



# FINAL DRAFT International Standard

## ISO/FDIS 18976

### Testing of refrigerant compressors

*Essais des compresseurs pour fluides frigorigènes*

ISO/TC 86/SC 4

Secretariat: **SAC**

Voting begins on:  
**2025-09-26**

Voting terminates on:  
**2025-11-21**

iTeh Standards  
(<https://standards.itih.ai>)  
Document Preview

ISO/FDIS 18976

<https://standards.itih.ai/catalog/standards/iso/2c9a642c-d6d4-49de-87f4-870526744a1f/iso-fdis-18976>

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

iTeh Standards  
(<https://standards.itih.ai>)  
Document Preview

ISO/FDIS 18976

<https://standards.itih.ai/catalog/standards/iso/2c9a642c-d6d4-49de-87f4-870526744a1f/iso-fdis-18976>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

## Contents

Page

<b>Foreword</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms, definitions and symbols</b>	<b>1</b>
3.1 Terms and definitions	1
3.2 Symbols	3
<b>4 Uncertainty of measurement and test conditions</b>	<b>5</b>
4.1 Uncertainty of performance data	5
4.2 Uncertainty of measurement	5
4.3 Refrigerant circuit state points	6
4.4 Test conditions	6
<b>5 General requirements</b>	<b>7</b>
5.1 Calculation methods	7
5.1.1 Principle	7
5.1.2 Specific enthalpy	8
5.1.3 Refrigerant mass flow	8
5.1.4 Power input	8
5.1.5 Basic formulae	8
5.2 Requirements for the selection of a test method	10
5.2.1 General	10
5.2.2 Second concurrent test	10
5.3 Test period	11
5.3.1 General	11
5.3.2 Steady state conditions	11
5.3.3 Recording of measured data	11
5.4 Pressure and temperature measuring points	11
5.5 Oil circulation	11
5.6 Fractionation	12
5.7 Calibration of calorimeters	12
5.7.1 Heat leakage	12
5.7.2 Reference temperature	12
5.7.3 Calibration procedure	12
5.8 Source of refrigerant data	13
5.9 Kinetic refrigerant properties	13
<b>6 Test methods</b>	<b>13</b>
6.1 General	13
6.2 List of test methods	13
6.2.1 Calorimetric methods	13
6.2.2 Flow meter methods	13
6.3 Choice of test methods for test X and test Y	14
6.4 Method A: Secondary fluid calorimeter	14
6.4.1 Description	14
6.4.2 Calibration	17
6.4.3 Test procedure	17
6.4.4 Requirements	17
6.4.5 Additional information	17
6.4.6 Determination of refrigerant mass flow	17
6.5 Method B: Flooded system calorimeter	17
6.5.1 Description	17
6.5.2 Calibration	18
6.5.3 Test procedure	18
6.5.4 Requirements	18
6.5.5 Additional information	18

6.5.6	Determination of refrigerant mass flow .....	18
6.6	Method C: Dry system refrigerant calorimeter .....	19
6.6.1	Description .....	19
6.6.2	Calibration .....	23
6.6.3	Test procedure .....	23
6.6.4	Requirements .....	23
6.6.5	Additional information .....	23
6.6.6	Determination of refrigerant mass flow .....	23
6.7	Method G: Water-cooled condenser/gas cooler on the discharge side .....	24
6.7.1	Description .....	24
6.7.2	Calibration .....	25
6.7.3	Test procedure .....	25
6.7.4	Requirements .....	25
6.7.5	Additional information .....	25
6.7.6	Determination of refrigerant mass flow .....	25
6.8	Method D: Refrigerant gas flow meter .....	26
6.8.1	Description .....	26
6.8.2	Requirements .....	27
6.8.3	Additional information .....	28
6.8.4	Determination of refrigerant mass flow .....	28
6.9	Method F: Refrigerant flow meter in the liquid line .....	28
6.9.1	General .....	28
6.9.2	Description .....	28
6.9.3	Test procedure .....	29
6.9.4	Requirements .....	29
6.9.5	Additional information .....	29
6.9.6	Determination of the refrigerant and oil mass flow .....	29
6.10	Method M: Energy balance on compressor .....	30
6.10.1	General .....	30
6.10.2	Description .....	30
6.10.3	Calibration .....	30
6.10.4	Test procedure .....	30
6.10.5	Requirements .....	31
6.10.6	Additional information .....	31
6.10.7	Determination of refrigerant mass flow .....	31
7	<b>Determination of the power input by the compressor .....</b>	<b>33</b>
7.1	Measurement .....	33
7.1.1	General .....	33
7.1.2	Measurement for externally driven compressors .....	33
7.1.3	Measurement for motor compressors .....	33
7.2	Calculation .....	34
8	<b>Test report .....</b>	<b>34</b>
8.1	General .....	34
8.2	Test results .....	34
	<b>Annex A (normative) Conversion of measured performance data to specified test conditions for compressors with intermediate pressure port .....</b>	<b>36</b>
	<b>Annex B (informative) Estimation of errors .....</b>	<b>39</b>
	<b>Bibliography .....</b>	<b>42</b>

## 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)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 86, *Refrigeration and air-conditioning*, Subcommittee SC 4, *Testing and rating of refrigerant compressors*.

This first edition of ISO 18976 is a technical revision of ISO 917:1989, which was withdrawn in 2015.

The main changes are as follows:

- addition of two stage and economized compressors;
- [Clause 2](#) was updated;
- [Clause 3](#) was updated, additional terms defined because of, for example, refrigerant blends with temperature glide;
- addition of the new [Clause 4](#) “Uncertainty of measurement and test conditions”;
- deletion of the list of measuring devices;
- extraction of calibration of calorimetric methods into a separate clause;
- addition of transcritical application;
- addition of test requirements for inverter driven compressors;
- addition of cyclic capacity control;
- reference point numbering, symbols and indexes revised to allow for economised compressors and to simplify formulae;
- former [Annex B](#) regarding the list of symbols was moved under [Clause 3](#);
- the text content of former Annex C was revised and is now [Annex B](#) “Estimation of errors”;
- document was editorially revised.

## ISO/FDIS 18976:2025(en)

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).

# iTeh Standards (<https://standards.iteh.ai>) Document Preview

ISO/FDIS 18976

<https://standards.iteh.ai/catalog/standards/iso/2c9a642c-d6d4-49de-87f4-870526744a1f/iso-fdis-18976>

# Testing of refrigerant compressors

## 1 Scope

This document applies to single stage, two stage and economised refrigerant compressors. Selected test methods are described for the determination of the refrigerating capacity, the power input, the isentropic efficiency and where possible the volumetric efficiency. These test methods provide results of sufficient accuracy to permit consideration of the suitability of a refrigerant compressor to operate satisfactorily under any set of basic test conditions required for a given application.

NOTE Tests on complete refrigeration installations are dealt with in ISO 916.

## 2 Normative references

There are no normative references in this document.

## 3 Terms, definitions and symbols

For the purposes of this document, the following terms and definitions apply.

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

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

### 3.1 Terms and definitions

#### 3.1.1 refrigerating capacity

$Q$

product of the refrigerant mass flow at the compressor inlet port and the difference between the specific refrigerant enthalpy at the compressor inlet port and the specific enthalpy of fluid entering the evaporator expansion device

#### 3.1.2 subcooling

difference between the bubble point temperature of the refrigerant corresponding to its pressure and the temperature of the liquid refrigerant

#### 3.1.3 power input

$P$

power demand to drive the compressor

Note 1 to entry: The determination of the power input is specified in [Clause 7](#).

#### 3.1.4 coefficient of performance

$COP_R$

ratio of the refrigerating capacity to the power input

Note 1 to entry: Both, refrigerating capacity and power input are at the specified test condition.