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**Aerospace — Fixed displacement  
hydraulic motors — General  
specifications**

*Aéronautique et espace — Moteurs hydrauliques à cylindrée fixe —  
Spécifications générales*



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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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

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

This third edition of ISO 9206 cancels and replaces the second edition (ISO 9206:2016) which has been technically revised.

The main changes compared to the previous edition are as follows:

- title replaced “Constant displacement” with “Fixed displacement”;
- deletion of requirement for minimum case drain flow ([6.3.2](#));
- update of external leakage requirements ([6.3.4](#));
- correction of requirement for overspeed ([6.4.1.2](#));
- coupling shaft requirements re-written ([10.5](#));
- the test stand requirements have been revised ([13.3](#));
- requirement to leave the case drain port unplugged in the Inlet port proof pressure test ([14.3.4.3](#)) and the Case port proof pressure test ([14.3.4.4](#));
- update of test procedures in Operational tests at rated conditions ([14.3.5](#));
- revision of the Sampling requirements ([14.3.6.1](#));
- correction of flow measurement in Torque and flow rate ([15.3.5.3](#));
- additional detail provided in the stalling torque and internal leakage test ([15.3.5.7](#));
- endurance test representativity text added ([15.3.6.1](#));
- revision of Endurance test alternating loads test requirements ([15.3.6.1](#) and [15.3.6.3](#));

- revision of filter used for endurance testing ([15.3.6.6](#));
- revision of Recalibration requirements ([15.3.6.9](#));
- correction of low-temperature test requirement ([15.3.7.2](#));
- clarification of motor operation during vibration tests ([15.3.8.1.4](#));
- clarification of resonant frequency vibration test ([15.3.8.1.4](#));
- ports identified for the ultimate pressure test ([15.3.8.5](#)); and
- clarification of coupling shear test ([15.3.8.6](#)).

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](http://www.iso.org/members.html).





# Aerospace — Fixed displacement hydraulic motors — General specifications

## 1 Scope

This document establishes the general requirements for constant displacement hydraulic motors, suitable for use in aircraft hydraulic systems at pressures up to 35 000 kPa (5 000 psi).

Primary and secondary function motors (see [Clause 4](#)) are covered in this document; however, actuators with internal rotation angle limits and low-speed motors are not covered.

This document is to be used in conjunction with the detail specification that is particular to each application.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2093, *Electroplated coatings of tin — Specification and test methods*

ISO 2669, *Environmental tests for aircraft equipment — Steady-state acceleration*

ISO 2671, *Environmental tests for aircraft equipment — Part 3.4 : Acoustic vibration*

ISO 2685, *Aircraft — Environmental test procedure for airborne equipment — Resistance to fire in designated fire zones*

ISO 3323, *Aircraft — Hydraulic components — Marking to indicate fluid for which component is approved*

ISO 3601-1, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 7137, *Aircraft — Environmental conditions and test procedures for airborne equipment*

ISO 7320, *Aerospace — Couplings, threaded and sealed, for fluid systems — Dimensions*

ISO 8078, *Aerospace process — Anodic treatment of aluminium alloys — Sulfuric acid process, undyed coating*

ISO 8079, *Aerospace process — Anodic treatment of aluminium alloys — Sulfuric acid process, dyed coating*

ISO 8081, *Aerospace process — Chemical conversion coating for aluminium alloys — General purpose*

ISO 8399-1, *Aerospace — Accessory drives and mounting flanges (Metric series) — Part 1: Design criteria*

ISO 8399-2, *Aerospace — Accessory drives and mounting flanges (Metric series) — Part 2: Dimensions*

ISO 8625-1, *Aerospace — Fluid systems — Vocabulary — Part 1: General terms and definitions related to pressure*

ISO 8625-2, *Aerospace — Fluid systems — Vocabulary — Part 2: General terms and definitions relating to flow*

ISO 8625-3, *Aerospace — Fluid systems — Vocabulary — Part 3: General terms and definitions relating to temperature*

ISO 11218, *Aerospace — Cleanliness classification for hydraulic fluids*

ISO 16889, *Hydraulic fluid power — Filters — Multi-pass method for evaluating filtration performance of a filter element*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8625-1, ISO 8625-2, ISO 8625-3, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1 General

##### 3.1.1

##### **fixed displacement hydraulic motor**

mechanical actuator that converts hydraulic pressure and flow into torque and angular velocity (rotation)

##### 3.1.2

##### **purchaser**

organization that has the engineering responsibility for the hydraulic system that includes the motor

Note 1 to entry: Typically, the purchaser is an aircraft manufacturer, an equipment manufacturer that has the actuation system responsibility or a modification centre.

Note 2 to entry: The purchaser is responsible for the compilation of the detail specification.

##### 3.1.3

##### **detail specification**

document compiled by the *purchaser* (3.1.2) that specifies the following:

- a) technical requirements;
- b) acceptance and qualification test requirements;
- c) reliability requirements;
- d) quality requirements;
- e) packaging requirements; and
- f) other requirements

##### 3.1.4

##### **supplier**

organization that provides the motor

Note 1 to entry: Typically, the supplier is the manufacturer of the motor who will be responsible for the design, production, and qualification of the motor.

#### 3.2 Ports of the hydraulic motor

A fixed displacement hydraulic motor typically achieves bi-directional operation by reversing the differential pressure across the inlet/outlet ports, thus reversing the output torque. [Table 1](#) below