

# DIN EN ISO 15614-1:2020-05 (E)

**Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017 + Amd 1:2019) (includes Amendment A1:2019)**

## Contents

	Page
European foreword .....	4
[A1] European foreword to Amendment 1[A1] .....	5
[A1] Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU (PED) [A1] .....	6
[A1] Annex ZB (informative) Relationship between this International Standard and the Essential Requirements of EU Directive 2014/29/EU (SPVD) [A1] .....	7
Foreword .....	8
[A1] Foreword to Amendment 1[A1] .....	9
Introduction .....	10
1 Scope .....	11
2 Normative references .....	12
3 Terms and definitions .....	13
4 Preliminary welding procedure specification (pWPS) .....	13
5 Welding procedure test .....	13
6 Test piece .....	13
6.1 General .....	13
6.2 Shape and dimensions of test pieces .....	14
6.2.1 General .....	14
6.2.2 Butt joint in plate with full penetration .....	14
6.2.3 Butt joint in pipe with full penetration .....	14
6.2.4 T-joint .....	14
6.2.5 Branch connection .....	14
6.3 Welding of test pieces .....	14
7 Examination and testing .....	18
7.1 Type and extent of testing .....	18
7.2 Location and taking of test specimens .....	19
7.3 Non-destructive testing .....	23
7.4 Destructive testing .....	23
7.4.1 Transverse tensile test .....	23
7.4.2 Bend test .....	23
7.4.3 Macroscopic examination .....	23
7.4.4 Impact testing .....	24
7.4.5 Hardness testing .....	24
7.5 Acceptance levels .....	25
7.6 Re-testing .....	26
8 Range of qualification .....	26
8.1 General .....	26
8.2 Related to the manufacturer .....	26
8.3 Related to the parent material .....	27
8.3.1 Parent material grouping .....	27
8.3.2 Material thickness .....	29

8.3.3	Diameter of pipes and branch connections .....	31
8.3.4	Angle of branch connection.....	31
8.4	Common to all welding procedures.....	32
8.4.1	Welding processes.....	32
8.4.2	Welding positions.....	32
8.4.3	Type of joint/weld.....	33
8.4.4	Filler material, manufacturer/trade name, designation.....	34
8.4.5	Filler material size.....	34
8.4.6	Type of current.....	35
8.4.7	Heat input (arc energy).....	35
8.4.8	Preheat temperature .....	35
8.4.9	Interpass temperature .....	35
8.4.10	Post-heating for hydrogen release.....	36
8.4.11	Heat-treatment.....	36
8.5	Specific to processes .....	36
8.5.1	Submerged arc welding (process 12).....	36
8.5.2	Gas-shielded metal arc welding (process 13).....	37
8.5.3	Gas-shielded arc welding with non-consumable electrode (process 14).....	38
8.5.4	Plasma arc welding (process 15).....	38
8.5.5	Oxy-acetylene welding (process 311).....	38
8.5.6	Backing gas .....	39
<b>9</b>	<b>Welding procedure qualification record (WPQR).....</b>	<b>39</b>
<b>Annex A</b> (normative)	<b>Filler material, designation .....</b>	<b>40</b>
<b>Annex B</b> (informative)	<b>Welding procedure qualification record form (WPQR) .....</b>	<b>42</b>
<b>Bibliography .....</b>		<b>46</b>