



# RINA



SGQ N° 002 A    SSI N° 001 G  
 SGA N° 002 D    DAP N° 001 H  
 PRD N° 002 B    PRS N° 066 C  
 SCR N° 003 F    LAB N° 0832

Signatory of EA, IAF and ILAC  
 Mutual Recognition Agreements

## WELDING PROCEDURE QUALIFICATION RECORD (WPQR)

✕ N. 11PA00043PO2/A

Manufacturer **METALTUMINO - 97100 Ragusa**

✕ WPQR No. **03/11**

Dated **01/06/2011**

Manufacturer's welding procedure (WPS) No. **03/11**

Dated **16/05/2011**

### RANGE OF APPROVAL

Welding process **131** Type **Partly mechanized**  
 Joint type **Plates and Pipes BW ssmb-bsgg/FW**  
 Single/Multiple pass **Multiple**  
 Parent material group(s) **All subgroups in group 22 and their combinations** ISO/TR 15608  
 Parent material thickness (mm) **Butt Joint = 3 to 20    Fillet Joint  $t_1 = 3$  to 20     $t_2 = 3$  to 20**  
 Throat thickness (mm)  **$\geq 7,5$**   
 Weld deposit thickness (mm) **3 to 20**  
 Outside diameter (mm) **Over 150 (PA-PB-PC positions); Over 500 (other positions)**  
 Filler metal **Solid wire UNI EN ISO 18273 - S Al 5356    UNI EN 1011-4 group 5**  
 Shielding gas (ISO 14175) **II** Backing gas (ISO 14175) **None**  
 Type of welding current **Pulsed DCEP** Heat input Kj/cm **No restriction**  
 Welding position **All positions except PG and J-L045**  
 Preheat min. (°C) **20** Interpass temp. Max. (°C) **160**  
 Post weld heat treatment / Ageing **None**  
 Other information **-**

Welders name **Tumino Daniele**

Stamp No. **AD**

Welding test conducted by **METALTUMINO - 97100 Ragusa**

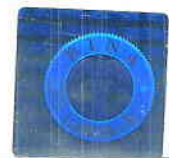
Mechanical test conducted by **TECNOLAB RINA-IIS srl** Laboratory test No. **n.768-769/11 del 24/05/11**  
**n.483 del 31/05/11**

At presence of RINA Surveyor **Arecco Mauro**

We certify that statements in this certificate are correct and that the test welds were prepared, welded and tested in accordance with the requirements of **UNI EN ISO 15614-2: 2006** Standard

Issued at: **Genova**

on **21 June 2011**

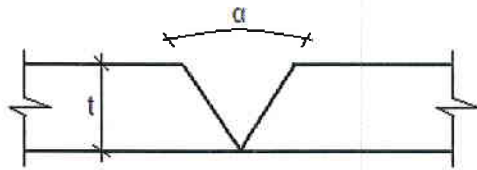


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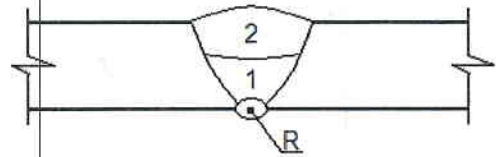
**JOINT DETAILS AND WELDING SEQUENCES**

BUTT WELD; BOTH SIDES WELDED

Pass No.	Process	Filler metal diam. (mm)	Filler metal classification	Amps	Volt	Travel speed (cm/min)	Heat input (kJ/cm)	Other
1	131	1,2	S Al 5356	120	20	30	3,8	-
2	131	1,2	S Al 5356	124	21	22	5,7	-
GRINDING TO SOUND METAL								
R	131	1,2	S Al 5356	126	21	16	7,9	-



t=10mm; α=60°;



**PARENT MATERIAL**

Material specification	UNI EN 573-2	
Type or grade	EN AW-5083	
Group(s)/Subgroup(s) No. (ISO/TR 15608)	22.4	
Thickness (mm)	10	Throat thickness (mm) N.A.
Diameter (mm)	N.A.	
Branch connection angle	N.A.	
Other	-	

**WELDING CONSUMABLES**

Process	131
Trade name(s)	EWP A5356
Specification	UNI EN ISO 18273
Classification / designation	S Al 5356
UNI EN 1011-4 grouping	5
Size (mm)	1,2
Deposited metal thickness	
Groove	10 mm
Throat	N.A.
Flux trade name	N.A.
Consumable insert	N.A.
Other	-



<b>GAS</b>			
	Gas	Mixture	Flow rate (l/min.)
Shielding	Ar 99,9%		10
Trailing			
Backing			

<b>POSITION</b>	
Welding position	PA
Other	-

<b>PREHEAT</b>		<b>POSTWELD HEAT TREATMENT</b>	
Preheat temperature	20°C	Temperature	None
Interpass temperature	160°C	Time	N.A.
Other	-	Other	-

<b>ELECTRICAL CHARACTERISTICS</b>			
Current	Pulsed DCEP		
Ampere (range)	See table	Volts (Range)	See table
Mode of metal transfer	Spray Arc		
Tungsten electrode size and type	N.A.		
Other	-		

<b>TECHNIQUE</b>	
Travel speed (range)	See table
String or weave bead	String
Oscillation (*)	N.A.
Method of groove/edge preparation	Machining/Grinding
Interpass cleaning	Grinding/Brushing
Method of back gouging	Grinding to sound metal
Orifice or gas cup size	12 mm
Stand off distance (*)	N.A.
Multiple or single pass	Multiple
Multiple or single electrodes	Single
Torch angle (*)	N.A.
Other	(*) for fully mechanized/robotic only



TRANSVERSE TENSILE TEST						
Spec. (No.)	Width (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Total load (N)	R <sub>m</sub> (N/mm <sup>2</sup> )	Fracture location
T1	25,03	9,99	250,04	69761	279	Weld metal
T2	25,00	10,03	250,75	68956	275	Weld metal

BEND TEST		
Type	No.	Result
FACE TRANSVERSE	2 OFF	Acceptable
ROOT TRANSVERSE	2 OFF	Acceptable

**OTHER TEST**

MACROGRAPHIC EXAMINATION      **Acceptable**

MICROGRAPHIC EXAMINATION      **Not required**

**NON DESTRUCTIVE EXAMINATION**

VISUAL EXAMINATION      **Acceptable**

RADIOGRAPHIC EXAMINATION      **Acceptable**

PENETRANT TEST      **Acceptable**

MAGNETIC PARTICLE      **Not required**

ULTRASONIC TEST      **Not required**

Issued at: Genova

on 21 June 2011




RINA Services S.p.A.



CND SERVICE Controlli non distruttivi srl  
ROMA - CIVITAVECCHIA

# RAPPORTO ESAME RADIOGRAFICO

RADIOGRAPHIC EXAMINATION REPORT



UNI EN ISO 9001-2008  
Certificato n. 98.107

CERTIFICATO N. 0768/11  
Report n.

Foglio n. 1 di 2  
Sheet Of

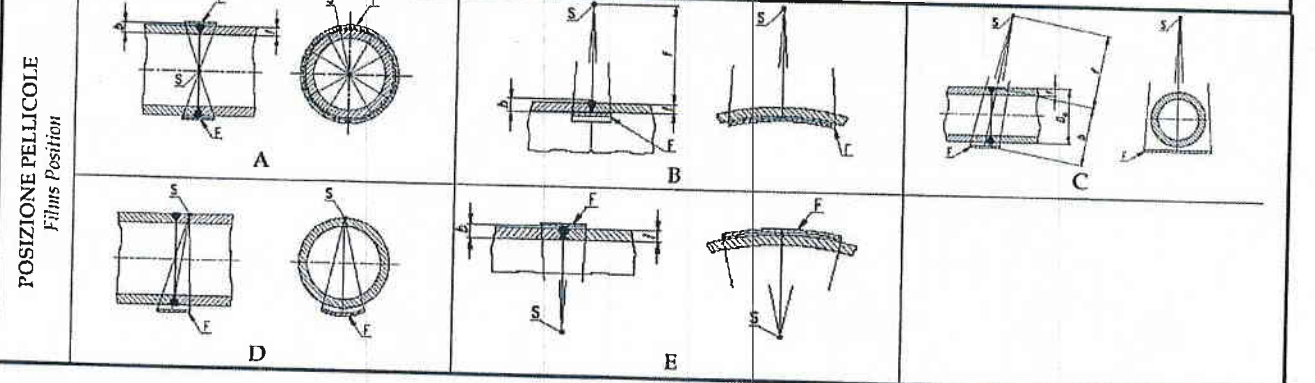


EASA PART 145  
Certificato ENAC n. IT.145.128

COMMITTENTE Customer	TECNOLAB SRL	COSTRUTTORE Constructor	METALTUMINO	ORDINE Order
IMPIANTO Plant	QUALIFICA PROCEDIMENTO DI SALDATURA 131 POS. PA IN ACCORDO ALLA NORMA UNI EN ISO 15614-2:2006			COMMESSA Job
OGGETTO Object	WPS 03/11 SAGGIO 128 E			

DISEGNO Drawing	====	MATERIALE Material	ALLOY EN AW 5083 Tp H111	
TIPO DI GIUNTO Type of Joint	BW	TECNICA DI SALDATURA Weld Procedure	===	
DIAMETRO Diameter	SPESORE Thickness	10 mm	TRATTAMENTO TERMICO Heat Treat	<input type="checkbox"/> RT PRIMA/Before <input type="checkbox"/> RT DOPO/After
PROCEDURA D'ESAME Examination Procedure	UNI EN 1435		LIMITI DI ACCETTABILITA' Accept Criteria	EN ISO 5817 LIV. B

PROCEDURA Procedure	CLASSE RADIOGR. Radiographic Class	LIV. B			PELLICOLA Film	TIPO Type	KODAK MX 125	FORMATO Size	10X48	
	TECNICA D'ESP Exposure Techn	B			SCHERMO/ANT. Front Screen	PB 0,05	SCHERMO/POST. Back Screen	PB 0.10		
	DISTANZA S. F. Distance S.F.	700 mm			ESPOSIZIONE Exposure	1 MINUTO				
	APPARECCHIO RX Equipment Rx	MARCA - S/N Mark - s/n	ICM		TECNICA DI TRATTAMENTO Development	<input type="checkbox"/> MANUALE/Manual <input checked="" type="checkbox"/> AUTOMATICA/Autom				
	APPARECCHIO RY Equipment Ry	MARCA - S/N Mark - s/n			IQI RICHIESTO IQI Required	10 AL EN				
	MACCHIA FOCALE RX Focal Spot Rx	3X3	KV	130	mA	6	QUALITA' RICHIESTA Quality Level	W 14		
	MACCHIA FOCALE RY Focal Spot Ry		Ci		GBq		DENSITA' RICHIESTA Density Required	2,3-4		



### SIMBOLI DEI DIFETTI Defects Symbol

ISO 6520-1	DESCRIZIONE	ISO 6520-1	DESCRIZIONE	ISO 6520-1	DESCRIZIONE
100	E CRICCHE Cracks	301-302	Ba INCLUSIONI DI SCORIA/FLUSSO Slag-flux inclusions	5013	F INCISIONE AL VERTICE Shrinkage groove
2011 2012	Aa POROSITA' Gas pore	303	J INCLUSIONI DI OSSIDO Oxide inclusions	504	Ep ECCESSO DI PENETRAZIONE Excessive penetration
2013	A NIDO DI SOFFIATURE Clustred localized porosity	304	H INCLUSIONE METALLICA Metallic inclusion	507	SI SLIVELLAMENTO Linear misalignment
2014	Ab PORI ALLINEATI Linear porosity	401	C MANCANZA DI FUSIONE Lack of fusion	515	Ins INSELLAMENTO AL VERTICE Root concavity
2015 2016	Ab CAVITA' ALLUNGATE-TARLI Elongated cavity-wormholes	402	D MANCANZA DI PENETRAZIONE Lack of penetration	516	== SPUGNOSITA' AL VERTICE Root restart
202	K CAVITA' DI RITIRO Shrinkage cavity	5011 5012	F INCISIONE MARGINALE Undercut	517	== DIFETTO DI RIPRESA Poor restart

OPERATORE Operator	LIV Lev	DATA Date	COMMITTENTE Customer	ISPETTORE COMMITTENTE Customer Inspector
VEZIO BIANCHIONE EN 473 ISO 9712	3	24/05/2011		
			FIRMA (Signe) 	DATA (Date) 24.05.11







CND SERVICE Controlli non distruttivi srl  
ROMA-CIVITAVECCHIA

RAPPORTO ESAME LIQUIDI  
PENETRANTI  
PENETRANT TESTING EXAMINATION REPORT



UNI EN ISO 9001-2008  
Certificato n. 98.107



EASA PART 145  
Certificato ENAC n. IT.145.128

CERTIFICATO N. 0769/11 Foglio n. 1 Di 1  
Report n. Sheet n. of

COMMITTENTE: Customer	TECNOLAB SRL	COSTRUTTORE Manufacturer	METALTUMINO	ORDINE: Order
IMPIANTO: Plant	QUALIFICA PROCEDIMENTO DI SALDATURA 131 POS ALLA NORMA UNI EN 15614-2:2006		FA IN ACCORDO	COMMESSA: Job
OGGETTO Object	WPS 03/11		SAGGIO 128 E	
DISEGNO: Drawings	===		PULIZIA DOPO ESAME: Cleaning after examination	NO
MATERIALE: Material	ALLOY EN AW 5083 Tp H111		ESTENSIONE ESAME: Test extension	100%
DIMENSIONI: Dimensions	Sp. 10 mm		PRODOTTI UTILIZZATI: Inspection products	CGM
TIPO DI GIUNTO Type of joint	BW		PROCEDURA D'ESAME: Examination procedure	UNI EN 571-1
STADIO DI LAVORAZIONE: Fabrication step	COME SALDATO		LIMITI DI ACCETTABILITA': Acceptance standards	UNI EN ISO 23277
CONDIZIONI SUPERFICIALI: Test surface status	SPAZZOLATA			

TIPO Description	<input checked="" type="checkbox"/> SOLUBILE IN ACQUA Water washable				<input type="checkbox"/> POST EMULSIONABILE Post emulsifiable				<input type="checkbox"/> LAVABILE IN SOLVENTE Solvent removable			
	<input checked="" type="checkbox"/> VISIBILE Visible		<input type="checkbox"/> FLUORESC. Fluoresc.		<input type="checkbox"/> VISIBILE Visible		<input type="checkbox"/> FLUORESC. Fluoresc.		<input type="checkbox"/> VISIBILE Visible		<input type="checkbox"/> FLUORESC. Fluoresc.	
	MARCA Trade mark	LOTTO Batch	MARCA Trade mark	LOTTO Batch	MARCA Trade mark	LOTTO Batch	MARCA Trade mark	LOTTO Batch	MARCA Trade mark	LOTTO Batch	MARCA Trade mark	LOTTO Batch
PULITORE Cleaner	VELNET											
PENETRANTE Penetrant	RED W											
EMULSIFICATORE Emulsifier	==											
PULITORE Remover	ACQUA											
RIVELATORE Developer	WITHE W											


PROCEDURA D'ESAME Inspection procedure			
TEMPERATURA D'ESAME Temperature of examination	AMBIENTE	ESSICCAZIONE Dry process	ARIA
PULITURA Cleaning	MANUALE	TEMPO DI PENETRAZIONE Min. penetration time	10 MINUTI
APPLICAZIONE PENETRANTE Penetrant application	SPRAY	APPLIC. EMULSIFICATORE Emulsifier application	=====
RIMOZIONE PENETRANTE Penetrant removal	MANUALE	TEMPO DI SVILUPPO Developing time	10 MINUTI
APPLICAZIONE SVILUPP. Developer application	SPRAY	TEMPO DI LETTURA Checking time	30 MINUTI

INDICAZIONI:  
Indication

NESSUNA

CONFORME Conforming	<input checked="" type="checkbox"/>	NOTE: Remarks:
NON CONFORME Not conforming	<input type="checkbox"/>	

OPERATORE Operator	LIV. Lev.	DATA Date	COMMITTENTE Customer	ISPETTORE COMMITTENTE Customer Inspector
VEZIO PANTALONE EN 473/ISO 9712	3	24/05/2011		
			FIRMA M. Trecco	DATA (Date) 24.05.11

 TECNOLAB RINA IIS - srl Via G. Mauro De Angelis D'Ossat snc 00053 - Civitavecchia RM	<b>SAGGIO TEC / JOB</b> N. 128E	<b>DATA / DATE</b> 31/05/2011	<b>RAPPORTO / REPORT</b> N. 483	<b>PAGINA/PAGE</b> 1/2
	<b>ORDINE / ORDER</b> N. QIB/FMD/50872 del 27/11/2009		<b>SAGGIO / TEST</b> N. 3	

**CLIENTE/CUSTOMER**

METALTUMINO

Ragusa

**DESCRIZIONE/DESCRIPTION**

QUALIFICA PROCEDIMENTO DI SALDATURA "131" WPS 03/11 Pos. PA

Mat.base: UNI EN 485-2:2009 Alloy EN AW5083 Tp. H111

Norma: UNI EN ISO 15614-2:2006

Saldatore: TUMINO Daniele PraticaRINA2011PAPO43 (Metaltumino)

**PLACCA / PLATE**

COLATA / HEAT

**COLLAUDO/INSPECTION**  
 RINA Services

**DIMENSIONI DEL MATERIALE / DIMENSIONS OF MATERIAL (mm) spess. 10**

Senso e Posizione Orientation	Spessore Larghezza Diametro  Thickness Width Diameter  (mm)	TRAZIONE / TENSION TEST					PIEGA BEND TEST  $\alpha = 180^\circ$  d = 52mm	RESILIENZA IMPACT TEST	
		Area della Sezione  Section  (mm <sup>2</sup> )	Lunghezza Utile  Gage Length  (mm)	Snervamento Yield Strength	Rottura Tensile Strength	Allungamento Elongation		Strizione Reduction of Area	Tipo Type  Temperatura °C Temperature  min. sing. min. medio min for 1 J min. average
				N/mm <sup>2</sup> min. max	N/mm <sup>2</sup> min. 270 max	% min. max		% min.	
T	9,99 x 25,03	250,04		279	(Rottura in saldatura)				
T	10,03 x 25,00	250,75		275	(Rottura in saldatura)				
T	10,0 x 20,0	PIEGA AL DRITTO				Soddisfacente			
T	10,0 x 20,0	PIEGA AL DRITTO				Soddisfacente			
T	10,0 x 20,0	PIEGA AL ROVESCIO				Soddisfacente			
T	10,0 x 20,0	PIEGA AL ROVESCIO				Soddisfacente			

MACRO

Esito/Result: Soddisfacente

**NORME / STANDARDS:**

UNI EN 895:97 ; UNI EN ISO 6892-1:09

UNI EN ISO 5173:10

UNI EN 1321:97

**NOTE / REMARKS**
**RESPONSABILE DEL LABORATORIO**  
 HEAD OF THE LABORATORY

  
 M. Romitelli

**OPERATORE**  
 OPERATOR


**ISPEITTORE**  
 INSPECTOR  
  
 M. Trecco



 <b>TECNOlab</b> RINA IIS TECNOlab RINA IIS srl Via G. Mauro De Angelis D'Ossat snc 00053 - Civitavecchia RM	SAGGIO TEC / JOB N. 128E	DATA / DATE 31/05/2011	RAPPORTO / REPORT N. 483	PAGINA/PAGE N. 2 di/of 2
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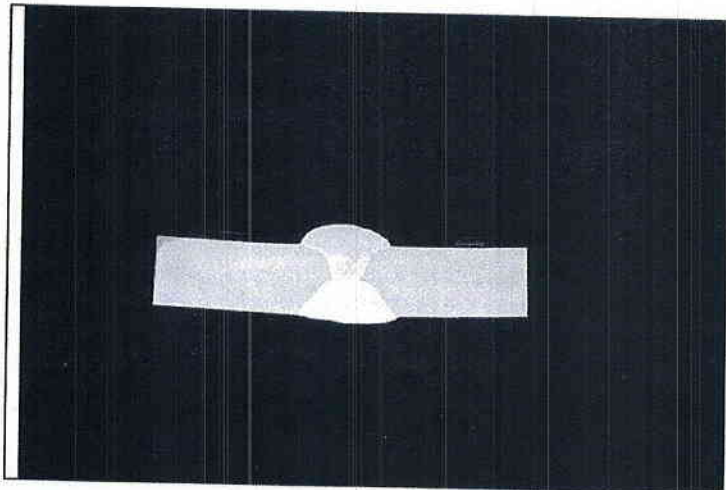
CLIENTE/CUSTOMER

METALUMINO

Ragusa

RG

**ESAME MACROSCOPICO**



Macrografia: N° 128E

Attacco: Idrossido di sodio 25%

Ingrandimento: 1 x

Riferimento Normativo: UNI EN ISO 5817:2008 liv. B

Esito : Soddisfacente

NORME / STANDARDS : UNI EN 1321:1997.

NOTE / REMARKS

RESPONSABILE DEL LABORATORIO  
HEAD OF THE LABORATORY

  
M. Romitelli

OPERATORE  
OPERATOR

*Manuela Romitelli*

ISPETTORE  
INSPECTOR

 **RINA**  
M. Aprecco