DIN EN 12420:2024-12 (E)

Copper and copper alloys - Forgings

Contents

Page

European foreword 4

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 7

4 Designations 8
4.1 Material 8
4.1.1 General 8
4.1.2 Symbol 8
4.1.3 Number 8
4.2 Material condition 8
4.3 Product 9

5 Ordering information 10

6 Requirements 11
6.1 Composition 11
6.2 Mechanical properties 11
6.2.1 Hardness properties 11
6.2.2 Tensile properties 11
6.3 Electrical properties 11
6.4 Resistance to dezincification 11
6.5 Residual stress level 11
6.6 Tolerances for die forgings 12
6.6.1 General 12
6.6.2 Tolerances for dimensions within the die cavity and for dimensions across the die parting line 13
6.6.3 Mismatch 13
6.6.4 Flash projection 14
6.6.5 Ejector marks 15
6.6.6 Flatness tolerances 15
6.6.7 Angular tolerances 16
6.7 Tolerances for cored forgings 16
6.8 Tolerances for hand forgings 18
6.8.1 General 18
6.8.2 Tolerances on dimensions 18
6.8.3 Flatness tolerance 19
6.8.4 Surface quality 19
6.8.5 Drawings 19

7 Sampling 19
7.1 General 19
7.2 Analysis 19
7.3 Hardness, stress corrosion resistance, dezincification resistance and electrical property tests 20

8 Test methods 20

8.1 Analysis 20
8.2 Hardness test 20
8.3 Electrical conductivity test 20
8.4 Dezincification resistance test 20
8.5 Stress corrosion resistance test 20
8.6 Retests 21
8.6.1 Analysis, hardness, electrical conductivity and dezincification resistance tests 21
8.6.2 Stress corrosion resistance test 21
8.7 Rounding of results 21

9 Certificate of compliance and inspection documentation 21
9.1 Certificate of compliance 21
9.2 Inspection documentation 21

10 Marking, labelling, packaging 22

Annex A (informative) Recommended guidelines for design 41

A.1 Introduction 41
A.2 General information 41
A.3 Guidelines for die forgings 42
A.3.1 Drafts 42
A.3.2 Web thicknesses 42
A.3.3 Side wall thicknesses 43
A.3.4 Rib design 44
A.3.5 Cores 45
A.3.6 Flash 46
A.3.7 Transition radii 47
A.3.8 Clamping lengths and clamping areas for finish machining 49
A.3.9 Design for cross-sectional shapes 49
A.3.10 Recommended machining allowances and total allowances 50
A.4 Guidelines for hand forgings 52
A.4.1 General 52
A.4.2 General information 52
A.4.3 Section changes and transitions 53
A.4.4 Recommended machining allowances 53
A.4.5 Total allowances per side of forging 54
A.5 Guidelines for marking 55

Annex B (informative) Tensile properties 56

Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU (Pressure equipment Directive) aimed to be covered 60

Bibliography 61