INTERNATIONAL STANDARD

ISO 14952-1

First edition
2003-11-15

Space systems — Surface cleanliness of fluid systems —

Part 1: Vocabulary

Systèmes spatiaux — Propreté des surfaces en contact avec des fluides —

Partie 1: Vocabulaire

Reference number
ISO 14952-1:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14952-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

ISO 14952 consists of the following parts, under the general title *Space systems — Surface cleanliness of fluid systems*:

— *Part 1: Vocabulary*

— *Part 2: Cleanliness levels*

— *Part 3: Analytical procedures for the determination of nonvolatile residues and particulate contamination*

— *Part 4: Rough-cleaning processes*

— *Part 5: Drying processes*

— *Part 6: Precision-cleaning processes*

Introduction

This part of ISO 14952 defines the terms intended for use in cleaning processes for equipment and components used in space fluid systems. The purpose of this part of ISO 14952 is to establish uniform terms used in the cleaning, analysis, and verification processes for launch vehicles, spacecraft and ground support equipment.

Space systems — Surface cleanliness of fluid systems —

Part 1: Vocabulary

1 Scope

This part of ISO 14952 defines the basic terms for use in cleaning processes for equipment and components used in space fluid systems. It is applicable to terms used in the description of processes for the cleaning, analysis and verification of fluid systems used in ground support equipment, launch vehicles and spacecraft.

2 Terms and definitions

2.1
accuracy
measure of how close a value is to the “true” value

2.2
assembly
two or more **parts** (2.19) having a common mounting and being capable of performing a definite function

2.3
blank
result for an analytical sample of the virgin test **fluid** (2.11) prior to use in performing a cleanliness **verification** (2.34) test

2.4
component
article that is normally a combination of **parts** (2.19) or **assemblies** (2.2) and is a self-contained element within complete operating equipment

2.5
condensable hydrocarbon
hydrocarbon (2.14) capable of going from a gaseous to a liquid or solid state at ambient temperature and pressure

2.6
critical surface
any surface of an item that contacts the critical service medium (liquid oxygen, pneumatic gases, etc.)

2.7
dewar
double-walled vessel with the annular space between the walls evacuated to provide insulation

2.8
dewpoint
temperature at which condensation of water vapour takes place at prevailing pressure

NOTE The prevailing pressure is usually atmospheric pressure.

2.9
fibre
flexible structure having a length-to-width ratio of 10 to 1 or greater

2.10
field cleaning
processes of **rough cleaning** (2.27) and **precision cleaning** (2.25) of **components** (2.4) and **systems** (2.30) which cannot be processed in a controlled environment such as a clean room

2.11
fluid
gas or liquid

2.12
generally clean
GC
free from manufacturing residue, dirt, oil, grease, processing debris, or other extraneous contamination based on visual examination

NOTE This level does not apply to hardware that is sensitive to contamination.

2.13
high-efficiency particulate air filter
HEPA
filter that is at least 99,97 % efficient by volume on 0,3 µm particles

2.14
hydrocarbon
organic compound consisting exclusively of the elements of carbon and hydrogen

2.15
hypergolic propellants
any fuel/catalyst (monopropellant) or fuel/oxidizer (bipropellant) combination that ignites spontaneously and is used in propelling a rocket

2.16
item
assembly, component, subsystem, or system

2.17
nonvolatile residue
NVR
soluble or suspended material and insoluble particulate matter remaining after temperature-controlled evaporation of a filtered, volatile liquid

2.18
oxidizer
chemical reactants, such as liquid oxygen and nitrogen tetroxide, which when combined with appropriate fuels constitute the propellants for rocket engines

NOTE For the purposes of this part of ISO 14952, gaseous oxygen and breathing air are considered to be oxidizers.

2.19
part
one unit of two or more pieces joined together in such a way that it is not normally disassembled without destruction of the designed use

NOTE A part is the basic unit in an assembly, component, subsystem, or system.

EXAMPLE Fittings, O-rings, and poppets are normally considered pieces that comprise a valve that is considered a part of an **assembly** (2.2).

2.20
particle
unit of solid or liquid matter with observable size

2.21 Particle size
NOTE Various methods for defining size may be used and are dependant upon the measurement technique.

2.21.1
particle size
⟨manual method⟩ apparent maximum linear dimension of a particle in the plane of observation as observed with instruments such as optical, electron, or atomic force microscopes

2.21.2
particle size
⟨automatic method⟩ equivalent diameter of a particle detected by automatic instrumentation

NOTE The equivalent diameter is the diameter of a reference sphere having known properties and producing the same response in the sensing instrument as the particle being measured

2.22
passivation
process by which a corrosive-resistant layer is bonded to a metal surface by submersing the surface in an acid solution

2.23
pH
value taken to represent the acidity or alkalinity of an aqueous solution

NOTE 1 pH is defined as the logarithm of the reciprocal of the hydrogen ion concentration of a solution.

NOTE 2 The pH is measured over the nominal range of 0 to 14.

NOTE 3 A pH reading below 7 is acidic, pH 7 is neutral, and pH above 7 is alkaline.

2.24
pickling
chemical or electrochemical process by which surface oxides are removed from metals

2.25
precision cleaning
cleaning process used to achieve cleanliness levels more stringent than **visibly clean** (2.35)

2.26
repeatability
closeness of the agreement between the results of successive measurements of the same measurand carried out under the same conditions of measurement

[VIM:1993, definition 3.6]

2.27
rough cleaning/precleaning
cleaning process normally used to achieve the **visibly clean** (2.35) cleanliness level

2.28
silting
accumulation of **particles** (2.20) (approximately 2 µm to 20 µm) of sufficient quantity to cause a haze or obscuring of any portion of a filter membrane when viewed visually or under 40-power maximum magnification

2.29
subsystem
two or more **assemblies** (2.2) joined together to perform a definite function

NOTE A subsystem should be capable of independent operation when interconnected into a **system** (2.30).

2.30
system
series of **subsystems** (2.29) joined together to perform a definite function

2.31
test fluid
fluid (2.11), which is either a liquid solvent or an aqueous solution, that is utilized to determine the fluid system wetted-surface cleanliness level

2.32
threshold limit valve
TLV
maximum average daily dosage, based on an 8-h day, 5-day week, to which an average worker may be exposed to hazardous chemicals without harmful effect

NOTE 1 The TLV is a time-weighted average concentration.

NOTE 2 The TLV is normally expressed in parts of the gas or vapour in microlitres per litre.

2.33
validate/validation
process or method of proving that an item, **subsystem** (2.29), or **system** (2.30) meets the specified requirements

2.34
verify/verification
process or method to establish the truth, **accuracy** (2.1), or reality of the cleanliness level of a cleaned item

NOTE This definition is different from that in ISO 9000.

EXAMPLE A solvent flush might be used to verify the cleanliness level of a system.

2.35
visibly clean
VC
absence of surface contamination when examined using a specified light source and angle of incidence, viewing distance and angle, and normal or magnified vision

NOTE 1 This level requires precision-cleaning (2.25) methods but a particle (2.20) count may be optional.

NOTE 2 Fluorescence indicates possible contamination by, for example, a **hydrocarbon** (2.14).

NOTE 3 If recleaning fails to remove fluorescent indications, an investigation should be made to determine if the item material is naturally fluorescent or if the cleaning method is adequate.

2.36
visibly clean plus ultraviolet
VC + UV
cleaning level that is visibly clean (VC) and also meets the requirements for inspection with the aid of an ultraviolet light (black light) of wavelength 320 nm to 380 nm

2.37
volatile hydrocarbon
hydrocarbon (2.14) capable of going from liquid or solid to a gaseous state at ambient temperature and pressure

Bibliography

[1] ISO 9000:2000, *Quality management systems — Fundamentals and vocabulary*

[2] VIM:1993, *International vocabulary of basic and general terms in metrology*. BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML

Index

ICS 49.080; 49.140

Price based on 7 pages