

# WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

## PRD-0502-21-ITA-DNV

According to rule/standard/code:	EN ISO 15614-1:2017/A1:2019
Level:	Level 2
Manufacturer:	<b>UNITEK S.r.L.</b>
Manufacturer address:	Via Satriano,43/12 80142 Angri (SA)
Place of welding test:	Angri (SA)
Manufacturer WPQR no.:	-

Range of Qualification			
Welding process(es)	1	2	3
- Process (mech. grade):	<b>141 (M)</b>	<b>136 (PM)</b>	
- Deposited metal thickness (mm):	max. 4,4	max. 13,08	
Type of joint weld:	Butt Weld; T-joint; Branch connection $\alpha \geq 60^\circ$ ; Fillet Weld; Build-up weld Single side with & without material backing; Both side		
Parent material/group/sub-group:	8-8		
Parent material thickness (mm):	3 to 17,48		
Throat thickness (mm):	No restriction		
Single layer/multi-run:	Single & Multi Layer		
Outside pipe diameter (mm):	$\geq 30,15$		
Filler material designation:	Any others with equivalent mechanical properties, same type of covering or flux core, same nominal chemical composition and the same or lower hydrogen content, according designation in the appropriate international standard.		
Filler material trade name:	No restriction	No restriction	-
Filler material size:	No restriction		
Designation of shielding gas/flux:	I1 ( $\pm$ max. 10% He; $\pm$ max. 0,1% any gas)/ C1 ( $\pm$ max. 20% CO <sub>2</sub> ; $\pm$ max. 0,1% any gas)		
Designation of backing gas:	I1 (change between I, N, R)		
Type of welding current and polarity	Same used on test		
Transfer mode:	-	-	-
Heat input:	No restriction		
Welding positions:	All positions except vertical down.		
Preheat temperature (°C):	$\geq 20$		
Interpass temperature (°C):	max. 250		
Post heating:	With and Without		
Post-weld heat-treatment:	Without (addition not permitted)		
<b>Other information:</b>	Test performed according to DNV GL Rule for Ship Classification ed.2020 Part 2, Chapter 4, Section 5. The validity of this certificate may be subject to specific approval by classification society.		
a Test piece materials in groups 1, 2, 3 and 11 qualify the equal or lower specified minimum yield strength steels (independent of the material thickness). b Test piece materials in groups 4, 5, 6, 8 and 9 qualify steels in the same sub-group and any lower sub-group within the same group. c Test piece materials in groups 7 and 10 qualify steels in the same sub-group.			

### This is to certify

That the statements in this record are correct and the welds were prepared, welded, heat treated and tested in accordance with the specified rule/standard/code above indicated.

The certificate is approved for application under Directive PED 2014/68/EU by DNV GL Business Assurance Italia S.r.l., Notified Body N°

Examiner/Inspector:

**Biagio Regio**

Place: **Vimercate (MB)**

Date: **07-05-2021**



PRD N° 003 B

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC

Signatory of EA, IAF and ILAC Mutual Recognition Agreements



for DNV Product Assurance

*Zeno Beltrami*

**Zeno Beltrami**

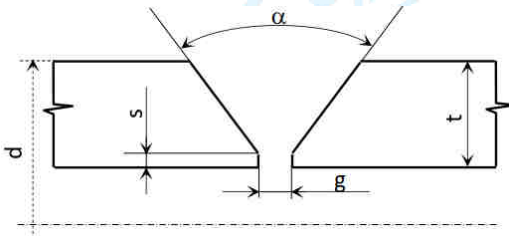
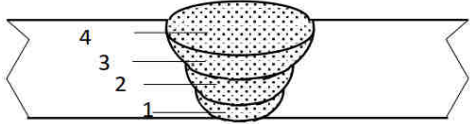
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement with DNV may render this Certificate invalid.

DNV GL Business Assurance Italia S.r.l. Via Energy Park, 14, 20871 Vimercate (MB), Italy +39 68 99 905 [www.dnv.it/assurance](http://www.dnv.it/assurance)

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Record of weld test			
<b>General information</b>			
WPS No./Rev. No.:	UNITEK 02/20 Rev.0	Joint type and weld:	Butt Weld (BW)
Welder's/operator's name:	FRANCO AVELLA	Single/Double side welding	Single side
Welding process(es):	141 + 136	Gas Backing:	I1
Welding position:	PH	Material/Flux Backing:	No backing
Method of prep./cleaning:	Machining and brushing	Single layer/multi-run:	Multi Layer
Date of test weld:	22-12-2020	Preheating temperature (°C):	20

Joint preparation (sketch) and welding details	
<b>Joint design</b> State rolling direction, if applicable  	<b>Welding sequences</b> For multiple welding process qualification, the deposited weld metal thickness shall be recorded for each filler metal and process used.  

Material specification			
Base material 1:	ASTM A312 TP 316L	Base material 2:	ASTM A312 TP 316L
Material group:	8.1	Material group:	8.1
Delivery condition:	Solution Annealed	Delivery condition:	Solution Annealed
Type of product:	Pipe	Type of product:	Pipe
Heat No:	A180078	Heat No:	A180078
Material thickness (mm):	8,74	Material thickness (mm):	8,74
Outside diameter (mm):	60,3	Outside diameter (mm):	60,3
Additional information: (e.g. C%, Ceq, Pcm)	--	Additional information: (e.g. C%, Ceq, Pcm)	--

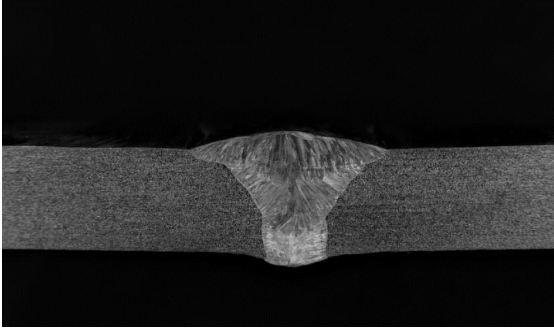
Welding consumables						
No.	Filler material		Shielding gas	Flux		DNV grade
	Manufacturer	Brand name / ISO designation		Manufacturer	Brand name / ISO designation	
1	LINCOLN ELECTRIC	CARBOROD 1A W 19 12 3 L	I1 100%			
2	LINCOLN ELECTRIC	FLUXINOX 316L PF T 19 12 3 L P C	C1 CO2 100%			
3						

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Test Results											
<b>Non-destructive testing</b>											
Test Method		Results		Reference No.		Test Method		Results		Reference No.	
Visual inspection:		Satisfactory		DNV 02 20		RT/UT:		Satisfactory		SICIL S. N° 02/20	
PT/MT:		Satisfactory		SICIL S. N° 01/20		Other test:		Not performed			
<b>Destructive testing</b>											
<b>Tensile test</b>						Test report No.:			Quality S.V. 21037B		
Specified ReH (MPa):								Specified Rm (MPa):			>490
No.	Direction	Location	Dimension	R <sub>eH</sub> (MPa)	R <sub>m</sub> (MPa)	Elongat. A (%)	Reduct. Z (%)	Test Temp.(°C)	Fracture location /character		
37B-1	T	-	8,7X12,1	-	568,1	-	-	20	Out Weld		
37B-2	T	-	8,7X12,2	-	569,1	-	-	20	Out Weld		
<b>Bend test</b>						Test report No.:			Quality S.V. 21037B		
Bend angle (°):		180				Former diameter (mm):			35		
Type	Dimension (WxTxL)		Result		Type	Dimension (WxTxL)		Result			
37B-F1	8,74X35,0		ACCEPTABLE		37B-R1	8,74X35,0		ACCEPTABLE			
37B-F2	8,74X35,0		ACCEPTABLE		37B-R2	8,74X35,0		ACCEPTABLE			
<b>Impact test</b>						Test report No.:					
Test temperature (C°):								Minimum requirement (J):			
Notch location		Direction	Position	Notch Type	Res.1 (J)	Res.2 (J)	Res.3 (J)	Aver.(J)	Remarks		
Weld metal (Root)											
Weld metal (Cap)											
Fusion line (Root)											
Fusion line (Cap)											
Fusion line + 5 mm											
Fusion line + 10 mm											
Base metal (1)											
Base metal (2)											
Note:											
<b>Hardness test</b>						Test report No.:					
Type/Load:								Location of measurements:			
Zone	Base metal (1)		HAZ (1)		Weld metal		HAZ (2)		Base metal (2)		Remarks
Row 1											
Row 2											
Row 3											
<b>Macro examination</b>						Test report No.:					
						Macro#2					
<b>Other test / Observation</b>											

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