DIN EN 15502-1:2012-10 (E)

Gas-fired heating boilers - Part 1: General requirements and tests

Contents

Page

Foreword 5

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms, definitions and symbols 9
3.1 Terms and definitions 9
3.2 Symbols 19

4 Classification 20
4.1 Gases and categories 20
4.2 Mode of air supply and evacuation of the combustion products 20
4.3 Maximum water-side operating pressure 20

5 Construction 20
5.1 General 20
5.2 Conversion to different gases 20
5.3 Materials 21
5.4 Method of construction 23
5.5 Burners 27
5.6 Pressure test points 28
5.7 Requirements for the application of control and safety devices 28

6 Electrical safety 35

7 Controls 35
7.1 General 35
7.2 Detailed specifications 35
7.3 Thermostats and water temperature limiting devices 36

8 Operational requirements 40
8.1 General 40
8.2 Soundness 45
8.3 Hydraulic resistance 47
8.4 Heat inputs and heat output 47
8.5 Limiting temperatures 51
8.6 Ignition, cross lighting, flame stability 53
8.7 Reduction of the gas pressure 55
8.8 Defective closure of the gas valve immediately upstream of the main burner 56
8.9 Pre-purge 56
8.10 Functioning of a permanent ignition burner when the fan stops during the standby time 56
8.11 Adjustment, control and safety devices 56
8.12 Carbon monoxide 68
8.13 NOx 72
8.14 Special provisions for boilers intended to be installed in a partially protected place 76
8.15 Formation of condensate 76
8.16 Temperature of combustion products 76

9 Useful efficiencies 77

9.1 General ... 77
9.2 Useful efficiency at the nominal heat input ... 77
9.3 Useful efficiency at part load ... 79
9.4 Losses of combination boilers ... 85

10 Electric auxiliary energy ... 88
10.1 General ... 88
10.2 System boundaries ... 88
10.3 Auxiliary energy at nominal heat input ... 88
10.4 Auxiliary energy at part load ... 89
10.5 Auxiliary energy at stand-by ... 89

11 Risk assessment ... 89

12 Marking and instructions ... 90
12.1 Boiler marking ... 90
12.2 Instructions ... 91
12.3 Presentation ... 95
12.4 Supplementary marking and instructions in the case of boilers to be installed in partially protected places ... 95

Annex A (informative) Properties of carbon and stainless steels ... 102

Annex B (normative) Minimum requirements for cast iron ... 103

Annex C (normative) Parts in aluminium and aluminium alloys ... 104

Annex D (normative) Parts in copper or copper alloys ... 105

Annex E (normative) Minimum thicknesses for rolled parts ... 106

Annex F (normative) Nominal minimum thicknesses of boiler sections of cast materials under water pressure ... 107

Annex G (normative) Parameters for welded joints and welding processes ... 108

Annex H (informative) Composition of the gas circuit ... 113

Annex I (informative) Compilation of the test conditions for the various gas families ... 122

Annex J (informative) Calculation of conversions of NOx ... 124

Annex K (informative) Example of calculation of the weighting factors NOx ... 125

Annex L (informative) Practical method of calibrating the test rig to enable the heat loss Dp to be determined ... 127

Annex M (informative) Means of determining the ignition time at full rate ... 128

Annex N (informative) Determination of the heat losses from the test rig of the indirect method and the contributions of the circulating pump of the test rig ... 129

Annex O (informative) Example of a risk assessment method ... 130

Annex P (informative) Examples of risk assessment with a method described in Annex O133
Annex Q (informative) Realisation of a protective measure ... 137

Annex R (informative) Overall classification of a basic risk ... 139

Annex S (informative) Not exhaustive list of classification examples ... 142

Annex T (normative) Correction for the determined efficiency in the low water temperature test of low temperature boilers (LTB) and condensing boilers (CB) 144

Annex U (informative) Use of test gases 145

Annex V (informative) Standards intended to be replaced by this standard in combination with the relevant part 2 146

Annex W (informative) Alternative Method for the determination of the nominal heat input or the maximum and minimum heat input (according to 8.4.1) for appliances using a pneumatic gas/air ratio control system 147

Annex ZA (informative) Clauses of this European tandard addressing essential requirements or provisions of EU Directive 2009/142/EC, "Directive relating to appliances burning gaseous fuels (codified version)" (GAD) 148

Annex ZB Clauses of this European Standard addressing the methods for the verification of the efficiency of the EU Directive 92/42/EEC, relating to the efficiency of new hot boilers with an output of 4 - 400 kW 151

Bibliography 152