WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

Welding procedure qualification - Test certificate

3 Manufacturer's Welding Procedure Specification — Inspection Company : **SGS Italia S.p.A.**
4 Reference No. : **WPS HPS 01/20** — Reference No. : **WPQR.PED.5639**

5 Manufacturer : **H.P.S. SRL**

6 Address : **Via Europa S.N. 24040-Comun Nuovo - (BG)**

7 Code : Testing Standard : **UNI EN ISO 15614-8 : 2016 + CUSTOMER REQUEST**

8 Date of Welding : **29.01.2020**

9 **Range of qualification**

Test piece

Product form : **Tubes to tube**

10 Welding Process :

	No. 1	No. 2	No. 3
Process	142 Mech orbital		

11 Joint Type : **Tubes to Tube**

12 Parent Metal Group(s) and Sub-groups(s): **Group 8 (CR ISO 15608 Subgroup 8.1)**
Qualfied groups : 8.1

13 Parent Material Thickness (mm) : **Tube :** 1,5 — **Cladding:** **N.A.** — **Tube: 0,75 ÷ 3,00**

14 Pipe Outside Diameter (mm) : **40** — **≥ 20**

15 Filler Metal Type/Designation : **N.A.**
Filler material make : **N.A.**
16 Shielding Gas / Flux : **EN 14175 : I 1 (Ar 99,99%)**

17 Type of Welding Current/Polarity : **DC EN**
18 Welding Position : **PH-PJ Up-Downward**

19 Preheat Temperature : **≥ 10°C** — Interpass Temperature: **< 150 °C**

20 Post Weld Heat Treatment and / or Ageing : **N.A.**
Branch connection angle alfa: **N.A.**

21 Other Information : **Heat Input : ± 25%**
Welding Machine : AXXAIR SAXX 200 + SATF-115NDHX
Jigging : KATEX-MECHANICAL

(*) Note: Level 2 satisfies Level 1 requirements.

22 We confirm that the statemnts in this record are correct and that the test pieces were prepared, welded,tested and have fulfilled the requirements in accordance with ISO 15614-1

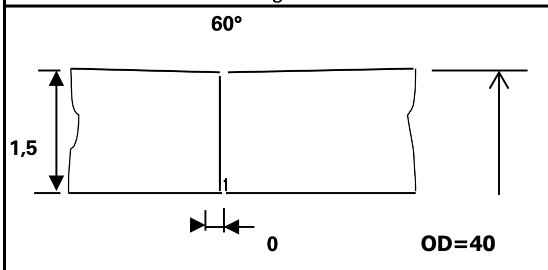
Notified Body N° **1381**

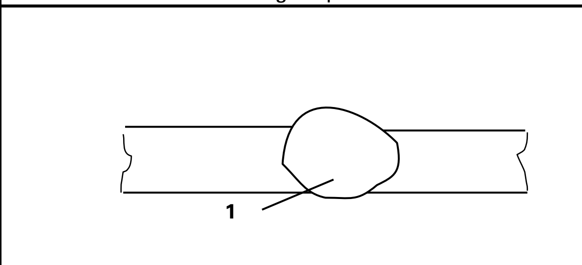
23 Location : **Malcontenta (VE)** — Date of Issue : **20.03.2020** — Name and Signature: **Nogarin M.**

DETAILS OF WELD TEST
Record of weld test

3 Manufacturer's Welding Procedure Specification — Inspection Company : **SGS Italia S.p.A.**
4 Reference No. : **WPS HPS 01/20** — Reference No. : **WPQR.PED.5639**
5 Manufacturer : **H.P.S. SRL** — Date of Welding : **29.01.2020**
6 Location : **Workshop**
7 Preparation and Cleaning : **Machining & Solvent**
8 Welder's Name : **DE PASQUALE DOMENICO**
9 Parent Metal Specification : **ASME SA 240 Tp 304L (tube)**
ASME SA 240 Tp 304L (tube)
10 Welding Process : **142 Mechanized** — Parent Material Thickness (mm) : **1,5**
11 Joint Type : **Tube to tube** — Pipe Outside Diameter (mm) : **40,0**
12 Weld Preparation Details (Sketch) — Welding Position : **PH-PJ Up-Downward**

13 Joint Design | Welding Sequences





14 Welding Details

15

Run	Process	Size of Filler Metal mm	Current Min. / Max. A	Voltage V	Type of Current / Polarity	Wire Feed Speed cm/min.	Travel Speed mm/min.	Heat Input * J/mm.	Run Out x Unit Length
1st pass									
1/1 (110°)	**142**		**70 - 70**	**11**	**DC EN**	**15 - 15**	**80**	**2700-2700**	
1/2 (256°)	**142**		**60 - 60**	**11**	**DC EN**	**15 - 15**	**80**	**2700-2700**	

* If required

16 Filler Metal : **N.A.**
17 Type, Designation, Tradename : **N.A.**
18 Any Special Baking or Drying : **None**
19 Gas / Flux : Shielding : **EN 14175 : I 1 (Ar 99,99%)**
Backing : **EN 14175 : I 1 (Ar 99,99%)**
20 Gas Flow Rate : Shielding : **10-12 l/min**
Backing : **6**
22 Tungsten Electrode Type / Size : **EN 6848 WT20 ; 2%THORIATED, ϕ 2,4 mm**
21,23 Details of Back Gouging / Backing **N.A. / Base material**
24 Preheat Temperature : **≥ 10° C**
25 Interpass Temperature : **< 150 °C**
26 Post Weld Heat Treatment and / or Ageing : **N.A.**
27 Time, Temperature, Method : **N.A.**
28 Heating and Cooling Rates * : **N.A.**
Branch connection angle alfa: **N.A.**

Other information * :
Cup nozzle dia. **11 mm**
Stand Off distance: **6 mm**
Pulse details : **n.a**

I ignition = 100A 1° / 70A 2°
I final 10A
Total T = 56,1 sec. 1° / 60,9 sec 2°
t pregas = 2 ec.
t final gas 2 sec
ramp up 8 sec.

Remarks :

29 The above test piece was welded in the presence of : Name and Signature: Lotito T.

1 # TEST RESULTS

3 Manufacturer's Welding Procedure Specification — Inspection Company : **SGS Italia S.p.A.**
4 Reference No. : **WPS HPS 01/20** — Reference No. : **WPQR.PED.5639**

5 Visual Examination : **Satisfactory** RP 1/341/2020 — Radiography* : **Satisfactory** RP 3/341/202(
6 Penetrant/~~Magnetic Particle~~ Test* : **Satisfactory** RP 2/341/2020 — Ultrasonic Examination* : **N.A.**
7 Pull-Out Test — Temperature : **20°C**

8	Type / No	Re N/mm²	Rm N/mm²	A % on	Z %	Fracture location	Remarks
9	Requirement						
	MIF 2847		**560**			**weld**	

10 **Bend Tests** Former Diameter :

11	Type / No	Bend Angle	Elongation*	Result
12				

Macro Examination : **13 x** **Satisfactory (n° 12)**
Micro Examination * : **400 x** **Satisfactory (weld Metal)**
Micro Examination * : **400 x** **Satisfactory (HAZ plate)**
Micro Examination * : **400 x** **Satisfactory (HAZ tube**

13 **Impact Test *** Type: Size (mm) : Requirement :

14	Notch Location/Direction	Temp. °C	Values 1	2	3	Average J	Remarks

* If required

15 **Hardness Tests *** **N.A.** — Location of Measurements (Sketch *)
16 Type / Load: **HV10**

17 Values :- Parent Metal :
18 H.A.Z. :
19 Weld Metal :

20 Other Tests : **Thickness of welding min. a= 1,50 mm. : 0,75 ÷ 3,00 mm**
chemical analysis : N.A.
ferrite content : N.A.

21 Remarks :

22 Tests Carried out in accordance with the requirements of : **UNI EN ISO 15614-8 : 2016 + CUSTOMER REQUEST**
23 Laboratory Report Reference Number : **SGS CTR RP RP 184-20**
24 Test results were acceptable :
25 Test Carried out in the presence of : Name and Signature: LOTITO T.