



DET NORSKE VERITAS

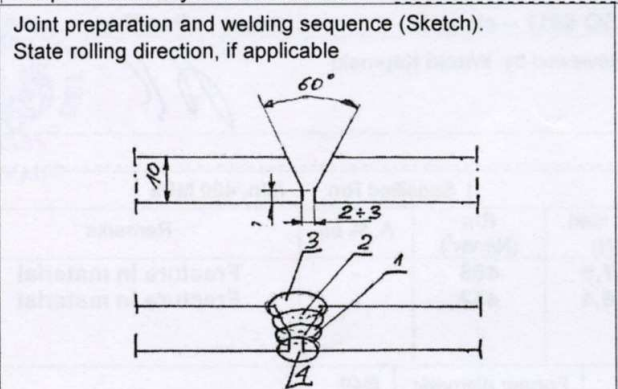
WELDING PROCEDURE QUALIFICATION TEST

Ref. 2/135-PA/DNV

According to (code, standard)
ISO 15614-1:2005

Manufacturer's welding procedure No.
2/135-PA/DNV

Manufacturer **Meblomor S.A., Czarnków, Poland** Place and date **Czarnków, 2007-03-13**
 Purchaser's spec. No. - Project -
 Requirements beyond code/standard **ISO 15614-1:2005**



BASE MATERIAL SPECIFICATION AND GROUPING

Cert. No: **DNV/D0062/0/01/7** Heat No: **730083**
 ≠ 10 NVA ≠ 10 NVA

Grade	C, %	C eq %	Grade	C, %	C eq %
NVA	0,18	0,26	NVA	0,18	0,26

Group: 1 Subgroup: 1.1 according to ISO 15608

If applicable, the following C eq based on ladle analysis is to be calculated:

$$C_{eq} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15} \%$$

Welding process(es) **135** Welding position **PA** Single-/double sided welding **SINGLE**

WELDING CONSUMABLES:

Index	Consumable(s), trade name	Code designation
A	ESAB OK Autrod 12.51	EN 440: G 42 3 M G3Si1
B	Kristal 18	EN 439: M21
C		
D		

WELDING PARAMETERS

Pass No.	Index	Diam. mm	Gas composition	Gas L/min	Current polarity	Amps	Volts	Travel speed mm/min	Wire feed mm/min	Heat input kJ/mm
1	A + B	1,2	M21	14-18	DC(+)	130-150	21-22	150-160	-	1,09-1,24
2-3	A + B	1,2	M21	12-15	DC(+)	220-240	25-26	240-350	-	1,07-2,06
4	A + B	1,2	M21	12-15	DC(+)	210-230	24-25	450-500	-	0,67-0,69

Other information (weaving, backing, groove preparation, gouging, grinding, etc.):
Root cleaning: grinding

SPECIAL REQUIREMENTS: Preheat min. **N/A** Interpass max **220 °C** PWHT **N/A** Time **N/A**
 Heating/cooling rate **N/A** Baking of electrodes - Others -
 WELDING CARRIED OUT BY **Jerzy Sikora** TEST PIECE MARKED **2/135-PA SP33 NVA**
 EXTENT OF APPROVAL. Base material(s) **1.1 (ISO 15608)** Positions: **PA, PB**
 Plate /wall thickness **3 + 20 mm** Diam. **>150 mm (PA)** Other limitations -
None.

We certify that the statements in this record are correct and that the test weld was prepared, welded and heat treated in accordance with the specified Code/Standard and/or purchaser's requirements.

Manufacturer's signature and stamp _____ DNV's survey station and surveyor's signature *W. Kepinski*
DNV Gdansk – Witold Kepinski

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

NON-DESTRUCTIVE TESTING											
1. Radiographic testing											
Procedure ref. -			Acceptance criteria -				Result -				
Film type -			Screens -				IQI -				
KV -		mAmin. -		Sensitivity -		Density -					
2. Ultrasonic examination - report No.: 1403 / 2007											
Procedure ref. EN1714			Acceptance criteria ISO 5817 class B				Result Positive				
3. Other examination Type: Penetrant testing- see report No.. 1402 /2007											
Procedure ref. EN 1289			Acceptance criteria ISO 5817 - class B				Result Positive				
Place and date Kromet, Elbląg, Poland 16.04.2007					Reviewed by Witold Kepinski						
Laboratory signature and stamp											
MECHANICAL TESTING (According to ISO 15614-1:2005)											
1. Tensile tests			Specified R _{eH}			Specified R _m : Min. 400 MPa					
Test No.	Dim (mm)	Area (mm ²)	Yield load (kN)	ReH (N/mm ²)	U.T load (kN)	R _m (N/mm ²)	A, % on	Remarks			
1	10,3x25	257,5	-	-	117,5	456	-	Fracture in material			
2	10,3x25	257,5	-	-	116,4	452	-	Fracture in material			
2. Bend tests		Specified		180		degr.		Former diameter Ø40			
Type and dimensions			Results			Type and dimensions			Results		
SBB, 10x30			Positive								
SBB, 10x30			Positive								
SBB, 10x30			Positive								
SBB, 10x30			Positive								
3. Impact tests		Type: KV		Size: 55x10x10		Requirement: Min. 27 J					
Notch Location/Direction		Temp. °C		Values, J			Average J		Remarks		
				1	2	3					
VWT		+22		143	117	180	147				
VHT		+22		51	48	54	51				
VHT 2		+22		29	30	29	29				
VHT5		+22		31	28	29	29				
4. Macro examination		1 specimen acc. to EN 1321:2000 - report No.. MT1/0161/2007 - Positive									
5. Hardness test		Specified type if test: HV 10 acc. to EN 1043-1:2000 - report as above									
Sketch showing indentations				Point	Hardness	Point	Hardness	Point	Hardness		
				I-1-1	156	I-4-5	171	II-4-1	189		
				I-1-2	142	I-5-1	184	II-4-2	192	III-2-5	209
				I-1-3	139	I-5-2	183	II-4-3	177	III-7	169
				I-2-1	179	I-5-3	175	II-4-4	175	III-8	168
				I-2-2	181	II-1-1	153	II-4-5	153	III-9	167
				I-2-3	185	II-1-2	140	II-5-1	139	III-10-1	257
				I-2-4	190	II-1-3	153	II-5-2	146	III-10-2	259
				I-2-5	192	II-2-1	172	II-5-3	146	III-10-3	250
				I-3-1	203	II-2-2	174	III-1-1	152	III-11	232
				I-3-2	199	II-2-3	180	III-1-2	143	III-12	207
				I-3-3	212	II-2-4	197	III-1-3	143	III-13	152
				I-4-1	176	II-2-5	201	III-1-4	143	III-14	152
				I-4-2	193	II-3-1	203	III-2-1	171	III-15	151
				I-4-3	174	II-3-2	200	III-2-2	176		
				I-4-4	170	II-3-3	211	III-2-3	203		
				I-4-4	170	II-3-3	211	III-2-4	201		
6. Other tests		Type and results: Visual Inspection EN 790, ISO 5817 - B report No.: 1401/2007									
Place Metrotest, Elbląg, Poland		Date 16.04.2007		Reviewed Witnessed by Witold Kepinski							
Laboratory signature and stamp											
We hereby certify that by virtue of the information given on page 1 of this form and the laboratory test results given above, this welding procedure meets the Code/Standard and/or purchaser's specification, and that within the limitations given in the Code/Standard and/or purchaser's specification by our signature is approved for welding on said product.				Place Poznań, Poland		Date 08.08.2007r.					
				Surveyor		Witold Kepinski					