory, operational, technical, environmental, social, informational, evidence-based, or claim-based.

2. A boundary determines what is inside and outside the Quality Claim Statement.
3. A design-declared boundary may require evidence before it is treated as a verified or realized boundary.

4.7 Interface

A quality-relevant interaction condition between two sides of a boundary.

Notes:

1. Interfaces may exist between infrastructure and environment, subsystem and subsystem, asset and operating medium, organization and organization, lifecycle stage and lifecycle stage, infrastructure and public-consequence area, or evidence and claim.
2. Quality may fail at interfaces even when individual elements appear acceptable.

4.8 Boundary Transparency

The explicit identification in a Quality Claim Statement or supporting evaluation of the boundary used, including what is included, what is excluded, which interfaces are considered, and what evidence supports the boundary.

Notes:

1. Boundary transparency prevents a narrow evidence basis from being presented as a broad infrastructure quality claim.

4.9 Lifecycle Stage

A distinguishable phase in the life of an infrastructure quality object.

Notes:

1. Lifecycle stages may include concept, investigation, design, procurement, manufacturing, construction, acceptance, commissioning, operation, maintenance, inspection, repair, replacement, modernization, modification, conservation, recommissioning, repurposing, deactivation, abandonment, decommissioning, and post-decommissioning evidence where relevant.

4.10 Lifecycle Gate / Quality Gate

A defined decision, transfer, acceptance, verification, or transition point at which evidence, assumptions, responsibilities, unresolved conditions, or quality claims are reviewed before the object proceeds to another lifecycle condition.

Notes:

1. A lifecycle gate is not necessarily a formal regulatory gate.
2. A lifecycle gate may reveal evidence gaps, assumption drift, unresolved non-conformities, or limitations on claim validity.

4.11 Infrastructure Work

Work performed to create, modify, preserve, operate, monitor, repair, inspect, decommission, or otherwise affect an infrastructure quality object or its intended functions.

Notes:

1. Infrastructure work may occur on site or off site when asset-specific intent, lifecycle contribution, and traceability to the defined infrastructure asset exist.
2. Infrastructure work does not automatically establish a satisfactory infrastructure outcome.

4.12 Infrastructure Outcome

The realized or affected condition of an infrastructure quality object resulting from infrastructure work or lifecycle activity.

Notes:

1. An infrastructure outcome may be satisfactory, not satisfactory, partial, uncertain, insufficiently evidenced, or limited to a declared boundary.
2. Infrastructure outcome is interpreted in relation to intended functions, Quality Outcome Criteria, evidence, and lifecycle conditions.

4.13 Infrastructure Function / Service

The intended function, purpose, protection, output, condition, or effect that an infrastructure quality object is expected to realize, preserve, prevent, support, or make possible.

Notes:

1. Infrastructure functions may include transport, containment, pressure control, energy delivery, storage, protection, monitoring, safe isolation, continuity, environmental protection, public protection, and other context-specific functions.

4.14 Infrastructure Quality

The degree to which a defined infrastructure quality object realizes its intended infrastructure functions and outcomes within declared boundaries and interfaces, as evaluated against applicable Quality Outcome Criteria and supported by sufficient evidence.

Notes:

1. Infrastructure quality is object-relative, function-based, bounded, evidence-supported, and dependent on defined criteria.
2. Infrastructure quality is not established by component conformity, documentation, compliance, data, current operation, or absence of known failure alone.

4.15 Infrastructure Safety

The condition in which unacceptable risk to people, workers, communities, the environment, the infrastructure asset itself, and the conditions necessary for intended infrastructure functions is prevented or controlled within the declared boundary.

Notes:

1. Safety is a dimension of infrastructure quality where the object may affect life, health, environment, public protection, continuity, or essential function.
2. Infrastructure safety includes protection from the asset and protection of the asset where loss of asset condition may create unacceptable risk or functional loss.

4.16 Quality State

The interpreted condition of a Quality Object in relation to its intended functions or results, boundaries, interfaces, lifecycle or context conditions, Quality Factors, Indicators, Quality Outcome Criteria, and evidence.

Notes:

1. Within IQI, an infrastructure quality state may be satisfactory, not satisfactory, partially satisfactory, uncertain, insufficiently evidenced, limited to a declared boundary, valid only for a stated lifecycle condition, or dependent on unresolved assumptions.

2. A quality state should not be overstated where evidence is incomplete, indirect, outdated, or limited.

4.17 Quality Determination

The structured process of identifying or evaluating the quality state of a Quality Object.

Notes:

1. Quality Determination may include defining the object, identifying intended functions, boundaries, interfaces, lifecycle or context conditions, failure-mode families, Quality Factors, Indicators, Quality Outcome Criteria, Evidence, Reference Layer, and bounded Quality Claim Statements.
2. Quality Determination is broader than inspection, audit, compliance review, certification, measurement, or data collection.

4.18 Quality Factor

A broad dimension of quality derived from the nature of the infrastructure quality object, its intended functions, boundaries, interfaces, lifecycle conditions, and failure-mode families.

Notes:

1. Quality Factors organize what must be considered for the object's quality state to be responsibly determined.
2. Core Quality Factors are defined in the Infrastructure Quality Standard - Core, not created ad hoc by Context Guides.

4.19 Quality Indicator

A defined point of examination under a Quality Factor that identifies where infrastructure quality should be evaluated.

Notes:

1. Indicators are derived from Quality Factors.
2. Indicators do not by themselves define pass/fail results; they require applicable Quality Outcome Criteria and evidence interpretation.

4.20 Quality Outcome Criterion

A defined condition, result, control, limitation, or evidence expectation used to determine whether an Indicator is satisfied, not satisfied, uncertain, or insufficiently evidenced within a declared context.

Notes:

1. Quality Outcome Criteria may be defined in the Core Standard or interpreted through Context Guides and the Reference Layer.
2. Criteria should be connected to the object, boundary, indicator, lifecycle condition, and claim scope.

4.21 Evidence

Information used to support a quality determination or Quality Claim Statement about whether relevant Quality Outcome Criteria are met, not met, uncertain, or insufficiently evidenced.

Notes:

1. Evidence may include records, observations, assessments, inspection results, monitoring data, test results, design assumptions, interface records, handoff records, audit findings, corrective actions, stakeholder input, and other appropriate sources.

2. Evidence supports quality interpretation; it does not replace quality.

4.22 Evidence Sufficiency

The degree to which available evidence is adequate, relevant, traceable, current, and bounded enough to support a quality determination or Quality Claim Statement for the declared object, boundary, lifecycle condition, Indicator, and Quality Outcome Criteria.

Notes:

1. Evidence sufficiency depends on significance of the condition, uncertainty involved, consequence of failure, visibility limits, and claim breadth.
2. Insufficient evidence should result in a limited, uncertain, or insufficiently evidenced claim rather than an overstated claim.

4.23 Reference Layer

The body of external or internal references needed to interpret Indicators, Quality Outcome Criteria, evidence, and claims responsibly in a defined infrastructure context.

Notes:

1. The Reference Layer may include laws, regulations, engineering codes, technical standards, professional guidance, safety rules, environmental requirements, operator procedures, scientific knowledge, contractual requirements, and accepted industry practices.
2. The Reference Layer does not replace IQI structure; it supports responsible context-specific interpretation.

4.24 Technology

A tool, system, device, software, data system, automation, model, method, or technical arrangement used to support, monitor, control, evaluate, operate, or modify an infrastructure quality object.

Notes:

1. Technology can support evidence, visibility, control, and decision-making.
2. Technology does not by itself establish infrastructure quality.

4.25 Technology Governance

The decisions, rules, responsibilities, and controls that determine how technology is selected, integrated, relied upon, interpreted, validated, and acted upon within an infrastructure system.

Notes:

1. Responsibility for infrastructure quality remains with accountable parties regardless of automation.
2. Technology governance includes recognition of limitations, uncertainty, misleading outputs, incomplete information, and accountability for technology-enabled decisions.

4.26 Data

Recorded observations, measurements, signals, values, outputs, or other information associated with the condition, behavior, environment, operation, or context of an infrastructure quality object.

Notes:

1. Data may be raw, processed, aggregated, modeled, visualized, or interpreted.
2. Data becomes evidence only when connected to a defined object, boundary, Indicator, Outcome Criterion, lifecycle condition, and claim.

4.27 Uncertainty

A condition in which relevant characteristics, assumptions, interactions, evidence, behavior, or future states of an infrastructure quality object or its context are not fully known.

Notes:

1. Uncertainty may be geological, environmental, operational, technical, organizational, evidentiary, regulatory, public-consequence-related, or interface-related.
2. Uncertainty should remain visible where it affects quality interpretation or claim validity.

4.28 Unresolved Condition / Unresolved Uncertainty

A condition, assumption, non-conformity, limitation, interface issue, evidence gap, or uncertainty that has not been sufficiently resolved or evidenced for the declared quality determination or claim.

Notes:

1. Unresolved conditions may transfer across lifecycle stages.
2. Continuation of work, commissioning, operation, or absence of known failure does not by itself resolve unresolved conditions.

4.29 Assumption Drift

A change over time between assumptions used in an earlier lifecycle stage and the actual or current conditions affecting the infrastructure quality object.

Notes:

1. Assumption drift may arise from environmental change, land-use change, operating-medium change, degradation, modification, responsibility transfer, regulatory change, or improved knowledge.
2. Assumption drift may limit or invalidate a prior Quality Claim Statement.

4.30 Degradation and Aging

Processes by which the condition, behavior, performance, evidence base, or operating context of an infrastructure quality object changes over time.

Notes:

1. Degradation mechanisms may include corrosion, fatigue, wear, settlement, deformation, erosion, material aging, environmental effects, obsolescence, or evidence deterioration.
2. Degradation and aging do not by themselves indicate poor quality, but they may affect quality state and evidence sufficiency.

4.31 Modification and Reconstruction

Any change to an infrastructure quality object that may affect how its functions are realized, evidenced, controlled, interpreted, or claimed.

Notes:

1. Modifications may be incremental or substantial, planned or unplanned.
2. Modification and reconstruction may require re-interpretation of boundaries, interfaces, assumptions, and Quality Claim Statements.

4.32 Stakeholders and Community / Interested Parties

Persons, groups, organizations, authorities, workers, users, communities, owners, operators, or other parties affected by, responsible for, relying on, regulating, financing, evaluating, or otherwise having a legitimate interest in an infrastructure quality object or claim.

Notes:

1. This domain addresses public-facing quality impacts and claim-supporting responsibilities.
2. Stakeholder and community considerations apply across lifecycle stages.

4.33 Core Standard

A published IQI standard that defines the stable quality architecture for a defined infrastructure quality object or class of objects, including Core Quality Factors, Core Indicators, evidence principles, Reference Layer principles, and rules for bounded Quality Claims.

Notes:

1. A Core Standard is not a context-specific instruction manual.
2. A Core Standard stabilizes quality logic so that Context Guides can interpret it in real infrastructure contexts.

4.34 Context Guide

A document that specifies how Core Quality Factors and Core Indicators are interpreted and applied within a defined infrastructure context.

Notes:

1. Context Guides do not introduce new Core Quality Factors or Core Indicators.
2. Context Guides interpret boundaries, interfaces, lifecycle conditions, critical conditions, Reference Layer anchors, evidence limitations, and Quality Claim boundaries for the context they cover.
3. Context Guides may support context-specific Quality Outcome Criteria and evidence interpretation.

4.35 Context-Specific Interpretation

The application of stable IQI vocabulary, Core Quality Factors, Core Indicators, evidence principles, and claim logic to a defined infrastructure context, lifecycle condition, operating environment, boundary, or interface condition.

Notes:

1. Context-specific interpretation preserves the Core structure while adapting meaning to real conditions.
2. It should not be used to bypass non-substitutability of factors or indicators.

4.36 Critical Condition

A condition whose failure, degradation, uncertainty, loss of visibility, or unresolved status may compromise essential infrastructure function, permit unacceptable risk, or invalidate the basis for a credible Quality Claim Statement.

Notes:

1. Critical conditions are not limited to a fixed list of critical components.

2. A condition becomes critical because of its effect on system behavior, consequence severity, lifecycle continuity, evidence sufficiency, or claim validity.

4.37 Absence of Observed Failure

A condition in which no failure, incident, visible defect, reported problem, or known nonconformity has been observed or recorded within a given period or evidence set.

Notes:

1. Absence of observed failure shall not by itself be interpreted as proof of satisfactory infrastructure quality.
2. It may be relevant evidence only when interpreted with monitoring adequacy, evidence sufficiency, uncertainty, lifecycle history, critical conditions, and claim boundaries.

4.38 Quality Claim Statement

A bounded statement describing the quality state, scope, evidence basis, assumptions, limitations, lifecycle condition, applicable Indicators, and claim boundary of an infrastructure quality evaluation.

Notes:

1. A Quality Claim Statement specifies the infrastructure quality object, boundary, lifecycle condition, applicable standards or guides, interpreted indicators, evidence basis, included and excluded interfaces, assumptions, limitations, unresolved conditions, and known evidence gaps.
2. A Quality Claim Statement shall not imply quality beyond the stated scope or evidence basis.
3. A Quality Claim Statement does not constitute IQI certification, approval, endorsement, or continuing conformity unless a separate authorized certification scheme expressly exists.

4.39 Quality Claim Boundary

The declared limit of a Quality Claim Statement, including the object, physical or functional scope, lifecycle stage, included and excluded interfaces, evidence basis, assumptions, limitations, unresolved conditions, and temporal validity of the claim.

Notes:

1. A claim boundary protects against overstatement and makes the meaning of a claim transparent.

4.40 Infrastructure Operating Medium

A material, substance, energy flow, physical state, or process condition present within or interacting with an infrastructure quality object that directly affects realization of its intended functions.

Notes:

1. Examples include crude oil, natural gas, LNG, hydrogen blends, electrical current, steam, water, process fluids, pressure, temperature, chemical composition, or phase behavior.
2. Compatibility between operating medium and asset design is an infrastructure-quality consideration.
3. This Standard does not define commercial or product acceptability criteria for operating media.

5 Scope, Applicability, and Exclusions

5.1 Scope

This Vocabulary Standard establishes a common, infrastructure-level vocabulary for describing and communicating infrastructure quality objects, infrastructure assets, infrastructure work, infrastructure outcomes, infrastructure functions, infrastructure quality states, evidence, Reference Layer relationships, Context Guides, and Quality Claim Statements within the IQI framework.

The scope of this Standard is limited to terminology and conceptual relationships. It defines the meaning of key terms used across IQI standards and guidance documents in order to support consistent interpretation, communication, and application of infrastructure quality concepts.

This Standard applies to capital-intensive infrastructure systems whose quality, performance, safety, environmental impact, and public consequences arise from the integrated behavior of the assembled system across its lifecycle, rather than from individual products, components, services, activities, records, or compliance statements considered in isolation.

5.2 Applicability

- energy infrastructure, including oil, gas, electric power, LNG, hydrogen, storage, transmission, distribution, and related facilities;
- critical infrastructure where system-level function, consequence, lifecycle evidence, and public-facing quality are relevant;
- infrastructure programs, subsystems, networks, lifecycle activities, interface conditions, and defined asset populations where a bounded Quality Claim Statement is made.

5.3 Relationship to Laws, Regulations, Codes, and Contracts

This Standard does not replace or modify any applicable law, regulation, permit, contract, code, or technical standard. Such references may form part of the Reference Layer for context-specific interpretation, but they remain external to this Standard unless expressly incorporated by a separate IQI document.

5.4 Exclusions

- technical design requirements;
- engineering calculations or design methods;
- inspection methods or acceptance thresholds;
- regulatory compliance determinations;
- procurement specifications;
- certification schemes, audit protocols, or accreditation requirements;
- commercial product quality criteria;
- operator-specific management systems;
- legal advice or regulatory interpretation.

Annex A (informative) - Illustrative Regulatory / Code Sources by Infrastructure Segment

A.1 Purpose

This Annex provides illustrative regulatory and code source categories that may form part of the Reference Layer for infrastructure-quality interpretation. It is informative only.

A.2 Illustrative U.S. Examples

Examples may include federal pipeline safety regulations, environmental regulations, occupational safety requirements, state utility commission requirements, building and fire codes, and industry standards related to materials, welding, inspection, pressure testing, corrosion control, metering, odorization, emergency response, asset integrity, records, and operations.

A.3 Illustrative International Examples

Examples may include EAEU technical regulations, national construction and industrial safety rules, EU gas market and infrastructure regulations, ISO standards, IEC standards, ASME standards, API standards, NFPA standards, and other recognized technical or safety references.

A.4 Use of Regulatory Examples Within IQI Documents

Regulatory references in IQI documents are used as context anchors, Reference Layer examples, or evidence anchors. They do not convert IQI standards into regulatory requirements and do not imply legal compliance or non-compliance.

A.5 Interpretation

The relevance of any external reference depends on the declared infrastructure quality object, context, boundary, lifecycle stage, jurisdiction, operating condition, and Quality Claim Statement.

Annex B (informative) - Asset / Subsystem Reference Framework for Context Guides

B.1 Purpose, Scope, and Role of This Annex

This Annex provides an illustrative asset and subsystem reference framework for Context Guides. It is informative only and does not define mandatory boundaries.

B.2 Production / Field Facilities and Preliminary Preparation

May include wells, well pads, gathering interfaces, separation, dehydration, produced-fluid handling, preliminary treatment, metering, storage, power and control systems, and transfer points where asset-specific boundaries are declared.

B.3 Main Pipeline Transportation Systems

May include main pipeline segments, compressor or pump stations, valves, launcher/receiver facilities, control systems, cathodic protection, rights-of-way, pressure-management interfaces, transported-medium interfaces, environmental interfaces, and public-consequence boundaries.

B.4 Local Distribution Networks

May include distribution inlet stations, pressure reduction, odorization, local mains, branches, services, regulators, meters, valves, corrosion control, leak management, emergency-response interfaces, records, mapping, abandonment/deactivation conditions, and consumer/gas-consumption interfaces where included in the claim boundary.

B.5 LNG, Storage, Terminals, and Interface Facilities

May include LNG facilities, storage facilities, terminals, custody-transfer interfaces, regasification interfaces, pressure and temperature control, measurement, isolation, safety systems, and external utility or transport interfaces.

B.6 Compressor, Pump, Pressure-Control, and Metering Stations

May be treated as standalone quality objects or as subsystems within a broader quality object depending on the declared Quality Claim Boundary.

B.7 Interfaces and Boundary Considerations

Context Guides should identify midstream and downstream interfaces, operating-medium interfaces, environmental interfaces, lifecycle interfaces, public-consequence interfaces, regulatory/reference interfaces, responsibility interfaces, and evidence boundaries relevant to the context.

Annex C (informative) - Alignment Notes with WQI and Context Guides

C.1 Alignment with WQI Foundational Vocabulary

This edition aligns IQI vocabulary with WQI terms including Quality Object, Quality State, Quality Determination, Evidence, Reference Layer, Core Standard, Context Guide, and Quality Claim. In IQI, these terms are interpreted through infrastructure assets and infrastructure systems-of-systems.

C.2 Alignment with MNT1 and LDN1

MNT1 and LDN1 demonstrate that Context Guides must interpret Core Indicators through context-specific boundaries, lifecycle conditions, evidence limits, critical conditions, and claim boundaries. This edition imports those stable vocabulary relationships without importing all context-specific natural gas content into VOC1.

C.3 Evidence and Absence of Observed Failure

MNT1 and LDN1 both clarify that absence of observed failure shall not by itself be treated as proof of satisfactory infrastructure quality. This principle is now included as a general IQI vocabulary term because it applies across infrastructure contexts.

C.4 Quality Claims and Boundary Transparency

This edition strengthens Quality Claim Statement vocabulary to require bounded scope, evidence basis, lifecycle condition, included and excluded interfaces, assumptions, limitations, unresolved conditions, and known evidence gaps.

C.5 Controlled Growth of VOC1

This edition does not turn VOC1 into the Core Standard or into a natural gas Context Guide. It adds only those vocabulary terms that became necessary after the WQI foundational articles and the first IQI Context Guides.

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