DIN EN ISO 15614-8:2016-11 (E)

Specification and qualification of welding procedures for metallic materials - Welding proc edure test - Part 8: Welding of tubes to tube-plate joints (ISO 15614-8:2016)

Contents

Page

European foreword 4

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC -- Pressure Equipment 5

Foreword 6

Introduction 8

1 Scope 9

2 Normative references 9

3 Terms and definitions 10

4 Symbols and abbreviated terms 10

5 Preliminary welding procedure specification (pWPS) 11
5.1 General 11
5.2 Parameters for all welding process 11
5.3 Parameters for particular welding processes 12

6 Qualification of welding procedure 13

7 Welding of test pieces 13
7.1 General 13
7.2 Type of test piece 13
7.2.1 Joint preparation and joint construction 13
7.2.2 Tube ends welded on triangular pitch 13
7.2.3 Tube ends welded on square pitch 14

8 Examination and testing 15
8.1 Performance 15
8.1.1 General 15
8.1.2 Visual testing 15
8.1.3 Penetrant testing 16
8.1.4 Radiographic testing 16
8.1.5 Macroscopic examination 16
8.1.6 Hardness test 16
8.1.7 Push-out or pull-out test 16
8.2 Acceptance levels 17
8.2.1 General 17
8.2.2 Visual testing 17
8.2.3 Penetrant testing 17
8.2.4 Radiographic testing 17
8.2.5 Macroscopic examination 18
8.2.6 Hardness values 18
8.2.7 Push-out or pull-out load 18
8.3 Re-test 18

9 Range of qualification 19

9.1 General 19
9.2 Related to the manufacturer 19
9.3 Related to the material 19
9.3.1 Parent metal 19
9.3.2 Tube-plate and tube dimensions 19
9.3.3 Tube pitch 19
9.4 Common to all welding procedures 19
9.4.1 Welding process 19
9.4.2 Welding position of tube-plate 19
9.4.3 Type of joint 19
9.4.4 Filler metal, classification 20
9.4.5 Filler metal, dimensions 20
9.4.6 Type of current 20
9.4.7 Arc energy (heat input) 20
9.4.8 Pre-heat temperature 20
9.4.9 Interpass temperature 20
9.4.10 Post-weld heat treatment 20
9.4.11 Shielding gas 20

10 Welding procedure qualification record form (WPQR) 20

Annex A (informative) Welding procedure qualification record form for tube to tube-plate joints (WPQR) 22

Bibliography 26