DIN EN 12693:2026-11 (E)

Refrigerating systems and heat pumps - Safety and environmental requirements - Positive displacement refrigerant compressors

Contents

Page

European foreword 5

Introduction 6

1 Scope 7

2 Normative references 8

3 Terms, definitions and symbols 10
3.1 Terms and definitions 10
3.2 Symbols 11

4 List of significant hazards 14

5 Safety requirements and/or protective measures 16
5.1 General 16
5.2 Protection of moving parts 16
5.3 Safety to prevent loss of stability 16
5.4 Safety during handling 16
5.5 Safety to prevent rupture or bursting 16
5.5.1 General 16
5.5.2 Pressure requirements 16
5.5.3 Design and materials 17
5.5.4 Sight glasses 18
5.5.5 Application of pressure relief devices 18
5.6 Vibrations 19
5.7 Electrical safety 19
5.7.1 General 19
5.7.2 Classification 19
5.7.3 Determination of current ratings 19
5.7.4 Protection against access to live parts 20
5.7.5 Connecting devices 20
5.7.6 Provisions for earthing 20
5.7.7 Internal wiring 20
5.7.8 High potential test 21
5.7.9 Insulating materials 21
5.7.10 Motor compressors protection devices 21
5.8 Measures to reduce emissions of substances in case of maintenance and decommissioning 21

6 Verification of safety requirements and/or protective measures 22
6.1 General 22
6.2 Type test 22
6.2.1 General 22
6.2.2 Strength test 22
6.2.3 Pressure relief device 23
6.2.4 Verification of electrical safety 23
6.2.5 Lifting points 24
6.3 Individual test 24
6.3.1 General 24
6.3.2 Strength test 24

6.3.3 Test for tightness 25
6.3.4 Verification of electrical safety 25

7 Marking, graphical symbols, written warnings 26
7.1 General 26
7.2 Marking 26
7.3 Graphical symbols, written warnings and information 27
7.3.1 Lifting points 27
7.3.2 Pressurizing the housing 27
7.3.3 Lubricant charge 27

8 Appropriate manufacturing procedures 27

9 Documentation and information for the user 28
9.1 General 28
9.2 Instruction handbook 28

Annex A (normative) Procedure for the design of a refrigerant compressor by calculation 29

A.1 Calculation method 29
A.2 Design stress to be used for the calculation 30

Annex B (normative) Experimental design method for refrigerant compressors 33

B.1 Experimental design method 33
B.2 Determination of maximum allowable design test pressure PF 34
B.3 Determination of the minimum burst test pressure PTest 35
B.4 Correction for the actual wall thickness 36

Annex C (normative) Determination of the allowable pressure at the maximum operating temperature 38

C.1 Relation of the allowable pressure and higher temperatures 38
C.2 Determination of the maximum allowable pressure at higher temperatures 38

Annex D (normative) Determination of the allowable pressure at minimum operating temperature -- Requirements to avoid brittle fracture 39

D.1 Relation of the allowable pressure and lower temperatures 39
D.2 Determination of the maximum allowable pressure at the minimum operating temperature 40
D.3 Determination of the maximum allowable pressure at the minimum operating temperature on the basis of an empirical method (tmin-Method) 40
D.4 Determination of the minimum operating temperature TSmin based on reference thickness eB 42
D.5 Determination of screws, fasteners, nuts and bolts below -10 °C 55

Annex E (informative) Compilation of material characteristics of often used materials 57

Annex F (informative) Basic design criteria for refrigerant compressors 81

F.1 General 81
F.2 Compressor capability against technical performance 81
F.3 Compressor capability against user requirements 81

Annex G (normative) Grouping system for materials 83

G.1 Grouping system for steels 83
G.2 Grouping system for aluminium and aluminium alloys 84
G.3 Grouping system for copper and copper alloys 85
G.4 Grouping system for titanium 85
G.5 Grouping system for cast irons 85

Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered 86

Bibliography 88