

---

---

**Space systems — Fluid characteristics —  
Part 3:  
Nitrogen**

*Systèmes spatiaux — Caractéristiques des fluides —*

*Partie 3: Azote*

iTeh **STANDARD PREVIEW**  
(standards.iteh.ai)

ISO 14951-3:1999

<https://standards.iteh.ai/catalog/standards/sist/a9f65140-a804-48ef-8559-dcfc225a2c9/iso-14951-3-1999>



## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 14951-3 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

ISO 14951 consists of the following parts, under the general title *Space systems — Fluid characteristics*:

— Part 1: Oxygen

— Part 2: Hydrogen propellant

— Part 3: Nitrogen

— Part 4: Helium

— Part 5: Nitrogen tetroxide propellant

— Part 6: Monomethylhydrazine propellant

— Part 7: Hydrazine propellant

— Part 8: Kerosene propellant

— Part 9: Argon

— Part 10: Water

— Part 11: Ammonia

— Part 12: Carbon dioxide

— Part 13: Breathing air

ITeh STANDARD PREVIEW  
(standards.iteh.ai)

[ISO 14951-3:1999](https://standards.iteh.ai/catalog/standards/sist/a9f65140-a804-48ef-8559-dcfc225a2c9/iso-14951-3-1999)

<https://standards.iteh.ai/catalog/standards/sist/a9f65140-a804-48ef-8559-dcfc225a2c9/iso-14951-3-1999>

© ISO 1999

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization  
Case postale 56 • CH-1211 Genève 20 • Switzerland  
Internet iso@iso.ch

Printed in Switzerland

# Space systems — Fluid characteristics —

## Part 3: Nitrogen

### 1 Scope

This part of ISO 14951 specifies limits for the composition of nitrogen and test methods for verification of nitrogen composition. This part of ISO 14951 is applicable to nitrogen of the following types and grades, intended for purging and pressurization of propellant systems of space systems and for preparing oxygen-nitrogen mixtures for breathing purposes on board space vehicles:

- type I: gaseous
  - grade A: 99,5 % pure, purging/pressurizing;
  - grade B: 99,99 % pure, crew breathing;
  - grade C: 99,995 % pure;
  - grade F: 99,99 % pure;
- type II: liquid
  - grade A: 99,5 % pure, purging/pressurizing;
  - grade B: 99,99 % pure, crew breathing;
  - grade C: 99,995 % pure;
  - grade F: 99,99 % pure.

This part of ISO 14951 is applicable to nitrogen used in both flight hardware and ground facilities, systems, and equipment. It is applicable to influents only to the extent specified herein.

### 2 Terms and definitions

For the purposes of this part of ISO 14951, the following terms and definitions apply.

#### 2.1

##### direct method

method of measuring fluid purity by direct means (e.g. measurement device, analyzer, etc.)

**2.2**  
**indirect method**

method of measuring the aggregate impurities, as a volume percent or percent by weight, and subtracting it from 100

**2.3**  
**particulate**

undissolved solids retained on a filter paper with a 10 µm absolute rating

**3 Composition**

The composition of nitrogen delivered to the flight vehicle interface shall be in accordance with the limits given in Table 1 when tested in accordance with the applicable test methods.

**4 Test methods****4.1 Sampling**

Nitrogen should be selected in accordance with a sampling plan that will produce results with sensitivities and accuracies equivalent to or better than those required to meet the programme or project requirements.

**4.2 Composition tests**

The composition of the nitrogen shall be tested by such methods, apparatus, or analyzers as may be required to produce results with the sensitivities and accuracies necessary to meet programme or project requirements.

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/a9f65140-a804-48ef-8559-dcffe225a2c9/iso-14951-3-1999>

Table 1 — Composition limits

Composition		Limits			
		Type I and type II			
		Grade A	Grade B	Grade C	Grade F
Nitrogen	volume fraction, % <sup>a</sup> , min.	99,5	f	99,995	99,9
Moisture	µl/l, max.	26,3	11,5	5,7	15
Total hydrocarbons as methane (CH <sub>4</sub> )	µl/l, max.	58,3	5,0 <sup>g</sup>	5,0	25
Oxygen	µl/l, max.	5000	50	20	1000
Hydrogen	µl/l	e	e	0,5	e
Argon <sup>b</sup>	µl/l	e	20	2,0	e
Carbon dioxide <sup>b</sup>	µl/l, max.	e	5,0	5,0	e
Carbon monoxide <sup>b</sup>	µl/l, max.	e	5,0	5,0	e
Aromatic hydrocarbons as benzene <sup>b</sup>	µl/l, max.	—	0,5	—	—
Halogenated hydrocarbons <sup>b</sup>	µl/l, max.	—	1,0	—	—
Chlorinated hydrocarbons <sup>b</sup>	µl/l, max.	—	0,1	—	—
Nitrous oxide <sup>b</sup>	µl/l, max.	—	1,0	—	—
Odour		—	None	—	—
Particulate <sup>c</sup>	mg/l, max.	—	—	1,0	1,0
Total impurities <sup>d</sup>	µl/l, max.	5000	100	50	1000

<sup>a</sup> Percent nitrogen includes trace quantities of neon, helium, and small amounts of argon.

<sup>b</sup> If required by use.

<sup>c</sup> Applies only to Type II (Liquid) nitrogen.

<sup>d</sup> Sum of all percentages of water, hydrocarbons, oxygen, hydrogen, and if applicable, carbon monoxide, carbon dioxide, and argon.

<sup>e</sup> No limit for this grade.

<sup>f</sup> By indirect method 99,99 or by direct method 95,0.

<sup>g</sup> For Environmental Control and Life Support System (ECLSS) ground test only.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 14951-3:1999

<https://standards.iteh.ai/catalog/standards/sist/a9f65140-a804-48ef-8559-dcffe225a2c9/iso-14951-3-1999>