INTERNATIONAL STANDARD

ISO 14951-8

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Space systems — Fluid characteristics —

Part 8:
Kerosene propellant

Systèmes spatiaux — Caractéristiques des fluides —

Partie 8: Kérosène carburant

Reference number
ISO 14951-8:1999(E)

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 14951-8 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 8:
Kerosene propellant

1 Scope

This part of ISO 14951 specifies limits for the composition of kerosene propellant intended for use as a fuel for propellant systems of space systems, and test methods for verification of propellant composition. This part of ISO 14951 is applicable to propellant used in both flight hardware and ground facilities, systems, and equipment. This part of ISO 14951 applies to influents only to the extent specified herein.

2 Term and definition

For the purposes of this part of ISO 14951, the following term and definition apply.

2.1
particulate
undissolved solids retained on a filter paper with a 10 µm nominal and 40 µm absolute rating

3 Chemical and physical properties

3.1 Limits

The chemical and physical properties of kerosene 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.

3.2 Water reaction

When tested as specified in Table 1 and 6.2, the propellant shall separate sharply from the water layer. In addition, neither layer shall change in volume by more than 1 ml.

4 Additives

4.1 Type and amount

The additives listed in this clause may be used singly or in combination, in amounts which shall not exceed those specified. No substance of known dangerous toxicity under usual conditions of handling and use shall be added except as specified herein. The type and amount of each additive used shall be reported.

4.2 Antioxidants

The following active inhibitors may be added separately or in combination to the propellant in total concentration not in excess of 9 g of inhibitor (not including weight of solvent) per 375 l of fuel in order to prevent the formation of gum.

a) 2,6-ditertiary butyl 4-methyl phenol;

b) *N*,*N*'-disecondary butyl paraphenylenediamine;

c) 2,4-dimethyl-6 tertiary-butyl phenol;

d) 2,6-ditertiary butyl phenol.

4.3 Metal deactivator

A metal deactivator, *N*,*N*'-disalicylidene-1,2-propanediamine, may be added in an amount which shall not exceed 2,1 g of active ingredient per 375 l of fuel.

4.4 Dye

A dye, methyl derivative of azobenzene-4azo-2-naphthol, may be added in an amount which shall not exceed 14 g per 3 750 l of fuel.

5 Qualitative properties

The propellant shall be a homogeneous liquid when examined visually by transmitted light.

6 Test methods

6.1 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.

6.2 Composition tests

The chemical and physical properties 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 — Chemical and physical properties

Property			Limit
Distillation	Initial boiling point		a
	Fuel evaporated, 10 %		185 °C to 210 °C
	Fuel evaporated, 50 % at °C		a
	Fuel evaporated, 90 % at °C		a
	End point, max.		274 °C
	Residue, volume fraction, %, max.		1,5
	Distillation loss, volume fraction, %, max.		1,5
Specific gravity		max.	0,815
		min.	0,799
Existent gum		mg/100 ml, max.	7
Potential gum, 16 h aging		mg/100 ml, max.	14
Sulfur		total mass fraction, %, max.	0,05
Mercaptan-sulfur		mass fraction, %, max.	0,005[b]
Freezing point		°C, max.	– 37,8
Thermal value: net heat of combustion		MJ/kg, min.	43,031
Viscosity		mm^2/s at –34,4 °C, max.	16,5
Aromatics		volume fraction, %, max.	5,0
Olefins		volume fraction, %, max.	2,0
Smoke point		mm, min.	25,0
Copper strip corrosion		max.	a
Water reaction			c
Flashpoint		min.	43,3 °C
Aniline point		°C	a
Particulate		max.	1,5 mg/l
Copper corrosion test for 3 h at 100 °C			a

a To be reported; not limited.

b The mercaptan-sulfur determination may be waived at the option of the customer if the fuel is considered “sweet.”

c See 3.2 for requirements.

ICS 49.140

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