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INTERNATIONAL STANDARD

colour inside

AMENDMENT 1

Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors

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Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

This amendment has been prepared by sub-committee 61C: Safety of refrigeration appliances for household and commercial use, of IEC technical committee 61: Safety of household and similar electrical appliances.

The text of this amendment is based on the following documents:

FDIS	Report on voting
61C/597/FDIS	61C/603/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

The contents of the corrigendum of June 2015 have been included in this copy.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Delete the ninth paragraph.

1 Scope

Add the following new paragraphs before Note 101:

This standard also covers

– multi-speed **motor-compressors**, that are **motor-compressors**, the speed of which can be set to different values;
– variable capacity **motor-compressors**, that are **motor-compressors** where the capacity of the compressor is controlled at fixed speeds.

2 Normative references

Replace "This clause of Part 1 is applicable." *by "This clause of Part 1 is applicable except as follows.*

Addition:"

IEC 60079-15:2010, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60851-4, *Methods of test for winding wires – Part 4: Chemical properties*

IEC 60851-5:2008, *Winding wires – Test methods – Part 5: Electrical properties*

ISO 7010, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

3 Terms and definitions

3.107 *Replace Note 1 to entry by the following:*

Note 1 to entry: For the purpose of this standard, the following classifications of application categories are made relative to the evaporation temperature range:

– low back pressure (LBP): denotes an evaporation temperature range from –35 °C to –15 °C;
– medium back pressure (MBP): denotes an evaporation temperature range from –20 °C to 0 °C;
– high back pressure (HBP): denotes an evaporation temperature range from –5 °C to +15 °C.

Add the following new definition:

3.111
two-stage motor-compressor
motor-compressor comprising two compressors and one motor in a single **housing**

5 General conditions for the tests

Add the following new subclause:

5.103 *For cascade systems comprising two or more motor-compressor circuits, each* ***motor-compressor*** *circuit is tested separately in the end product. IEC 60335-2-34 is not applicable for the system but each* ***motor-compressor*** *can be tested according to this standard.*

6 Classification

6.101 *Delete the third paragraph.*

Add the following new subclause:

6.105 Motor-compressors using refrigerant R744 shall be classified as used in a **transcritical refrigeration system** or in a non-**transcritical refrigeration system**.

Compliance is checked by inspection and by the relevant tests.

7 Markings and instructions

Add the following:

7.1 *Addition:*

Motor-compressors suitable for use with a flammable refrigerant shall be marked with symbol ISO 7010 W021.

7.6 *Addition:*

Symbol ISO 7010 W021 Warning; flammable materials

Add the following new subclause:

7.101 Refrigerants that can be used with the **motor-compressor** shall be listed in the instructions.

Compliance is checked by inspection.

22 Construction

22.7 *Add the following as a new second dashed item to the second paragraph of the test specification:*

– *for R-744 non-**transcritical refrigeration systems**, a minimum of 3,5 times the saturated vapour pressure of the refrigerant at 27 °C, rounded up to the next 0,5 MPa (5 bar).*

Add the following after the existing second dashed as a new dashed item to the second paragraph of the test specification:

– *if the **motor-compressor** employs a bypass valve, a minimum of 3 times the maximum high side pressure, but not less than the minimum test pressure as required in Table 101.*

*In the third paragraph of the test specification beginning "*The test values for some refrigerants are given in Table 101" *change the style to italic font.*

Add the following as a last entry to Table 101:

Non-transcritical CO_2	R-744	23,0	(230)

Add the following as new paragraphs immediately before Note 102:

*A **housing** which is exposed only to low side pressure in R-744 non-**transcritical refrigeration systems** shall be subjected to a pressure equal to a minimum of 5 times the saturated vapor pressure of the refrigerant at − 6,5 °C or equal to 13,5 MPa (135 bar), whichever is higher, rounded up to the next 0,2 MPa (2 bar).*

*A **housing** which is exposed only to low side pressure in **transcritical refrigeration systems** shall be subjected to a pressure equal to a minimum of 5 times the **design pressure** but not less than the minimum test pressure as required by Table 102.*

*For a **motor-compressor** employing a bypass valve, the **housing** which is exposed only to low side pressure shall be subjected to a pressure equal to 3 times the maximum low side pressure, but not less than the minimum test pressure as required in Table 102.*

*In the existing fifth paragraph of the test specification beginning "*The test values for some refrigerants are given in Table 102" *change the style to italic font.*

Add the following as a last entry to Table 102:

Non-transcritical CO_2	R-744	14,0	(140)

22.9 *Replace Note 101 by the following*:

*For the types of refrigerant and types of oil for which the **motor-compressor** is intended to be used, compliance of winding wire insulation shall be checked by the tests detailed in Annex BB or **motor-compressors** that do not use oil by test 16 in IEC 60851-4 for resistance to refrigerants.*

For test 16 in IEC 60851-4, the percentage of extractable matter shall not exceed 0,5 %. The breakdown voltage shall be at least 75 % of the minimum specified value.

*For the types of refrigerant and types of oil for which the **motor-compressor** is intended to be used, compliance of tie cords and insulation materials other than winding wire insulation shall be checked by the tests detailed in Annex CC.*

24 Components

Add the following new subclause:

24.101 In **motor-compressors** that employ flammable refrigerants, components that may arc or spark during **normal operation** of the end product shall comply with the requirements of IEC 60079-15, as modified by Annex DD, for group IIA gases or the refrigerant used. This requirement is not applicable to components within the **housing**.

Compliance is checked by inspection and the appropriate tests of IEC 60079-15.

Annex AA – Running overload tests for motor-compressors classified as tested with Annex AA

AA.1 *Add the following to the end of the first paragraph:*

Excluding starting current, the maximum value of the current averaged over any 5 min period is recorded. The interval between current measurements shall not exceed 30 s. The starting current is considered to be excluded if the first current measurement is made approximately 1 min after starting.

NOTE 1 The current is recorded to aid in checking reproducibility of test results.

Renumber existing Notes 1 to 6 as Notes 2 to 7.

AA.2 *Add the following to the first paragraph as a new second sentence:*

However, for R-744 refrigerant intended for use in a ***transcritical refrigeration system****, for all tests the maximum operating discharge pressure is 12 MPa and the return gas temperature is +25 °C.*

Table AA.1 – Substitute refrigeration circuit conditions for operating under running overload conditions

Replace the fourth column by the following:

Evaporation temperature °C
–15
–15
0
0
+15
+15
–15
–15
0
0
+15
+15
–15
–15
0
0
+15
+15

Add a new row at the bottom of the table as follows:

NOTE For R-744 refrigerant intended for use in a non-**transcritical refrigeration system**, for all tests the evaporation temperature is –15 ºC, the condensation temperature is +20 ºC , the **motor compressor** ambient temperature is +43 ºC and the return gas temperature is +2 ºC.

AA.4 *Add the following to the first paragraph as a new second sentence:*

*However, for R-744 refrigerant intended for use in a **transcritical refrigeration system**, for all tests the maximum operating discharge pressure is 12 MPa and for tests 4 and 6 the return gas temperature is +25 °C.*

Replace the text of the second paragraph first dashed item by the following:

– *the temperature rises of the **motor-compressor control system** and the **motor-compressor protection system** containing **electronic components** are measured and shall not exceed the values given in Table 3 of Part 1, reduced by 7 K*;

Table AA.2 – Substitute refrigeration circuit conditions for operating under maximum and minimum load conditions

Replace the fourth column by the following:

Evaporation temperature
°C
–15
–35
–15
–35
0
–20
0
–20
+15
–5
+15
–5

AA.5 *Replace the first sentence of the third paragraph by the following:*

For refrigerants other than R-744, the condensing temperature is then increased in steps of 5 K until steady conditions are reached at each step.

Add the following as a new fourth paragraph:

For R-744 refrigerant, the operating discharge pressure is then increased in steps of 0,8 MPa until steady conditions are reached at each step. This procedure is continued until one of the following conditions occurs:

– *the **motor-compressor protective electronic circuit** operates to disconnect the **motor-compressor** from the supply;*

– *the **motor-compressor** stalls and steady conditions are reached*

Replace the text of the first paragraph of the Note by the following:

The resistance of the windings at the end of the test can be determined by taking resistance measurements as soon as possible after switching off, and then at short intervals so that a curve of resistance against time can be plotted for ascertaining the resistance at the instant of switching off.

Figure AA.1 – Substitute refrigeration circuit

In the second sentence of Note 3, change “may” to “can”.