DIN EN 1982:2024-12 (E)

Copper and copper alloys - Ingots and castings

Contents

Page

European foreword 5

Introduction 6

1 Scope 9

2 Normative references 9

3 Terms and definitions 9

4 Designations 10
4.1 Material 10
4.1.1 General 10
4.1.2 Symbol 11
4.1.3 Number 11
4.2 Casting process 11
4.3 Product 11

5 Ordering information 12

6 Requirements 13
6.1 Composition 13
6.2 Mechanical properties 14
6.2.1 Ingots 14
6.2.2 Castings 14
6.3 Electrical properties 14
6.4 Microstructure and grain size 14
6.5 Dezincification resistance 15
6.6 Outer and inner conditions 15
6.6.1 Ingots 15
6.6.2 Castings 15

7 Sampling and testing frequency 15
7.1 General 15
7.2 Analysis of the chemical composition 15
7.2.1 General 15
7.2.2 Ingots 15
7.2.3 Castings 16
7.3 Mechanical tests 16
7.3.1 Mechanical testing of ingots 16
7.3.2 Mechanical testing of continuous castings 16
7.3.3 Mechanical testing of non-continuous castings 16
7.4 Microstructure 17
7.4.1 Alpha-phase content 17
7.4.2 Assessment of grain refinement 17
7.5 Dezincification resistance 17

8 Test methods 17
8.1 Analysis of the chemical composition 17
8.2 Mechanical tests 17
8.2.1 Tensile test 17
8.2.2 Preparation of tensile test samples 17

8.2.3 Hardness test ... 18
8.3 Electrical conductivity ... 18
8.4 Microstructure ... 18
8.4.1 Alpha-phase determination ... 18
8.4.2 Grain size determination ... 18
8.5 Dezincification resistance ... 19
8.6 Surface condition ... 19
8.7 Retests ... 19
8.7.1 General ... 19
8.7.2 Analysis of the chemical composition ... 19
8.7.3 Mechanical tests ... 19
8.7.4 Dezincification resistance test ... 19
8.8 Rounding of results ... 19

9 Certificate of compliance and inspection documentation ... 20
9.1 Certificate of compliance ... 20
9.2 Inspection documentation ... 20

10 Marking, labelling ... 20
10.1 Ingots ... 20
10.2 Castings ... 20

Annex A (informative) Guidance for the ordering and supply of copper alloy castings ... 21

A.1 General ... 21
A.2 Drawings ... 21
A.3 Patterns ... 21
A.4 Tolerances ... 21
A.5 Machining allowances ... 21
A.6 Heat treatment ... 22
A.7 Preliminary sample ... 22
A.8 Finishing welding ... 22
A.9 Fabrication welding ... 22

Annex B (informative) Optional supplementary testing procedures for ingots and castings ... 23

B.1 Introduction ... 23
B.2 Analysis of the chemical composition ... 23
B.3 Tensile testing of ingots and castings ... 23
B.3.1 Ingots ... 23
B.3.2 Castings ... 24
B.4 Electrical conductivity testing of Cu-C (CC040A) and CuCr1-C (CC140C) castings ... 24
B.5 Proof machining ... 24
B.6 Pressure testing ... 24
B.7 Liquid penetrant testing ... 25
B.8 Radiographic testing ... 25

Annex C (normative) Unalloyed copper ... 26

Annex D (normative) Copper-chromium alloys ... 27

Annex E (normative) Copper-zinc alloys ... 28

Annex F (normative) Copper-zinc-aluminium-alloys ... 29

Annex G (normative) Copper-zinc-lead alloys ... 32

Annex H (normative) Copper-zinc-silicon alloys ... 37

Annex I (normative) Other copper-zinc alloys ... 39

Annex J (normative) Copper-tin alloys ... 42

Annex K (normative) Copper-tin-zinc-lead alloys 47

Annex L (normative) Copper-tin-zinc-phosphorous-sulfur alloys 50

Annex M (normative) Copper-tin-lead alloys 52

Annex N (normative) Copper-aluminium alloys 55

Annex O (normative) Copper-manganese alloys 58

Annex P (normative) Copper-nickel alloys 59

Annex Q (normative) Copper-silicon-zinc alloys 62

Annex ZA (informative) Relationship between this European Standard and the Essential Safety Requirements of Directive 2014/68/EU aimed to be covered 65

Bibliography 66