

**CONTEC**Comissão de Normalização  
Técnica**SC-10**Industrial Instrumentation  
and Automation**Instrumentation Piping Material****1<sup>st</sup> Amendment**

This is the 1<sup>st</sup> amendment to PETROBRAS N-1931 REV. D, and it is used to alter the text of the Standard in the parts indicated below:

NOTE 1 The new pages with the performed amendments are placed in its corresponding positions.

NOTE 2 The amended pages, indicated the date of the amendment, are placed at the end of this standard, in chronological order, and shall not be used.

**CONTENTS OF THE 1<sup>st</sup> AMENDMENT - 05/2015**

- Subsection 5.1 c):

Alteration in the text.

- Annex A, specification Vh, FLANGE:

Alterations in the field ENDS.

- Annex A, specification Vi, OD TUBING:

Alteration of thickness.

- Annex B, Ball Valves (VES), line 12:

Alteration in the text.

- Annex B, Needle Valves (VAG), line 12:

Alteration in the text.

- Annex B, Manifold, line 11:

Inclusion in the text.

# Instrumentation Piping Material

## Standardization

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

**Technical Requirement:** A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

**Recommended Practice:** A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

***"This Standard is exclusive property of Petróleo Brasileiro S. A. - PETROBRAS, internal application and PETROBRAS Subsidiaries and shall be used by its suppliers of goods and services under contracts or similar under the conditions established in Bidding, Contract, Agreement or similar.***

***The use of this Standard by other companies / organizations / government agencies and individuals is the sole responsibility of the users.."***

## CONTEC

Comissão de Normalização  
Técnica

## SC - 10

Industrial Instrumentation and  
Automation

## Introduction

*PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard N-1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.*

## Foreword

This Standard is the English version (issued in 09/2014) of PETROBRAS N-1931 REV. D 07/2014. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

## 1 Scope

1.1 The purpose of this Standard is to standardize the piping materials to be used in PETROBRAS detailed instrumentation designs whenever the corresponding piping specification is PETROBRAS N-76.

1.2 This Standard applies to instrumentation impulse lines, piping heating systems (steam tracing) and pneumatic systems to control valves.

1.3 This Standard does not apply to sampling conditioning systems for process analyzers and hydraulic installations.

1.4 This Standard applies to projects begun on the day it is published and also to existing installations and equipment when subject to maintenance or modification.

1.5 This Standard contains only Technical Requirements.

## 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 applies.

PETROBRAS [N-57](#) - Mechanical Design of Industrial Piping;

PETROBRAS [N-75](#) - Abbreviations for Industrial Projects;

PETROBRAS [N-76](#) - Piping Materials for Refining and Transportation Plants;

PETROBRAS [N-858](#) - Construction, Assembly and Conditioning of Instrumentation;

PETROBRAS [N-2791](#) - Details for Installation of Process Instruments to the Process;

ASME [B 1.20.1](#) - Pipe Threads General Purpose;

ASME [B 16.5](#) - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard;

ASTM [A269](#) - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service;

ASTM [A276](#) - Standard Specification for Stainless Steel Bars and Shapes;

ASTM [A479](#) - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels;

ASTM [F1387](#) - Standard Specification for Performance of Piping and Tubing Mechanically Attached Fittings;

IEC [61518](#) - Mating Dimensions Between Differential pressure Measuring (Type) Instruments and Flanged-on Shut-off Devices Up to 413 bar (41,3 MPa);

MSS [SP-99](#) - Instrument Valves.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

### 3 Terms and Definitions

For the purposes of this document, the terms and definitions of PETROBRAS [N-75](#) and those below are adopted.

#### 3.1

##### **API**

American Petroleum Institute

#### 3.2

##### **ASME**

American Society of Mechanical Engineers

#### 3.3

##### **ASTM**

American Society for Testing and Materials

#### 3.4

##### **code**

material code

#### 3.5

##### **OD fitting**

compressing fitting for outside diameter pipe

#### 3.6

##### **diameter**

nominal diameter range, in inch

#### 3.7

##### **thick**

thickness (in inch)

#### 3.8

##### **ends**

type of end

#### 3.9

##### **HRB**

hardness Rockwell B

**3.10****HV**

hardness Vickers

**3.11****IEC**

International Electrotechnical Commission

**3.12****impulse line**

section of line connecting the root valve to instrument process fitting

**3.13****mat**

installation material

**3.14****MSS**

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc

**3.15****PC**

beveled end

**3.16****PL**

plain end

**3.17****PR**

threaded end

**3.18****obtur**

trim

**3.19****pressure**

admissible pressure at temperature of -28 °C to +37 °C, in psig

**3.20****PTFE**

polytetrafluoroethylene

**3.21****sc**

seamless

**3.22****impulse intake**

derivation point of equipment or process line where the root valve will be installed

**3.23****OD tubing**

tubing of small diameter (less than 2") that uses compression fittings and which dimensional standard is based on its outer diameter

**3.24****rigid tubing**

tubing that uses welded, threaded, or flanged fittings, which material standardization complies with PETROBRAS [N-76](#)

**3.25****use**

application or use of material

**3.26****root valve**

block valve which isolates the impulse intake from impulse line

**4 General Conditions**

4.1 Table 1 shows the correspondence between the specification codes established in the piping standard (PETROBRAS [N-76](#)) and the material specification for installation of instruments, established in this Standard.

NOTE The specifications of PETROBRAS [N-76](#) listed in Table 1 are those used in process equipment piping or nozzle, in which the impulse intakes for instruments shall be installed.

4.2 In applications that required the use of rigid tubing and respective fittings in section or on the entire impulse line, the same piping specification used in process (PETROBRAS [N-76](#)) shall be complied with, according to Table 1.

4.3 Within the instrumentation scope limit, accessories with both threaded ends (sleeves, nipples, etc.) shall be made of stainless steel, according to the specification of this Standard.

**Table 1 - Correspondence Between the Specifications of Materials of Process Piping and Impulse Line**

| Specification of process piping                                                                                                                                                                                                            | Service class                                                                                                                           | Rigid tubing impulse line                                      | OD tubing impulse line |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------|----|
|                                                                                                                                                                                                                                            |                                                                                                                                         |                                                                | Vh                     | Vi |
| Aa, Ab, Ac, Ad, Ae, Ag, Ba, Bb, Bc, Bd, Be, Bf, Bg, Bh, Bj, Bm, Bo, Bq, Ca, Cb, Cc, Cd, Ce, Cf, Cg, Ci, Cj, Cm, Co, Ea, Eb, Ed, Ee, Eh, Ei, Ej, Eo, Fa, Fb, Fc, Fd, Ff, Fg, Fo, La, Lb, Lc, Ld, Le, Ma, Mb, Mc, Md, Me, Oa, Od, Pa, Xb, Xe | A - Fittings to instrument process, also operating with hydrocarbons and chemicals, except for high-pressure hydrogen                   | Use the piping specification (PETROBRAS <a href="#">N-76</a> ) | X                      |    |
| Pb, Pd, Qb                                                                                                                                                                                                                                 | B - Fittings to instrument process with high-pressure hydrogen service<br>-<br>Class $\geq 900$                                         | Use the piping specification (PETROBRAS <a href="#">N-76</a> ) |                        | X  |
| Af, Ch, Go, Qa, Ra, Xa                                                                                                                                                                                                                     | C - Fitting to instrument process working under conditions that demand the use of specific material of PETROBRAS <a href="#">N-76</a> . | Use the piping specification (PETROBRAS <a href="#">N-76</a> ) |                        |    |

4.4 Whenever the application allows it, the instrumentation impulse lines shall be made exclusively of OD tubing and OD fittings, as per specifications contained in this Standard.

4.5 In design and construction of impulse lines, the criteria for small-diameter piping design shall be followed, specific for installation of instruments presented in PETROBRAS [N-57](#).

4.6 The impulse line piping specification, according to Table 1, shall be defined in the typical detailed design of process installation of each instrument, as per PETROBRAS [N-2791](#).

4.7 When the use of rigid tubing is required, the piping standard of PETROBRAS [N-76](#), or of the piping material specification for the design shall be used, and the breakdown of this section shall be performed by the piping department, according to Instrumentation guidelines.