

### Contents

	Foreword
1	Scope
2	Normative references
3	Terms and definitions
4	Classification
5	General requirements
5.1	Order of precedence
5.2	Hydraulic system characteristics
5.3	Airworthiness regulations
5.4	Qualification
6	Functional requirements
6.1	Hydraulic fluid
6.2	Pressures
6.2.1	Rated supply pressure
6.2.2	Rated differential pressure
6.2.3	No-load break-out pressure
6.2.4	Motor outlet port pressure
6.2.4.1	Nominal return pressure
6.2.4.2	Rated motor return pressure
6.2.5	Case drain pressure
6.2.5.1	Rated case drain pressure
6.2.5.2	Maximum case drain pressure
6.3	Flows
6.3.1	Rated consumption
6.3.2	Case drain flow
6.3.3	Shaft seal leakage flow
6.3.4	External leakage
6.4	Speed and direction of rotation
6.4.1	Speed
6.4.1.1	Rated speed
6.4.1.2	Overspeed
6.4.1.3	Maximum no-load speed
6.4.1.4	Direction of rotation
6.5	Torque
6.5.1	Rated torque
6.5.2	Break-out torque
6.5.3	Stalling torque
6.5.4	Torque pulsations
6.6	Motor overall efficiency
6.7	Dynamic characteristics
6.7.1	General
6.7.2	Dynamic braking
6.7.3	Rapid reversals
6.8	Passive operation
6.9	Rated temperature
6.10	Acoustic noise level
6.11	Rated endurance
6.12	Environmental requirements

- 7       **Detail design requirements**
- 7.1      Dimensionally critical components
  - 7.2      Maintainability features
  - 7.3      Seals
  - 7.4      Lubrication
  - 7.5      Balance
  - 7.6      Self-contained failure
  - 7.7      Safety wire sealing
  - 7.8      Electro-conductive bonding
  - 7.9      Marking
  - 7.9.1     Nameplate
  - 7.9.2     Fluid identification
  - 7.9.3     Ports
- 8       **Strength requirements**
- 8.1      General
  - 8.2      Proof pressure
  - 8.2.1     Motor case
  - 8.2.2     Motor inlet port
  - 8.2.3     Motor outlet port
  - 8.3      Ultimate pressure
  - 8.3.1     Motor case
  - 8.3.2     Motor inlet port
  - 8.3.3     Motor outlet port
  - 8.4      Pressure impulse (fatigue)
  - 8.5      Port strength
- 9       **Construction requirements**
- 9.1      Materials
  - 9.1.1     General
  - 9.1.2     Metals
  - 9.1.2.1    General
  - 9.1.2.2    Motors for type I systems
  - 9.1.2.3    Motors for type II and III systems and for commercial aircraft applications
  - 9.2      Corrosion protection
  - 9.2.1     General
  - 9.2.2     Ferrous and copper alloys
  - 9.2.3     Aluminium alloys
  - 9.3      Castings
- 10      **Installation requirements**
- 10.1     Dimensions
  - 10.2     Mass
  - 10.3     Mounting
  - 10.4     Orientation
  - 10.5     Coupling shaft
  - 10.6     Ports
- 11      **Maintenance requirements**
- 11.1     Maintenance concept
  - 11.2     Service life limitations and storage specifications
- 12      **Reliability requirements**
- 12.1     Equipment compliance
  - 12.2     Requirements
- 13      **Quality assurance provisions**
- 13.1     Responsibility for inspection
  - 13.2     Classification of tests
  - 13.3     Test stand requirements
- 14      **Acceptance tests**
- 14.1     General

- 14.2 Examination of the product
- 14.3 Test programme
  - 14.3.1 General
  - 14.3.2 External leakage requirements
    - 14.3.2.1 General leakage
    - 14.3.2.2 Shaft seal leakage
  - 14.3.3 Break-in run
  - 14.3.4 Proof pressure and overspeed tests
    - 14.3.4.1 Overspeed test
    - 14.3.4.2 Operational test at overpressure
    - 14.3.4.3 Inlet port proof pressure test
    - 14.3.4.4 Case port proof pressure test
  - 14.3.5 Operational tests at rated conditions
  - 14.3.6 Teardown inspection examination
    - 14.3.6.1 Sampling requirements
    - 14.3.6.2 Inspection procedure
  - 14.3.7 Run-in
  - 14.3.8 Performance data
  - 14.3.9 Fluid contamination test
    - 14.3.9.1 General
    - 14.3.9.2 Inline particle counters
    - 14.3.9.3 Filter patch test
      - 14.3.9.3.1 General
      - 14.3.9.3.2 Filter sampling method
      - 14.3.9.3.3 Patch preparation
      - 14.3.9.3.4 Patch comparison
  - 14.3.10 Electro-conductive bonding
  - 14.4 Storage and packaging

## 15 Qualification procedures

- 15.1 General
- 15.2 Qualification procedure
  - 15.2.1 Qualification by analogy
  - 15.2.2 Motor qualification test report
  - 15.2.3 Samples and program of qualification tests
- 15.3 Qualification testing
  - 15.3.1 Dimensional check
  - 15.3.2 Expanded envelope acceptance tests
  - 15.3.3 Overspeed test
  - 15.3.4 Operational test at overpressure
  - 15.3.5 Calibration
    - 15.3.5.1 General
    - 15.3.5.2 Dynamic characteristics
    - 15.3.5.3 Torque and flow rate
    - 15.3.5.4 Dynamic braking
    - 15.3.5.5 Rapid reversals
    - 15.3.5.6 Passive operation
    - 15.3.5.7 Stalling torque and internal leakage
  - 15.3.6 Endurance testing
    - 15.3.6.1 General
    - 15.3.6.2 Start-stop tests
    - 15.3.6.3 Endurance in operating reversibility (bi-directional motors only)
    - 15.3.6.4 Hydraulic fluid
    - 15.3.6.5 External leakage permissible during endurance testing
    - 15.3.6.6 Filtration during endurance testing
    - 15.3.6.7 Filter checks
    - 15.3.6.8 Part failure
    - 15.3.6.9 Recalibration
  - 15.3.7 Environmental tests
    - 15.3.7.1 General
    - 15.3.7.2 Low-temperature tests
    - 15.3.7.3 Thermal shock test
    - 15.3.7.4 Fire resistance test
    - 15.3.8 Structural tests

- 15.3.8.1 Vibration tests**
- 15.3.8.1.1 General**
- 15.3.8.1.2 Position of a motor under test**
- 15.3.8.1.3 Motor operation during vibration tests**
- 15.3.8.1.4 Resonant-frequency vibration**
- 15.3.8.1.5 Cyclic vibration**
- 15.3.8.1.6 Other tests**
- 15.3.8.2 Fatigue (pressure impulse) tests**
- 15.3.8.3 Port strength**
- 15.3.8.4 Proof pressure test at rated fluid temperature**
- 15.3.8.5 Ultimate pressure test**
- 15.3.8.6 Coupling shear test**
- 15.3.9 Supplementary tests**

**Page count: 36**