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Second edition
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Aerospace series — Fluid systems and components — Methods for system sampling and measuring the solid particle contamination in hydraulic fluids

*Série aérospatiale — Systèmes de fluides et éléments constitutifs
— Méthodes de prélèvement et de mesure de la contamination
particulaire solide dans un fluide hydraulique*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 10, *Aerospace fluid systems and components*.

This second edition cancels and replaces the first edition (ISO 5884:1987), which has been technically revised. The main changes compared to the previous edition are as follows:

- update of the document to be in line with current ISO rules;
- improved layout and clarity in definition;
- removal of sample analysis detail, with reference to relevant ISO method instead;
- improved sampling point recommendations;
- improved clarity of sampling methods and recommendations for preference.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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0 Introduction

0.1 General

The design of modern hydraulic equipment for aerospace purposes, its use and performance are widely determined by the type and condition of the applicable hydraulic fluids.

The quality and serviceability of hydraulic fluids are dependent on various factors (e.g. thermal stability, viscosity), but in particular on the level of solid particle contamination. Regular fluid contamination testing is required to determine if the fluid is maintained within specified limits that are set by the aircraft manufacturer or hydraulic system operator.

In order to obtain consistent and comparable test results, the test methods detailed in this document should be used.

As a result of the rapid development and improvement of hydraulic systems and their components, which meet critical requirements, the problem of solid particle contamination of hydraulic fluids has steadily increased. The need for maintaining a specified standard of fluid cleanliness in hydraulic systems requires continuous control of the number and size of the solid particle contaminants.

0.2 Solid particle contamination

Solid particle contaminants can be the cause of abrasion and wearing, thereby shortening the life of the components in a hydraulic system.

In a hydraulic system:

- a) components are subject to erosion (primarily in components with higher fluid velocities);
- b) all moving parts are subject to wear by abrasion; and
- c) control valves are subject to silting (settlement of fine particles on the control bore).

0.3 Causes of solid particle contamination

Solid particle contamination of hydraulic fluids can be system-generated, introduced from the outside, in-built or maintenance-generated, for example:

- a) dust particles in the air;
- b) metal particles, produced during the manufacture of parts;
- c) sand residues on castings;
- d) abrasion of seals;
- e) oxide layers on welding seams and on heat-formed or heat-treated steel parts;
- f) chemical and physical changes in the condition of hydraulic fluids;
- g) maintenance of hydraulic systems (e.g. fibres, secondary contamination, etc.);
- h) wear of components from abrasion, adhesion and fatigue; and
- i) ingress of particles via piston gland seals.

0.4 Layout of this document

This document is sub-divided into the following clauses:

- Sampling apparatus ([Clause 4](#)):
 - Characteristics;

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- Preparation;
- Sampling ([Clause 5](#)):
 - Recommendations for sampling point location;
 - Recommendation of sampling frequency;
 - Sampling methods;
 - Recommendation of sample marking;
- Sample analysis methods ([Clause 6](#));
- Test report recommendations ([Clause 7](#)).