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**Space systems — Fluid characteristics —**

**Part 2:**  
**Hydrogen propellant**

*Systèmes spatiaux — Caractéristiques des fluides —*  
*Partie 2: Hydrogène carburant*

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## Foreword

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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 14951-2 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*

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# Space systems — Fluid characteristics —

## Part 2: Hydrogen propellant

### 1 Scope

This part of ISO 14951 specifies limits for the composition of hydrogen propellant and test methods for verification of propellant composition. This part of ISO 14951 is applicable to hydrogen propellant of the following types and grades, intended for use as a fuel in space systems:

- type I: gaseous
  - grade A: fuel, 99,994 % pure;
  - grade F: fuel, 99,995 % pure;
- type II: liquid
  - grade A: fuel, 99,994 % pure;
  - grade F: fuel, 99,995 % pure.

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

### 2 Composition

The composition of hydrogen propellant 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.

### 3 Test methods

#### 3.1 Sampling

The propellant 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.

#### 3.2 Composition tests

The composition of the propellant 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.

Table 1 — Composition limits

| Composition |                                                                         | Limits           |               |                  |         |
|-------------|-------------------------------------------------------------------------|------------------|---------------|------------------|---------|
|             |                                                                         | Type I (gaseous) |               | Type II (liquid) |         |
|             |                                                                         | Grade A          | Grade F       | Grade A          | Grade F |
| Purity      | Hydrogen (H <sub>2</sub> )<br>volume fraction,<br>% by difference, min. | 99,994           | 99,995        | 99,994           | 99,995  |
|             | Para hydrogen (balance<br>ortho-hydrogen)<br>volume fraction, %, min.   | Not specified    | Not specified | Not specified    | 95,0    |
| Impurities  | Total gases<br>µl/l, max.                                               | 60               | 50            | 60               | 50      |
|             | Nitrogen, moisture, and volatile<br>hydrocarbons combined<br>µl/l, max. | 9,0              | 10            | 9,0              | 10      |
|             | Oxygen plus argon<br>µl/l, max.                                         | 5,0              | 1             | 5,0              | 1       |
|             | Helium<br>µl/l, max.                                                    | 45,0             | 40            | 45,0             | 40      |
|             | Carbon monoxide plus carbon<br>dioxide<br>µl/l, max.                    | 1,0              | 1             | 1,0              | 1       |

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