

International Standard



2787

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Rotary and percussive pneumatic tools — Performance tests

Machines pneumatiques rotatives, percutantes et roto-percutantes — Essais de fonctionnement

Second edition — 1984-01-15

UDC 621.542

Ref. No. ISO 2787-1984 (E)

Descriptors : tools, pneumatic tools, performance tests, definitions, classification, specifications, test results.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2787 was developed by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*, and was circulated to the member bodies in September 1982.

It has been approved by the member bodies of the following countries :

Austria	Germany, F. R.	Spain
Belgium	India	United Kingdom
Czechoslovakia	Mexico	USA
Egypt, Arab Rep. of	Netherlands	
France	Poland	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 2787-1974).

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Rotary and percussive pneumatic tools — Performance tests

0 Introduction

This International Standard shows how information on hand-held pneumatic rotary tools, percussive tools and percussive tools with rotation should be obtained and presented.

Such information is valuable for the following purposes :

- a) to enable manufacturers of pneumatic rotary and percussive tools to offer their products under similar technical specifications;
- b) to help users to compare different tools and to select the right type and size for a specific task;
- c) to instruct test personnel about how performance tests shall be carried out, according to specified conditions described in this International Standard.

1 Scope and field of application

This International Standard specifies a method of performance tests and technical conditions for the supply of pneumatic tools and gives detailed instructions on the measurement of power output and air consumption and means of adjusting the measured values to specified conditions.

2 References

ISO 31, *Quantities, units and symbols*.

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*.

ISO 1180, *Shanks for pneumatic tools and fitting dimensions of chuck bushings*.¹⁾

ISO 2944, *Fluid power systems and components — Nominal pressures*.

ISO 3857/1, *Compressors, pneumatic tools and machines — Vocabulary — Part 1 : General*.

ISO 3857/3, *Compressors, pneumatic tools and machines — Vocabulary — Part 3 : Pneumatic tools and machines*.

ISO 5167, *Measurement of fluid flow by means of orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full*.

ISO 5391, *Compressors, pneumatic tools and machines — Classification*.²⁾

ISO 5393, *Rotary pneumatic tools for threaded fasteners — Performance test*.

ISO 6544, *Hand-held pneumatic assembly tools for installing threaded fasteners — Reaction torque and torque impulse measurements*.

1) At present at the stage of draft. (Revision of ISO/R 1180-1970.)

2) At present at the stage of draft.

3 Definitions

3.1 Definitions of some general physical terms

3.1.1 total pressure : The pressure measured on the stagnation point when a moving gas stream is brought to rest and its kinetic energy is converted by an isentropic compression from the flow condition to the stagnation condition. It is the pressure usually measured by a Pitot tube. In a stationary body of gas the static and the total pressures are numerically equal.

3.1.2 static pressure : The pressure measured in a gas in such a manner that no effect on measurement is produced by the gas velocity.

3.1.3 dynamic (velocity) pressure : The total pressure minus the static pressure.

3.1.4 atmospheric pressure : The absolute pressure of the atmosphere measured at the test place.

3.1.5 gauge (effective) pressure : The pressure measured above the atmospheric pressure.

3.1.6 absolute pressure : The pressure measured from absolute zero, i.e. from an absolute vacuum. It equals the algebraic sum of atmospheric pressure and gauge pressure.

3.1.7 free air : Air at the atmospheric conditions of the site.

3.1.8 total temperature : The temperature which would be measured at the stagnation point if a gas stream were brought to rest and its kinetic energy converted by an isentropic compression from the flow condition to the stagnation condition.

The temperature rise at stagnation of the gas stream can be neglected if the gas velocity around the measuring point is lower than 30 m/s.

3.2 Definitions concerning rotary air motor torque performance

3.2.1 static starting torque : The torque that continues to be developed by the motor in response to an application of fluid pressure when the torque load is sufficient to prevent rotation.

NOTE — The value may depend upon the angular position of the motor shaft. The maximum static starting torque is the value obtained when the angular position of the motor shaft is in the most advantageous location. The minimum static starting torque is the value obtained when the angular position of the motor shaft is in the least advantageous location.

3.2.2 dynamic starting torque : The peak torque delivered by the output shaft of the motor in response to an application of fluid pressure when the torque load is sufficient to prevent rotation.

NOTE — The dynamic starting torque will often be in excess of the static starting torque where lost motion exists between the motor shaft and the load, allowing rotation and momentum to develop prior to application of the load.

3.2.3 brake loaded torque : The continuous torque delivered at a constant speed.

3.2.4 maximum brake loaded torque : The maximum continuous torque that can be delivered at a constant speed.

3.2.5 static stall torque : The torque that continues to be developed after a load has stalled the motor.

NOTE — The value may depend upon the angular position of the motor shaft in the stalled position. The maximum static stall torque is the value obtained when the angular position of the motor shaft is in the most advantageous location. The minimum static stall torque is the value obtained when the angular position of the motor shaft is in the least advantageous location.

3.2.6 dynamic stall torque : The peak torque delivered by the output shaft when a load is applied that stalls the motor.

NOTE — The peak torque will vary, depending upon the rate of deceleration caused by the load.

4 Symbols and units

These are in accordance with ISO 31 and ISO 1000.

4.1 General rules for letter symbols

The use of the letter symbols given in 4.2 and 4.3 is recommended. The list is formulated in line with the following seven principles :

- a) the same symbols shall be used for the same quantities regardless of the system of units;
- b) for any one quantity a single symbol shall be used with subscripts to indicate readings other than the primary one;
- c) the same symbols shall be used for a given concept regardless of the number of special values which occur;
- d) letter subscripts shall be used to denote values under special conditions;
- e) numerical subscripts shall be used to denote values at different points of a cycle;
- f) symbols shall be confined if possible to roman letters;
- g) where possible, capital letters shall be used for absolute quantities.