

ICS 25.040
CCS N 10



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 32202.2-2026

Replacing GB/T 32203-2015

**Functional safety of safety instrumented systems in oil and gas
pipelines - Part 2: Acceptance requirements**

油气管道安全仪表系统的功能安全 第2部分：验收要求

Issued on: May 25, 2026

Implemented on: December 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

GB/T 32202.2-2026 | Functional safety of safety instrumented system in oil and gas pipelines - Part 2: Acceptance requirements

GB/T 32202.2-2026 English version. Functional safety of safety instrumented system in oil and gas pipelines - Part

2 Acceptance Requirements Published on 2026-05-

25 Implemented on December 1, 2026 State Administration for Market Regulation The State Administration for Standardization issued a statement.

1.Scope This document specifies the general functional safety requirements, SIS design review requirements, factory acceptance requirements, and current requirements for safety instrumented systems (SIS) in oil and gas pipelines. Site acceptance requirements, pre-start safety review and confirmation, and handover and acceptance requirements. This document applies to the functional safety acceptance of safety instrumented systems in oil

and gas pipeline transportation and storage systems.

4. Abbreviations The following abbreviations apply to this document. BPCS. Basic Process Control System ESD. Emergency Shutdown FAT. Factory Acceptance Test HMI. Human Machine Interface I/O. Input/Output SAT. Site Acceptance Test SIF. Safety Instrumented Function SIL. Safety Integrity Level SIS. Safety Instrumented System SOE. Sequence of Events SRS. Safety Requirements Specification

5.1 Acceptance Phase

5.1.1 Functional safety acceptance activities should be conducted throughout the entire lifecycle. This should be in accordance with GB/T 21109 (all parts) and oil and gas pipeline safety instruments. For the system lifecycle activities (Figure 1), functional safety acceptance activities should be performed at the following nodes.

---Node 1. SIS Design Review. This should be conducted after the SIS design is completed (but before approval), i.e., during the lifecycle of the safety instrumented system for oil and gas pipelines. This will take place after activities 1-4 are completed.

2. Factory Acceptance. This should be conducted after the integrator has completed the integration of the safety instrumented system and internal testing, specifically the oil and gas piping. This will be carried out after the completion of Safety Instrumented Lifecycle Activity 6.

3. On-site Acceptance. This should be carried out after the on-site testing components, actuators, and cabinet installation and commissioning are completed, i.e., after the oil and gas pipeline installation is finished. The full instrument lifecycle activity will be conducted after 9 months.

4. Pre-start Safety Verification. This should be carried out after training of relevant personnel on the safety instrumented system and completion of on-site acceptance testing. This will be carried out after all Safety Instrumented Lifecycle Activities 8 and 10 for oil and gas pipelines have been completed.

5. Handover and Acceptance. This should be conducted after the safety verification before startup of the safety instrumented system is completed, i.e., after the safety instrumented system for oil and gas pipelines has been successfully started. It will be carried out after the life cycle activity 11.

5.1.2 Acceptance activities shall be conducted in accordance with Chapters 6 to 10, including SIS design review and pre-launch safety validation. The SIS design and pre-operation assessment were conducted, and the assessment report of the assessment activities can be directly reviewed.

5.1.3 Acceptance activities may be supplemented at various stages of the project lifecycle, depending on the actual situation of the project execution.

5.2 Acceptance Requirements

5.2.1 The acceptance procedure for a safety instrumented system should be determined by the relevant personnel involved in each stage of the safety instrumented system's lifecycle, based on the actual project conditions. The staff confirmed this together.

5.2.2 Before acceptance, the acceptance organization shall establish an acceptance team and clarify the responsibilities of each member.

5.2.3 The acceptance team shall prepare an acceptance plan and establish the acceptance site and related ancillary facilities. The acceptance plan shall include the acceptance time, location, and personnel. The acceptance plan should include the composition, acceptance content, and acceptance criteria, and should be confirmed by the acceptance organization.

5.2.5 FAT can be implemented by the system integrator with user participation.

5.2.6 The system integrator shall complete all hardware and software integration, application development, loading, and completion before the FAT (Fixed Application Test). Internal testing of the system. The scope of internal testing should include all the contents specified in 7.2.7.

5.2.7 The system integrator shall prepare a FAT test plan in accordance with the relevant requirements of this document. The FAT test plan shall include the test work... The content and schedule are to be finalized by the user.

5.2.8 Safety instrumented systems shall not be shipped to the site until a factory acceptance certificate has been signed.

5.2.9 SAT should be implemented by the system integrator, with the cooperation of the system construction unit, equipment supplier and construction unit, and the user supervision.

5.2.10 SAT shall conduct actual operation tests on safety function circuits. Figure

1.Lifecycle and Acceptance Milestones of Safety Instrumented Systems for Oil and Gas Pipelines Note

1.Depending on the actual project situation, the output of the feasibility study stage may be in the form of a project proposal or other forms. Note

2.Preliminary design is called scheme design. 6.SIS Design Review

6.1 Review Basis SIS reviews should be conducted based on the following latest, approved information.

---The design should comply with the laws, regulations, standards, and norms;

6.2 Review Content

6.2.1 The design should comply with the laws, regulations, standards, and specifications, including the following.

- The completeness of the laws, regulations, standards, and norms followed;
- The accuracy of the laws, regulations, standards, and norms followed;
- Applicability of the laws, regulations, standards, and norms followed.

6.2.2 The hazard analysis and risk assessment report should include the following.

- Each identified hazardous event and risk factor;
- The likelihood and outcome of the event;
- Consider normal operation, start-up, shutdown, maintenance, and emergency shutdown scenarios;
- Identify additional risk reduction requirements to achieve the desired safety;
- Measures taken to eliminate or mitigate dangers and risks;
- Assumptions made during risk analysis include equipment failure rate, potential demand rate, operational constraints, and the possibility of human intervention. Credibility;
- The allocation of safety functions in the protection layer takes into account the potential performance reduction caused by common-cause failures;
- Identify the safety functions implemented by the safety instrumented system.

6.2.3 Check the safety requirements specification, which should include the following.

6.3 Review Report

6.3.1 Upon completion of the review process, a review report shall be prepared and signed and confirmed by the acceptance team.

6.3.2 The review report shall include all the contents of 6.2.

6.3.3 Non-conformities discovered during the review process should be recorded in the Non-conformity Table, which is shown in Table A.1 of Appendix A.

7 Factory Acceptance

7.1 Acceptance Criteria Acceptance should be based on the following information.

- The latest valid version of the design documents provided by the design unit, including process operation principle, process and instrumentation control flowchart, safety... Full requirements specifications, logic diagrams (cause and effect diagrams), instrument indexes, interlock alarm value setting lists, I/O lists, etc.;