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WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

LEVEL 2

N. 20SX00241PW 1 of 2

Manufacturer **CAUTIS JB '93 S.R.L**

WPQR No. **04P/2020** Dated **26.10.2020**

Manufacturer's welding procedure (WPS) No. **04P/2020** Dated **14.10.2020**

RANGE OF QUALIFICATION

Welding process	**135** Type **Partly mechanized**
Joint type	**Plates and Pipes and build-up Full penetration T-butt joint/FW**
Single/Multiple pass	**Multiple (Impact properties not applied)**
Parent material group(s)	**3-3, 1-1, 2-1, 2-2, 3-1, 3-2** ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174 with a specified minimum yield strength ≤ 1100 Mpa
Parent material thickness (mm)	**T Butt Joint = 3 to 24 Fillet Joint t_1 = 3 to 24 t_2 = 3 to 24**
Throat thickness (mm)	**No restriction**
Weld deposit thickness (mm)	**max. 24**
Outside pipe diameter (mm)	**Over 150 (PA-PB-PC); Over 500 (other positions)**
Filler metal make	**Solid wire OK AristoRoad 69** Nr. of wires for process 12: **N.A.**
Flux make	**N.A.** Flux Designation: **N.A.**
Filler metal designation	**Solid wire EN ISO 16834-A: G 69 4 M Mn3Ni1CrMo**
Shielding gas (ISO 14175)	**M21 with max. CO2 % = 20** Backing gas (ISO 14175) **None**
Type of welding current	**DCEP** Heat Input Kj/cm **min. 4.9**
Welding position	**All positions, vertical down excluded** Transfer Mode **Short arc first and second pass Spray, Pulse, Globular for other passes**
Preheat min. (°C)	**100** (if ISO/TR 17671-2 requirements are fulfilled)
Interpass temp. Max. (°C)	**220** Postheat min. (°C) **100 °C** Time (minutes) **N.A.**
Post weld heat treatment / Ageing	**590 °C** Time (minutes) **180 min.**
Other information	-
Welder's/Operator's name	**MIHAIL ALEXANDRU** Stamp No. **CAUTIS 01**
Welding test conducted by	**CAUTIS JB '93 S.R.L**
Mechanical test conducted by	**SC TAISCO PRODIMEX S.R.L.** Laboratory test No. **101.1.VT, 99.1.PT, 98.1.UTs / 21.10.2020; 69.1.AM, 69.1.D / 26.10.2020**
At presence of RINA Surveyor	**CRISTIAN CIUCA**

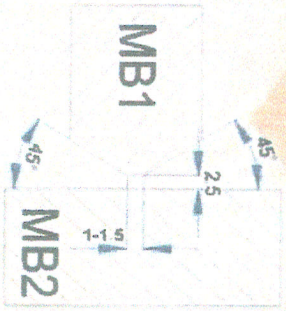
We confirm that statements in this record are correct and that the test welds were prepared, welded and tested and have fulfilled the requirements in accordance with **UNI EN ISO 15614-1: 2019** Standard

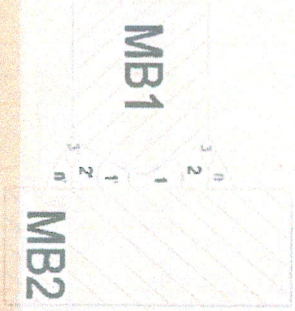
Issued at: Genova on 03 November 2020

RINA Services S.p.A.
PED No Bo 0474

RECORD OF WELD TEST

JOINT DETAILS AND WELDING SEQUENCES									
Pass No.	Process	Filler metal diam. (mm)	Amps	Volt	Type of Current/ Polarity	Travel speed (cm/min)	Heat input (kJ/cm)	Metal Transfer mode	Other
1	135	1.2	170	20	DCEP	25	6.5	Short Arc	position PB
1'	135	1.2	170	20	DCEP	25	6.5	Short Arc	position PB
2-4	135	1.2	230	25	DCEP	30	9.2	Globular	position PB
2'-4'	135	1.2	230	25	DCEP	30	9.2	Globular	position PB





PARENT MATERIAL

Material specification	STRENX 700 MC PLUS		
Type or grade	STRENX 700 MC PLUS		
Group(s)/Subgroup(s) No. (ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174)	3.1		
Thickness (mm)	12	Throat thickness (mm)	N.A.
Diameter (mm)	N.A.		
Branch connection angle	N.A.		
Other	-		

WELDING CONSUMABLES

Process	135
Trade name(s)	OK AristoRoad 69
Specification	EN ISO 16834-A
Classification / designation	G 69 4 M Mn3Ni1CrMo
Size (mm)	1.2
Deposited metal thickness	
Groove	12
Throat	N.A.
Flux trade name	N.A.
Consumable insert	N.A.
Other	-

GAS

	Gas	Mixture	Flow rate (l/min.)
Shielding	N.A.	82%Argon + 18%CO2	15
Trailing	N.A.	N.A.	N.A.
Backing	N.A.	N.A.	N.A.

POSITION

Welding position PB

Other -

PREHEAT

Preheat temperature min. 100°C

Interpass temperature max. 220°C

Postheat temperature N.A. Time N.A.

POSTWELD HEAT TREATMENT

Temperature 590°C Time 180 min.

Method Electric furnace

Other Controlled cooling from 590°C to 300°C (max. 100°C/hour)

ELECTRICAL CHARACTERISTICS

Current DCEP

Ampere (range) See table N.A. Volts (Range) See table N.A.

Mode of metal transfer Short Arc and Globular transfer

Tungsten electrode size and type N.A.

Pulse welding details N.A.

Plasmawelding details N.A.

Waveform controlled welding machine N.A. Waveform control mode N.A.

Power source - Welding mode Pulse ☐ Non pulse ☑

Other -

TECHNIQUE

Travel speed (range) See table

String or weave bead String and weave Maximum width of run N.A.

Oscillation (*) N.A. (Amplitude/Frequency/Dwell time)

Method of groove/edge preparation Machining/Grinding

Interpass cleaning Grinding/Brushing

Method of back gouging N.A.

Orifice or gas cup size 18 mm

Distance contact tube/worpiece (*) N.A.

Multiple or single pass Multiple

Multiple or single electrodes Single

Torch angle (*) N.A.

Other (*) for fully mechanized/robotic only

HARDNESS TEST determined on specimens sampled from test piece welded in PB position		
Location	Type/load	Maximum value
Parent metal(s)	HV10	293
H.A.Z.(s)	HV10	300
Weld metal	HV10	317

OTHER TEST

MACROGRAPHIC EXAMINATION	**Acceptable**
MICROGRAPHIC EXAMINATION	**Not required**

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION	**Acceptable**
RADIOGRAPHIC EXAMINATION	**Not required**
PENETRANT TEST	**Acceptable**
MAGNETIC PARTICLE	**Not required**
ULTRASONIC TEST	**Acceptable**

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PED No Bo 0474

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WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

LEVEL 2

N. 20SX00241PW 2 of 2

Manufacturer **CAUTIS JB '93 S.R.L**

WPQR No. **05P/2020** Dated **26.10.2020**

Manufacturer's welding procedure (WPS) No. **05P/2020** Dated **14.10.2020**

RANGE OF QUALIFICATION

Welding process	135	Type	Partly mechanized
Joint type	Plates and Pipes and build-up	Full penetration T-butt joint/FW	
Single/Multiple pass	Multiple	(Impact properties not applied)	
Parent material group(s)	1-1	ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174 with a specified minimum yield strength ≤ 355 Mpa	
Parent material thickness (mm)	T Butt Joint = 15 to 60	Fillet Joint t_1 = ≥5	t_2 = ≥5
Throat thickness (mm)	No restriction		
Weld deposit thickness (mm)	max. 60		
Outside pipe diameter (mm)	Over 150 (PA-PB-PC); Over 500 (other positions)		
Filler metal make	Solid wire T20/SG2	Nr. of wires for process 12: N.A.	
Flux make	N.A.	Flux Designation: N.A.	
Filler metal designation	Solid wire EN ISO 14341-A: G 42 4 M21 3Si 1		
Shielding gas (ISO 14175)	M21 with max. CO2 % = 20	Backing gas (ISO 14175) None	
Type of welding current	DCEP	Heat Input Kj/cm min. 11.3	
Welding position	All positions, vertical down excluded	Transfer Mode Spray, Pulse, Globular transfer	
Preheat min. (°C)	100 (if ISO/TR 17671-2 requirements are fulfilled)		
Interpass temp. Max. (°C)	250	Postheat min. (°C) N.A.	Time (minutes) N.A.
Post weld heat treatment / Ageing	N.A.	Time (minutes) N.A.	
Other information	-		
Welder's/Operator's name	MIHAIL ALEXANDRU	Stamp No. CAUTIS 01	
Welding test conducted by	CAUTIS JB '93 S.R.L		
Mechanical test conducted by	SC TAISCO PRODIMEX S.R.L.	Laboratory test No.	101.2.VT, 99.2.PT, 98.2.UTs / 21.10.2020; 69.2.AM, 69.2.D / 26.10.2020
At presence of RINA Surveyor	CRISTIAN CIUCA		

We confirm that statements in this record are correct and that the test welds were prepared, welded and tested and have fulfilled the requirements in accordance with UNI EN ISO 15614-1: 2019 Standard

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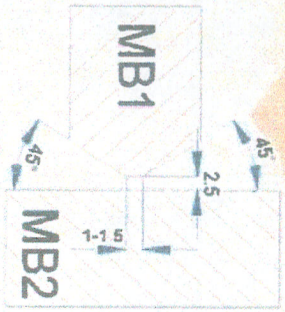
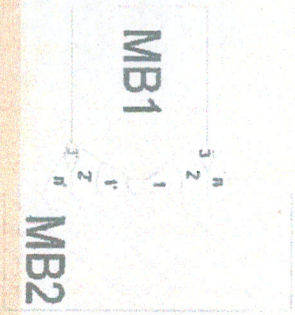
RECORD OF WELD TEST

JOINT DETAILS AND WELDING SEQUENCES									
Pass No.	Process	Filler metal diam. (mm)	Amps	Volt	Type of Current/ Polarity	Travel speed (cm/min)	Heat input (kJ/cm)	Metal Transfer mode	Other
1	135	1.2	265	33.6	DCEP	25	17.09	Spray Arc	position PB
1'	135	1.2	265	33.6	DCEP	25	17.09	Spray Arc	position PB
3-18	135	1.2	275	34.5	DCEP	30	15.05	Spray Arc	position PB
3'-18'	135	1.2	275	34.5	DCEP	30	15.05	Spray Arc	position PB





PARENT MATERIAL			
Material specification	EN 10025-2		
Type or grade	S355J2+N		
Group(s)/Subgroup(s) No. (ISO/TR 15608; ISO/TR20172; ISO/TR 20173; ISO/TR20174)	1.2		
Thickness (mm)	30	Throat thickness (mm)	N.A.
Diameter (mm)	N.A.		
Branch connection angle	N.A.		
Other	-		

WELDING CONSUMABLES	
Process	135
Trade name(s)	T20/SG2
Specification	EN ISO 14341-A
Classification / designation	G 42 4 M21 3Si 1
Size (mm)	1.2
Deposited metal thickness	
Groove	30
Throat	N.A.
Flux trade name	N.A.
Consumable insert	N.A.
Other	-

GAS

	Gas	Mixture	Flow rate (l/min.)
Shielding	N.A.	82%Argon + 18%CO2	15
Trailing	N.A.	N.A.	N.A.
Backing	N.A.	N.A.	N.A.

POSITION

Welding position PB

Other -

PREHEAT

Preheat temperature min. 100°C

Interpass temperature max. 250°C

Postheat temperature N.A. Time N.A.

POSTWELD HEAT TREATMENT

Temperature N.A. Time N.A.

Method N.A.

Other -

ELECTRICAL CHARACTERISTICS

Current DCEP

Ampere (range) See table N.A. Volts (Range) See table N.A.

Mode of metal transfer Spray Arc transfer

Tungsten electrode size and type N.A.

Pulse welding details N.A.

Plasmawelding details N.A.

Waveform controlled welding machine N.A. Waveform control mode N.A.

Power source - Welding mode Pulse ☐ Non pulse ☑

Other -

TECHNIQUE

Travel speed (range) See table

String or weave bead String and weave Maximum width of run N.A.

Oscillation (*) N.A. (Amplitude/Frequency/Dwell time)

Method of groove/edge preparation Machining/Grinding

Interpass cleaning Grinding/Brushing

Method of back gouging N.A.

Orifice or gas cup size 18 mm

Distance contact tube/worpiece (*) N.A.

Multiple or single pass Multiple

Multiple or single electrodes Single

Torch angle (*) N.A.

Other (*) for fully mechanized/robotic only

HARDNESS TEST determined on specimens sampled from test piece welded in PB position		
Location	Type/load	Maximum value
Parent metal(s)	HV10	187
H.A.Z.(s)	HV10	210
Weld metal	HV10	227

OTHER TEST

MACROGRAPHIC EXAMINATION	Acceptable
MICROGRAPHIC EXAMINATION	Not required

NON DESTRUCTIVE EXAMINATION

VISUAL EXAMINATION	Acceptable
RADIOGRAPHIC EXAMINATION	Not required
PENETRANT TEST	Acceptable
MAGNETIC PARTICLE	Not required
ULTRASONIC TEST	Acceptable

Issued at: Genova

on 03 November 2020

RINA Services S.p.A.
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WELDER APPROVAL CERTIFICATE
ACCORDING TO UNI EN ISO 9606-1:2017

No. **20SX00240PW1**

Designation	UNI EN ISO 9606-1 111 P BW FM1 B t10 PF ss nb				
Welder	MIHAIL ALEXANDRU				
Born in	CRAIOVA-ROMANIA			on	31/12/1975
Identification	1751231441522	Method of Identification	C.I.	Stamp No.	CAUTIS 01
Employed by	CAUTIS JB `93 SRL - Bucuresti (B)				

WPS used by welder during welding of test coupon: 19/2020 — Job knowledge: not tested

Welding variables	Test piece	Range of qualification
Welding process(es)	111	111
Product type	Plate	Plates and pipes
Type of weld	BW	Butt weld
Parent Metal group (ISO/TR 15608)	1.2	1 to 11
Filler material group(s)	FM1	FM1, FM2
Filler material type	B	A,RA,RB,RC,RR,R,B
Type of current and polarity	DC EP	All compatible
Deposited thickness (mm)	10	3 to 20
Pipe outside diameter (mm)	N.A.	PA 75 and over; PF 500 and over
Welding position(s)	PF	PA, PF
Weld details / Layer technique	ss nb	ss nb, ss mb, bs, ss gb, ss fb

Type of test							
Visual	Acceptable	Radiographic	Not tested	Magnetic particle	Not tested	Penetrant	Acceptable
Macro	Acceptable	Fracture	Acceptable	Bend	Acceptable	Ultrasonic	Acceptable

This certificate is valid from	14 October 2020	to	14 October 2023
Issued at	GENOVA	on	30 October 2020

This certificate consist of 2 pages

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Via Corsica 12 - 16128 Genova

WELDER APPROVAL CERTIFICATE
ACCORDING TO UNI EN ISO 9606-1:2017

No. **20SX00240PW2**

Designation	**UNI EN ISO 9606-1 111 P BW FM1 B t10 PF ss nb**				
Welder	**GHITEANU DANIELA**				
Born in	**BICAZ-ROMANIA**			on	**01/12/1971**
Identification	**2711201270016**	**Method of Identification**	**C.I.**	**Stamp No.**	**CAUTIS 02**
Employed by	**CAUTIS JB '93 SRL - Bucuresti (B)**				

WPS used by welder during welding of test coupon: **19/2020** Job knowledge: **not tested**

Welding variables	Test piece	Range of qualification
Welding process(es)	111	111
Product type	Plate	Plates and pipes
Type of weld	BW	Butt weld
Parent Metal group (ISO/TR 15608)	1.2	1 to 11
Filler material group(s)	FM1	FM1, FM2
Filler material type	B	A,RA,RB,RC,RR,R,B
Type of current and polarity	DC EP	All compatible
Deposited thickness (mm)	10	3 to 20
Pipe outside diameter (mm)	N.A.	PA 75 and over; PF 500 and over
Welding position(s)	PF	PA, PF
Weld details / Layer technique	ss nb	ss nb, ss mb, bs, ss gb, ss fb

Type of test							
Visual	Acceptable	Radiographic	Not tested	Magnetic particle	Not tested	Penetrant	Acceptable
Macro	Acceptable	Fracture	Acceptable	Bend	Acceptable	Ultrasonic	Acceptable

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WELDER APPROVAL CERTIFICATE
ACCORDING TO UNI EN ISO 9606-1:2017

No. **20SX00240PW3**

Designation	**UNI EN ISO 9606-1 135-D P FW FM2 S t12 PB ml**				
Welder	**MIHAIL ALEXANDRU**				
Born in	**CRAIOVA-ROMANIA**			on	**31/12/1975**
Identification	**1751231441522**	**Method of Identification**	**C.I.**	**Stamp No.**	**CAUTIS 01**
Employed by	**CAUTIS JB '93 SRL - Bucuresti (B)**				

WPS used by welder during welding of test coupon: **04P/2020** Job knowledge: **not tested**

Welding variables	Test piece	Range of qualification
Welding process(es)	135-D	135; 138
Transfer mode	Short-arc	Short, spray, globular and pulsed-arc
Product type	Plate	Plates and pipes
Type of weld	FW	Fillet weld
Parent Metal group (ISO/TR 15608)	3	1 to 11
Filler material group(s)	FM2	FM1, FM2
Filler material type	Solid wire	Solid wire/electrode core: M
Shielding gas (EN ISO 14175)	M21 - EN ISO 14175	All compatible
Type of current and polarity	DC EP	All compatible
Material thickness (mm)	12	>= 3
Pipe outside diameter (mm)	N.A.	75 and over
Welding position(s)	PB	PA, PB
Weld details / Layer technique	ml	sl, ml

Type of test							
Visual	Acceptable	Radiographic	Not tested	Magnetic particle	Not tested	Penetrant	Acceptable
Macro	Acceptable	Fracture	Not tested	Bend	Not tested	Ultrasonic	Acceptable

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WELDER APPROVAL CERTIFICATE
ACCORDING TO UNI EN ISO 9606-1:2017

No. **20SX00240PW4**

Designation	UNI EN ISO 9606-1 135-D P FW FM1 S t10 PB ml				
Welder	GHITEANU DANIELA				
Born in	BICAZ-ROMANIA			on	01/12/1971
Identification	2711201270016	Method of Identification	C.I.	Stamp No.	CAUTIS 02
Employed by	CAUTIS JB `93 SRL - Bucuresti (B)				

WPS used by welder during welding of test coupon: 18/2020 Job knowledge: not tested

Welding variables	Test piece	Range of qualification
Welding process(es)	135-D	135; 138
Transfer mode	Short-arc	Short, spray, globular and pulsed-arc
Product type	Plate	Plates and pipes
Type of weld	FW	Fillet weld
Parent Metal group (ISO/TR 15608)	1.2	1 to 11
Filler material group(s)	FM1	FM1, FM2
Filler material type	Solid wire	Solid wire/electrode core: M
Shielding gas (EN ISO 14175)	M21 - EN ISO 14175	All compatible
Type of current and polarity	DC EP	All compatible
Material thickness (mm)	10	>= 3
Pipe outside diameter (mm)	N.A.	75 and over
Welding position(s)	PB	PA, PB
Weld details / Layer technique	ml	si, ml

Type of test							
Visual	Acceptable	Radiographic	Not tested	Magnetic particle	Not tested	Penetrant	Not tested
Macro	Not tested	Fracture	Acceptable	Bend	Not tested		

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