

INTERNATIONAL
STANDARD

ISO
1217

Third edition
1996-09-15

**Displacement compressors — Acceptance
tests**

Compresseurs volumétriques — Essais de réception



Reference number
ISO 1217:1996(E)

Contents

	Page
1 Scope.....	1
2 Normative references.....	1
3 Definitions	2
3.1 General	2
3.2 Pressures	4
3.3 Temperatures	4
3.4 Flow rates.....	4
3.5 Powers	5
3.6 Efficiencies	5
3.7 Specific energy requirements	5
3.8 Gas properties	5
4 Symbols.....	6
4.1 Symbols and units.....	6
4.2 Subscripts.....	7
5 Measuring equipment, methods and accuracy	8
5.1 General	8
5.2 Measurement of pressure.....	8
5.3 Measurement of temperature.....	9
5.4 Measurement of humidity	10
5.5 Measurement of rotational frequency.....	10
5.6 Measurement of flow rate	10
5.7 Measurement of power and energy.....	10
5.8 Miscellaneous measurements	11
5.9 Calibration of instruments	11

© ISO 1996

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

6	Test procedures	12
6.1	General	12
6.2	Test arrangements	12
6.3	Evaluation of readings	13
6.4	Computation of test results	14
6.5	Volume flow rate corrections	14
6.6	Corrected volume flow rate	16
6.7	Power corrections	17
6.8	Corrected power	18
6.9	Corrected specific energy requirement	18
7	Uncertainty of measurement	18
8	Comparison of test results with specified values	18
8.1	General	18
8.2	Comparison of measured performance curves with guarantee points	19
8.3	Comparison of single measuring points with single guarantee points	19
8.4	Uncertainties and manufacturing tolerances	24
8.5	Special information	24
9	Test report	25

Annexes

A	Acceptance test for liquid-ring compressors	26
B	Simplified acceptance test for bare displacement air compressors	29
C	Simplified acceptance test for electrically driven packaged displacement air compressors	35
D	Simplified acceptance test for internal combustion engine-driven packaged displacement air compressors	41
E	Reference conditions	47
F	Uncertainty of measurement	48
G	Bibliography	58

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.

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.

International Standard ISO 1217 was prepared by Technical Committee ISO/TC 118, *Compressors, pneumatic tools and pneumatic machines*.

This third edition cancels and replaces the second edition (ISO 1217:1986), which has been technically revised.

Annexes A to D form an integral part of this International Standard. Annexes E, F and G are for information only.

Displacement compressors — Acceptance tests

1 Scope

This International Standard specifies methods for acceptance tests regarding volume rate of flow and power requirements of displacement compressors. It also specifies methods for testing liquid-ring type compressors as in annex A.

This International Standard specifies the operating and testing conditions which shall be agreed between the manufacturer and purchaser when a full performance test is specified.

For air compressors manufactured in batches or in continuous production quantities and sold against performance data published in manufacturers' sales, literature tests as described in annexes B, C and D are considered equivalent alternatives.

Detailed instructions are given for a full performance test including the measurement of volume flow rate and power requirement, the correction of measured values to specified conditions, and means of comparing the corrected values with the guarantee conditions. The tolerances to be applied to the measurement of flow, power, specific power, etc. for all acceptance tests carried out in accordance with this International Standard shall be agreed between the manufacturer and purchaser at the contractual stage or certainly prior to the execution of the tests. This International Standard specifies methods for determining the value of such tolerances.

Annex E of this International Standard specifies standard inlet conditions for reference purposes.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2602:1980, *The interpretation of test results — Estimation of the mean — Confidence interval.*

ISO 2854:1976, *Statistical interpretation of data — Techniques of estimation and tests relating to means and variances.*

ISO 3046-1:1995, *Reciprocating internal combustion engines — Performance — Part 1: Standard reference conditions, declarations of power, fuel and lubricating oil consumptions, and test methods.*

ISO 5167-1:1991, *Measurement of fluid flow by means of pressure differential devices — Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full.*

ISO 5941:1979, *Compressors, pneumatic tools and machines — Preferred pressures.*

ISO 9300:1990, *Measurement of gas flow by means of critical flow Venturi nozzles.*

IEC 46:1962, *Recommendations for steam turbines — Part 2: Rules for acceptance tests (now withdrawn).*

IEC 51-1:1984, *Direct acting indicating analogue electrical measuring instruments and their accessories — Part 1: Definitions and general requirements common to all parts.*

IEC 584-1:1995, *Thermocouples — Part 1: Reference tables.*

IEC 584-2:1982, *Thermocouples — Part 2: Tolerances.*

IEC 584-3:1989, *Thermocouples — Part 3: Extension and compensating cables — Tolerances and identification system.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 General

3.1.1 acceptance test: Performance test carried out in accordance with this International Standard.

3.1.2 displacement compressor: Machine where a static pressure rise is obtained by allowing successive volumes of gas to be aspirated into and exhausted out of a closed space by means of the displacement of a moving member.

NOTE 1 For the definition of a liquid-ring compressor, see annex A.

3.1.3 swept volume of a displacement compressor: Volume swept in one revolution by the compressing element(s) of the compressor's first stage.

3.1.4 displacement of a displacement compressor: Volume swept by the compressing element(s) of the compressor's first stage per unit of time.

3.1.5 shaft-driven reciprocating compressor: Displacement compressor in which gas intake and compression are achieved by the straightforward alternating movement of a moving element in a space constituting a compression chamber due to a shaft rotation.

3.1.6 rotary compressor: Displacement compressor in which the element is one or more rotors operating in a casing, the displacement being effected by vanes, meshing elements or by displacement of the rotor itself.

3.1.7 liquid injected rotary compressors: Rotary compressor in which a liquid is injected into the gas stream before or in the compressor.

3.1.8 packaged compressor: Compressor with prime mover, transmission, fully piped and wired internally which may also include ancillary and auxiliary items of equipment and may be a stationary or mobile (portable) unit.

3.1.9 clearance volume: Volume inside the compression space, which contains gas trapped at the end of the compression cycle.

3.1.10 relative clearance volume: Ratio of clearance volume of the stage under consideration to the swept volume of the compressing element of this stage.

3.1.11 standard inlet point: Inlet point considered representative for each compressor and which varies with compressor design and type of installation.