
Space systems — Fluid characteristics —

**Part 4:
Helium**

Systèmes spatiaux — Caractéristiques des fluides —

Partie 4: Hélium

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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 14951-4 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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Part 4: Helium

1 Scope

This part of ISO 14951 specifies limits for the composition of helium and test methods for verification of helium composition. This part of ISO 14951 is applicable to helium of the following types and grades, intended for purging and pressurization of propellant systems of space systems:

- type I: gaseous
 - grade A: purging and pressurizing helium;
 - grade F: purging and pressurizing helium;
- type II: liquid
 - grade A: purging and pressurizing helium;
 - grade F: purging and pressurizing helium.

This part of ISO 14951 is applicable to helium 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 helium 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

Helium 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 helium 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	Helium volume fraction, %, min.	99,99	99,995	99,99	99,995
Impurities	Water $\mu\text{l/l}$, max.	9	5	9	3
	Hydrocarbons (as methane) $\mu\text{l/l}$, max.	5	10	5	1
	Oxygen $\mu\text{l/l}$, max.	10	5	10	3
	Nitrogen $\mu\text{l/l}$, max.	50	20	50	5
	Neon $\mu\text{l/l}$, max.	—	23	—	23
	Argon $\mu\text{l/l}$, max.	—	—	—	1
	Hydrogen $\mu\text{l/l}$, max.	—	—	—	5
	Gaseous helium $\mu\text{l/l}$, max.	—	—	—	5
	Carbon monoxide plus carbon dioxide $\mu\text{l/l}$, max.	—	1	—	1
	Total allowable impurities $\mu\text{l/l}$, max.	100	—	100	—

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