
**Vacuum technology — Turbomolecular
pumps — Measurement of rapid
shutdown torque**

*Technique du vide — Pompes turbomoléculaires — Mesurage
du couple d'arrêt rapide*



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Published in Switzerland

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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.

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.

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ISO 27892 was prepared by Technical Committee ISO/TC 112, *Vacuum technology*.

Introduction

A rotating turbomolecular pump or molecular drag pump has a large amount of energy stored in the rotor due to the high rotational frequency. If the rotor breaks, this energy is released in a very short time and there is the possibility of rupture of the casing of the turbomolecular pump. A large reaction torque is also generated on the pump housing and there is a possibility that the bolts that fix the turbomolecular pump might break.

This International Standard is based on results compiled in studies of these possibilities and has been drafted as a measurement method by turbomolecular pump manufacturers with the aim of improving the safety of users.

The core contents of this International Standard are the test methods for rapid shutdown torque measurement of turbomolecular pumps and molecular drag pumps.

The term “turbomolecular pump” used in this International Standard is generic and includes molecular drag pumps and pumps which contain both technologies on the same shaft.

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Vacuum technology — Turbomolecular pumps — Measurement of rapid shutdown torque

1 Scope

This International Standard specifies a method for the measurement of rapid shutdown torque (destructive torque) of turbomolecular pumps in which gas momentum is produced by axial flow type blades and/or helical channels. The main forces leading to failure of turbomolecular pumps are torques around the rotational axis. Other insignificant forces and moments that can occur lie outside the scope of this International Standard.

There are two kinds of failure: rapid shutdown by whole burst and softer crash of rotor. This International Standard applies to both. The same measurement method can be used for turbomolecular pumps and molecular drag pumps.

2 Normative references

The following referenced documents are indispensable for the application 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 3529-2, *Vacuum technology — Vocabulary — Part 2: Vacuum pumps and related terms*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 3529-2 and the following apply.

3.1

inlet flange

turbomolecular pump inlet suction flange for connecting and fitting on to the vacuum vessel that is to be evacuated

3.2

rotor

rotational body

rotational parts

(vacuum pumps) assembly, composed of shaft, rotor body and rotor blades, which is supported by bearings and is driven by a motor

3.3

rotor blade

turbine blade

rotating blade

(vacuum pumps) part of a pump which rotates with a peripheral speed close to the speed of sound and which imparts a vacuum exhaust action to the pump, analogous to axial flow type turbine blades