



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

CONSTRUCTION STANDARD
FOR
INSTRUMENTS INSPECTION

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CONTENTS

- 1 GENERAL
 - 1.1 INTENT
 - 1.2 SCOPE
 - 1.3 CODES
 - 1.4 INSTRUMENT CALIBRATION
- 2 DESIGN
 - 2.1 DESIGN GENERAL
 - 2.2 INSTRUMENT PROCESS PIPING
 - 2.3 INSTRUMENT AIR PIPING & SUPPLY
 - 2.4 INSTRUMENT PROTECTION
 - 2.5 INSTRUMENT STEAM TRACING
 - 2.6 ELECTRONIC INSTRUMENTATION WIRING TECHNIQUES

FIGURE A

FIGURE B

FIGURE C

FIGURE D

FIGURE E

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1 GENERAL

1.1 INTENT

The intent of this standard is to define qualitatively the specification for installation and inspection of instruments & protective devices which may be included in the projects. It is intended that this standard shall be used as a basis and guide for inspection of construction contractor activities.

1.2 SCOPE

This standard covers the installation of instruments and their accessories; including:

1.2.1 Pressure testing of all pneumatic tubing in accordance with ISA/RP-7.1.

1.2.2 Calibration of instruments as defined in Clause 1.4.

1.2.3 Representation and symbols in general accordance with ISA-S-5.1.

1.3 CODES

1.3.1 Design, materials and workmanship shall be in accordance with the applicable codes and standards as listed below, and related NPC standards.

1.3.1.1 Process Piping

ASA B31.3, Latest Edition, Petroleum Refinery Piping.

ASA B16.5, Latest Edition, Flanges.

ASA B2.1, Latest Edition, Pipe Threads.

1.3.1.2 Boiler, Pressure Vessels and Piping

ASME Boiler and Pressure Vessel Codes, Sections I and VIII, Latest Edition.

1.3.1.3 Relief Valves

ASME, Unfired Pressure Vessel Code, Section VIII, Division I Paragraphs UG-125 Through UG-134.

ASME, Boiler and Pressure Vessel Code, P-269 Through P-290.

API RP 2000, Latest Edition.

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API Guide for Tank Venting.

API RP 520, API Recommended Practice for the Design & Installation of Pressure Relieving Systems in Refineries Part I, & Part II, Latest Edition.

1.3.1.4 Thermocouples and Thermocouple Extension Wire

ANSI C-96.1.

1.3.1.5 Electrical

ISA-RP 12.1.

ISA-RP 12.2 through RP 12.6.

U.S. National Electrical Code.

1.3.1.6 Materials

ASTM.

ASME (Section II).

1.3.1.7 Welding

ASME Boiler and Pressure Vessel Code, Section IX, Latest Edition (for Pressure Parts).

ASA B 31.3, Latest Edition (for Petroleum Refinery Piping). American Welding Society (AWS), Standard AWS D 1.0, Latest Edition (for Structural Steel).

1.3.1.8 Orifice Plates

ISA RP 3.2.

1.4 INSTRUMENT CALIBRATION

1.4.1 Test Equipment

1.4.1.1 The calibration of all test equipment must be checked before being used for any calibration of plant **instruments**.

1.4.1.2 The test equipment calibration check shall be made against contractor's standards wherever possible. If contractor's standards are not available, the equipment shall be sent to an independent testing laboratory for certification.

1.4.1.3 The test instrument calibration check shall be **recorded on a** label, showing date and person performing check, and attached to the piece of equipment in such a place as to be easily visible, but not easily removable.



1.4.1.4 The following test equipment should have a calibration check:

- a) Pneumatic Test Box : Five test gauges, dead weight tester, & portable potentiometer.
- b) Electronic Test Box : All equipment.

1.4.2 Procedure

1.4.2.1 A calibration check of indicating and recording instruments, in general, shall be made at three points 10%, 50%, and 90% of range or span. Instruments such as pressure switches, snap-acting relays, etc., which are two-position devices, should not be calibrated over their range or span. A check of trip point and re-set point is considered sufficient. A two-point calibration is satisfactory for analysis portion of analytical instruments.

1.4.2.2 A record showing instrument number, date of calibration, and calibration data shall be kept for all instruments. This record shall be available to the contractor.

1.4.2.3 Transmitters and receivers are to be calibrated independently using one of the test standards for transmitter output and received input. Normally, a separate system calibration will not be required.

1.4.2.4 A separate system or operational check may be required in certain critical services such as switching or shutdown systems. Contractor shall determine where such system checkouts are required.

1.4.3 Accuracy

1.4.3.1 The degree of accuracy required will normally be the accuracy guaranteed by the manufacturer.

1.4.3.2 Unless otherwise specified, the instrument manufacturers show the accuracy as limit of error in percent of instrument range. For example, the "Accuracy, $\pm 1/2\%$ " figure shown in the manufacturer's literature usually means at any point in its range, the reading of the instrument will be within $1/2\%$ of full range or full span of the true value".

1.4.3.3 For some instruments, the manufacturers may specify an accuracy based on instrument reading rather than range which means that "at any point in its range, the reading of the instrument will be within $1/2\%$ of the true value."

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