


# pWPS

## WELDING PROCEDURE SPECIFICATION

WPQR No	WPQR - 1	Parent Material Grad	Part 1 : st37	Part 2 : st37
Method of preparation and cleaning	: CNC :Brushing/grinding	Range of Material thickness	:3mm to 17,12mm	
Joint Type	:Butt joint	Range of Outside diameter	: 57,15 ≥ D > 500mm	
Parent Material Spec.	: CS (st37 DN100 114,3mm)	Range of Welding Position	: H-L045 (All positions)	

### Welding Preparation Details

Joint design	Welding sequences
	

### Welding Details

Run number	1	2	3	4		
Welding process	GTAW	GTAW	FCAW	FCAW		
Autom. Welding .nr. of heads						
.weaving						
Filler metal:wire (W) or electrode (E)	W	W	W	W		
.Designation	GEDİK WELDING A.Ş / HYUNDAI WELDING CO. LTD					
.Grade	4YM / SA3M, SA3YM, A3M, A3YM, HH					
.Description	GEKA SG 2 / SUPERCORED 71 – CO2					
.Diameter	2,4	2,4	1,2	1,2		
Shielding:Flux (F) or gas (G)	G	G	G	G		
.Powder flux .description						
.type and trade name	HABAS	HABAS	HABAS	HABAS		
.Gas flux .description	%99,9 Ar – CO2					
.type and trade name						
.Backing .flow rate (l/mn)						
.Shielding .flow rate (l/mn)						
.Plasma						
Tungsten electrode: type/size						
Type of current	DC	DC	DC	DC		
Electrode or wire polarity	-	-	+	+		
Current (A)	130-132	178-180	195-196	172-179		
Voltage (V)	10,2-10,5	11,0-11,5	22,8-23,0	26,5-26,8		
Travel speed S (cm/min)	8,18	10,72	10,72	7,19		
Wire feed speed (cm/min)						
Heat input (J/cm) = [ k x V x A x 60] / S	6099	6951	20185	32025		
Interpass temperature in °C (min/max)	Min 80 °C / Max 250°C					
Welding equipment .trade mark / Type	ESAB TIG 4000i / ASKAYNAK Mak451W					

Pre heat	NO	Temperature°C.....	Holding Time.....
Post heating	NO	Temperature°C.....	Holding Time.....
Post Weld Heat treatment	NO	Temperature°C.....	Holding Time.....

Prepared by Representative

Endorsed by BV Surveyor

Name: NEJDET AKPINAR  
(TR-IIW-IWIP .INT. WELDING INSPECTOR)

Name: HAKAN TIRYAKI  
Signature : .....

Signature / Stamp : .....

Stamp: .....

## WELDING PROCEDURE QUALIFICATION RECORD

Firm : GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ.

Address: GÜNAL GEMİ Aydıntepe Mah. Sahil Bulvarı Alize İş Merkezi No: 191/14 Tuzla - İSTANBUL

Reference : BV Rules on Material and Welding for the Classification of Marine Units,  
NR216, Ch 5, Sec 4, Approval of Welding Procedures

Further to the welding of the standardized test pieces carried out in the shipyard at GÜNAL GEMİ  
Aydıntepe Mah. Sahil Bulvarı Alize İş Merkezi No: 191/14 Tuzla - İSTANBUL

on 27.04.2018 in presence of Mr. HAKAN TİRYAKİ Bureau Veritas Surveyor,

We certify that shipyard welding procedure detailed in page 2/5 of this record has given satisfactory  
results in accordance with the requirements of above reference.

Date of Issue: 15.05.2018

Prepared by Representative

Name: NEJDET AKPINAR  
(TR-IIW-IWIP .INT. WELDING INSPECTOR)

Signature / Stamp :.....

  
GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ.  
Aydıntepe Mah. Sahil Bulvarı Alize İş Merkezi No: 191/14 Tuzla / İSİ  
Tel: 0216 447 37 40 Tlx: Sicil No: 606 133  
Tuzla V.D. 426 053 9954 Mersus No: 0428 053 9954 00018  
www.gunalgemi.com e-mail: gunalgemi@gmail.com

Endorsed by BV Surveyor

Name: HAKAN TİRYAKİ

Signature / Stamp :.....

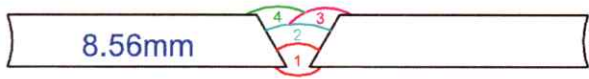




1 DETAILS OF WELD TEST

Method of preparation: CNC	Parent material spec	Part 1 : st37	Part 2 : st37
Cleaning : Brushing/grinding	Heat Nr	: Y1175303	Y1175303
Joint type : Butt joint	Material thickness	: 8,56mm	8,56mm
	Outside diameter	: 114,3mm (DN100)	

Weld Preparation Details


Joint design	Welding sequences
	

Welding Details

	1	2	3	4
Run number				
Welding process	GTAW	GTAW	FCAW	FCAW
Welding position	HL-045	HL-045	HL-045	HL-045
Autom. Welding .nr. of heads				
.weaving				
Filler metal: wire (W) or electrode (E)	W	W	W	W
.Designation	GEDİK WELDING A.Ş / HYUNDAI WELDING CO. LTD			
.Grade	4YM / SA3M, SA3YM, A3M, A3YM, HH			
.Description	GEKA SG 2/ELIFLUX BFB			
.Diameter	2,4	2,4	1,2	1,2
Shielding: Flux (F) or gas (G)	G	G	G	G
.Power flux .description				
.type and trade name				
.Gas flux .description	HABAS (%99,9 Ar – Co2)			
.type and trade name				
.Backing .flow rate (l/mn)				
.Shielding .flow rate (l/mn)				
.Plasma				
Tungsten electrode: type/size				
Type of current	DC	DC	DC	DC
Electrode or wire polarity	-	-	+	+
Current (A)	130-132	178-180	195-196	172-179
Voltage (V)	10,2-10,5	11,0-11,5	22,8-23,0	26,5-26,8
Travel speed S (cm/min)	8,18	10,72	10,72	7,19
Wire feed speed (cm/min)				
Heat input (J/cm) = [ k x V x A x 60 ] / S	6099	6951	20185	32025
Interpass temperature in °C (min/max)	Min 80 °C / Max 250°C			
Welding equipment .trade mark / Type	ESAB TIG 4000i / ASKAYNAK Mak451W			

Pre heat	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	Temperature°C	N.A	Holding Time.....
Post heating	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	Temperature°C.....	N.A	Holding Time.....
Post Weld Heat treatment	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	Temperature°C.....	N.A	Holding Time.....



 <b>GÜNAL GEMİ</b> <small>GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ.</small>	<b>WELDING PROCEDURE QUALIFICATION RECORD</b>  <b>WPQR</b>	<b>WPQR No: 1 432ITB18</b>  Page 3 of 5
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## 2 TEST RESULTS

2.1

NON-DESTRUCTIVE TESTS	PERFORMED BY	REPORT Nr. / DATE	RESULT
Visual examination	İMKOSAN	04058/18/VT – 28.04.2018	OK
Dye penetrant / Magnetic particle	İMKOSAN	04057/18/MT – 28.04.2018	OK
Radiographic examination	İMKOSAN	04144/18/SE – 30.04.2018	OK
Ultrasonic examination	N/A		

## 2.2 TENSILE TESTS

Performed by: İMKOSAN

Report Nr. / DATE: 1731/18 - 11.05.2018

Test Numune No <i>Test Piece No</i>	Boyutlar <i>Size of Specimen mm<sup>2</sup></i>	Akma Dayanımı %0,2 <i>(Yield Strength) N/mm<sup>2</sup></i>	Çekme Dayanımı <i>(Tensile Strength) N/mm<sup>2</sup></i>	Maks. Yük <i>(Max. Load) kN</i>	Kırılma Bölgesi <i>(Location of fracture)</i>	Notlar; Çatlak Kırılma Görünüşü <i>(Remarks e.g. fracture appearance)</i>
1	90,19	301	436	39	AM	...
2	90,19	309	431	39	AM	...
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## 2.3 BEND TESTS


Performed by: İMKOSAN

Report Nr. / DATE: 1732/18 – 11.05.2018

Test Numune No <i>Test Piece No</i>	Deney Türü <i>(Type of test)</i>	Boyutlar <i>(Dimensions) w x t x l (mm)</i>	Mandrel çapı <i>(Former diameter) mm</i>	Mesnetler arası mesafe <i>(Distance between rollers) mm</i>	Eğme açısı <i>(Bend angle degrees)</i>	Notlar; Çatlak Kırılma Görünüşü <i>(Remarks e.g. fracture appearance)</i>
1	ROOT	8,56x30x300	34	55	180	ACCEPTABLE
2	ROOT	8,56x30x300	34	55	180	ACCEPTABLE
3	FACE	8,56x30x300	34	55	180	ACCEPTABLE
4	FACE	8,56x30x300	34	55	180	ACCEPTABLE





 <p>GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ.</p>	<p>WELDING PROCEDURE QUALIFICATION RECORD</p> <p><b>WPQR</b></p>	<p>WPQR No: 1 432ITB18</p> <p>Page 4 of 5</p>
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## 2.4 IMPACT TESTS

Performed by: İMKOSAN

Report Nr. / DATE: 1733/18 – 11.05.2018

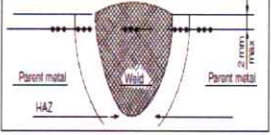
### TEST SONUÇLARI TEST RESULTS

TEST NUMUNE NO. /POZİSYONU	ÇENTİK YERİ Notch Location	ABSORBE EDİLEN ENERJİ Absorbed Energy (Jou) KVS			
		NUMUNE-1 Specimen 1	NUMUNE-2 Specimen 2	NUMUNE-3 Specimen 3	ORTALAMA Average
1	WELD CENTER	49,87	58,62	75,01	61,17
2	FL	87,48	70,74	97,35	85,19
3	HAZ+2	128,33	108,89	96,46	111,23
4	HAZ+5	0	0	0	0,00
5	MAIN METAL	0	0	0	0,00
6		0	0	0	0,00
7		0	0	0	0,00
8		0	0	0	0,00
ESNEKLİK(Elasticity) Jou/cm <sup>2</sup>					
1	WELD CENTER	0	0	0	0,00
2	HAZ+1	0	0	0	0,00
3	HAZ+2	0	0	0	0,00
4	MAIN METAL	0	0	0	0,00
<b>NOTLAR</b>		<b>Malzeme bilgisi müşteri beyanıdır. (Material information was given by Customer)</b>			
Notes:		Kopyalanamaz, tüm hakları gizlidir. (Can not be copied, all rights reserved.)			


## 2.5 HARDNESS TEST

Performed by İMKOSAN  
HARDNESS/SERTLİK  
Requierments : .....

Report Nr. / DATE: N/A

LOCATION OF MEASUREMENTS(sketch)	INDENTATION ROW		AVERAGE	RESULTS
	ÜST	ANA METAL	N/A	
		HAZ	N/A	
		KAYNAK METAL	N/A	
		HAZ	N/A	
	KÖK	ANA METAL	N/A	
		HAZ	N/A	
		KAYNAK METAL	N/A	
		HAZ	N/A	
	ALT	ANA METAL	N/A	
		HAZ	N/A	
		KAYNAK METAL	N/A	
		HAZ	N/A	
	ANA METAL	N/A		

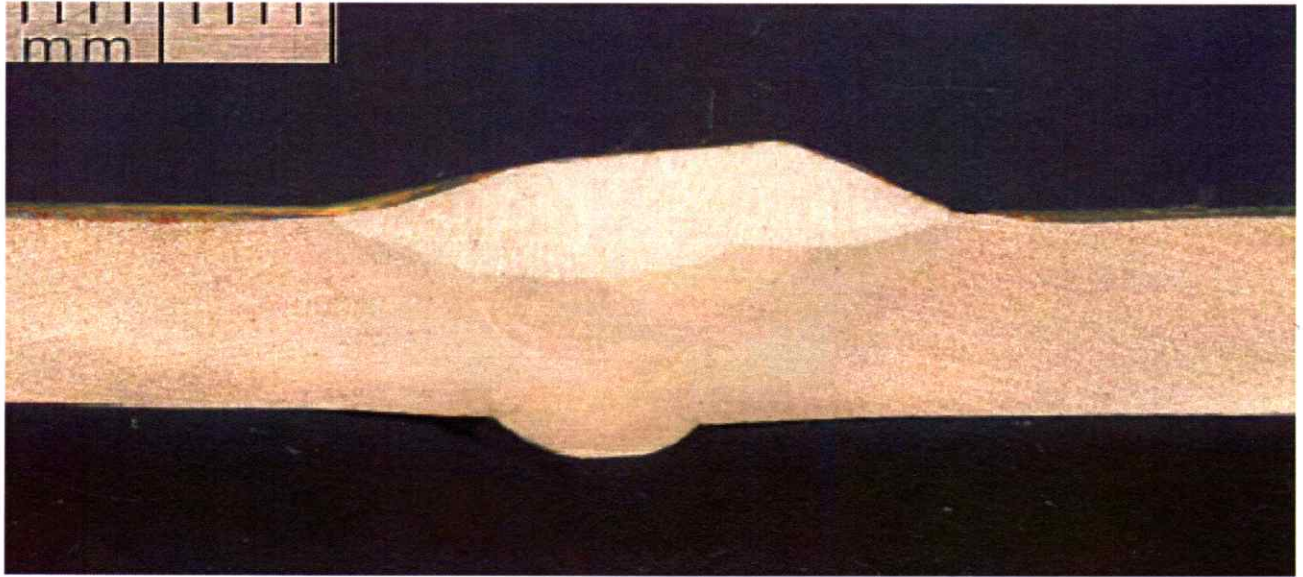


 <p><b>GÜNAL GEMİ</b> GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ.</p>	<p><b>WELDING PROCEDURE QUALIFICATION RECORD</b></p> <p><b>WPQR</b></p>	<p><b>WPQR No: 1 432ITB18</b></p> <p>Page 5 of 5</p>
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## 2.6 MACROGRAPHIC EXAMINATION

Performed by: IMKOSAN  
MAKRO  
Observations :

Report Nr. / DATE: 1734/18 – 11.05.2018







## 2.7 MICROGRAPHIC EXAMINATION

Performed by: N/A  
Observations : N/A

Report Nr. / DATE.: N/A

## 2.8 OTHER EXAMINATIONS OR TESTS

Annexed Documents Identification	Name and Signature of Bureau Veritas Surveyor	Name and Signature of Representative
Radiographic Test Report /IMKOSAN/04144/18/SE – 30.04.2018	 HAKAN TIRYAKI 	 NEJDET AKPINAR (TR-IW-IWIP .INT. WELDING INSPECTOR)  GÜNAL GEMİ İNŞAAT MAKİNA NAKLİYE SAN. VE TİC. LTD. ŞTİ. Ardıntepe Mh. Sahil Bulvarı Alize İş Merkezi No: 11/114 Tuzla / İST. Tel: 0216 447 37 40 ftc. Sicil No: 265133 Tuzla V.D. 426 053 9954 - Maras No: 0228 053 9954 00018 www.gunalgemi.com e-mail: gunalgemi@gmail.com
Penetrant Test Report /IMKOSAN/04057/18/MT – 28.04.2018		
Visual Test Report /IMKOSAN/04058/18/VT – 28.04.2018		
Tensile Test Report/ IMKOSAN/1731/18 - 11.05.2018		
Bend Test Report /IMKOSAN/1732/18 – 11.05.2018		
Impact test report/ IMKOSAN/1733/18 – 11.05.2018		
Hardness test report / N/A		
Macrographic Test Rep. /IMKOSAN/1734/18 – 11.05.2018		

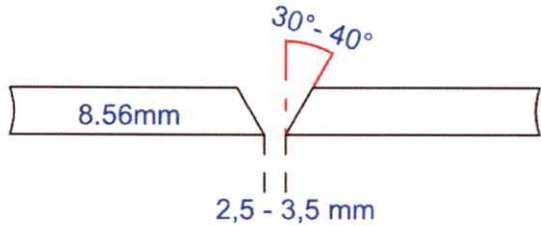
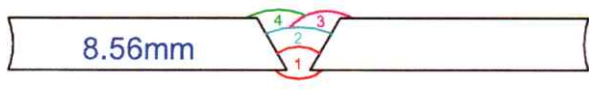


# WPS

## WELDING PROCEDURE SPECIFICATION

WPQR No	WPQR - 1	Parent Material Grad	Part 1 : st37	Part 2 : st37
Method of preparation and cleaning	: CNC :Brushing/grinding	Range of Material thickness	:3mm to 17,12mm	
Joint Type	:Butt joint	Range of Outside diameter	: 57,15 ≥ D > 500mm	
Parent Material Spec.	: CS (st37 DN100 114,3mm)	Range of Welding Position	: H-L045 (All positions)	

### Welding Preparation Details

Joint design	Welding sequences
	

### Welding Details

Run number	1	2	3	4			
Welding process	GTAW	GTAW	FCAW	FCAW			
Autom. Welding .nr. of heads							
.weaving							
Filler metal:wire (W) or electrode (E)	W	W	W	W			
.Designation	GEDİK WELDING A.Ş / HYUNDAI WELDING CO. LTD						
.Grade	4YM / SA3M, SA3YM, A3M, A3YM, HH						
.Description	GEKA SG 2 / SUPERCORED 71 – CO2						
.Diameter	2,4	2,4	1,2	1,2			
Shielding:Flux (F) or gas (G)	G	G	G	G			
.Powder flux .description							
.type and trade name	HABAS	HABAS	HABAS	HABAS			
.Gas flux .description	%99,9 Ar – CO2						
.type and trade name							
.Backing .flow rate (l/mn)							
.Shielding .flow rate (l/mn)							
.Plasma							
Tungsten electrode: type/size							
Type of current	DC	DC	DC	DC			
Electrode or wire polarity	-	-	+	+			
Current (A)	130-132	178-180	195-196	172-179			
Voltage (V)	10,2-10,5	11,0-11,5	22,8-23,0	26,5-26,8			
Travel speed S (cm/min)	8,18	10,72	10,72	7,19			
Wire feed speed (cm/min)							
Heat input (J/cm) = [ k x V x A x 60] / S	6099	6951	20185	32025			
Interpass temperature in °C (min/max)	Min 80 °C / Max 250°C						
Welding equipment .trade mark / Type	ESAB TIG 4000i / ASKAYNAK Mak451W						
Pre heat	NO	Temperature°C.....	Holding Time.....				
Post heating	NO	Temperature°C.....	Holding Time.....				
Post Weld Heat treatment	NO	Temperature°C.....	Holding Time.....				
Welder: Ahmet DEMİR							

### Prepared by Representative

Name: NEJDET AKPINAR  
(TR-IIW-IWIP .INT. WELDING INSPECTOR)  
Signature / Stamp : .....

### Endorsed by BV Surveyor

Name: HAKAN TIRYAKI  
Signature : .....

Stamp: .....



**Mekanik Test Laboratuvarı**  
*Mechanical Testing Laboratory*  
**TS EN ISO 9016' ya göre Çentik Darbe Deney Raporu**  
*Charpy Impact Test Report According to TS EN ISO 9016*

Rapor No/Report Nr. : 1733-18-ÇENTİK DARBE-  
Müşteri/Customer : GÜNAL GEMİ  
Proje adı/Project Name : ...  
Test Parçası Tanımı /Test Piece Designation : WPS-1 HEAT NR Y1175303 HL045 141+136  
Ürün Formu/Form of product : PIPE Ø4"X8,56 mm  
Çentik Tipi/Notch Type : V ÇENTİK  
Numune Boyutu/Size of Specimen (mm) : 5X10X55  
Test Sıcaklığı/Test temperature(C) : 23°C  
DolguMetalı/Filler metal : ...  
Ana Metal /Parent metal : S235JR  
Cihazın Anma Enerjisi : 300 JOULE  
Nominal Capacity of Machine  
Cihaz Bilgisi /Device Information : INSTRON 300 MPX

**TEST SONUÇLARI**  
*TEST RESULTS*

TEST NUMUNE NO. /POZİSYONU	ÇENTİK YERİ Notch Location	ABSORBE EDİLEN ENERJİ Absorbed Energy (Joul) KV8			
		NUMUNE-1 Specimen 1	NUMUNE-2 Specimen 2	NUMUNE-3 Specimen 3	ORTALAMA Average
1	WELD CENTER	49,87	58,62	75,01	61,17
2	FL	87,48	70,74	97,35	85,19
3	HAZ+2	128,33	108,89	96,46	111,23
4	HAZ+5	0	0	0	0,00
5	MAIN METAL	0	0	0	0,00
6		0	0	0	0,00
7		0	0	0	0,00
8		0	0	0	0,00
<b>ESNEKLİK(Elasticity) Joul/cm2</b>					
1	WELD CENTER	0	0	0	0,00
2	HAZ+1	0	0	0	0,00
3	HAZ+2	0	0	0	0,00
4	MAIN METAL	0	0	0	0,00
<b>NOTLAR</b> Notes	<b>Malzeme bilgisi müşteri beyanıdır. (Material information was given by Customer)</b> Kopyalanamaz, tüm hakları gizlidir. (Can not be copied, all rights reserved.)				

TARİH  
Date

SURVEYOR

OPERATÖR  
Performed by

MEK. TEST LAB. YÖNETİCİSİ  
Mech. Testing Lab. Manager

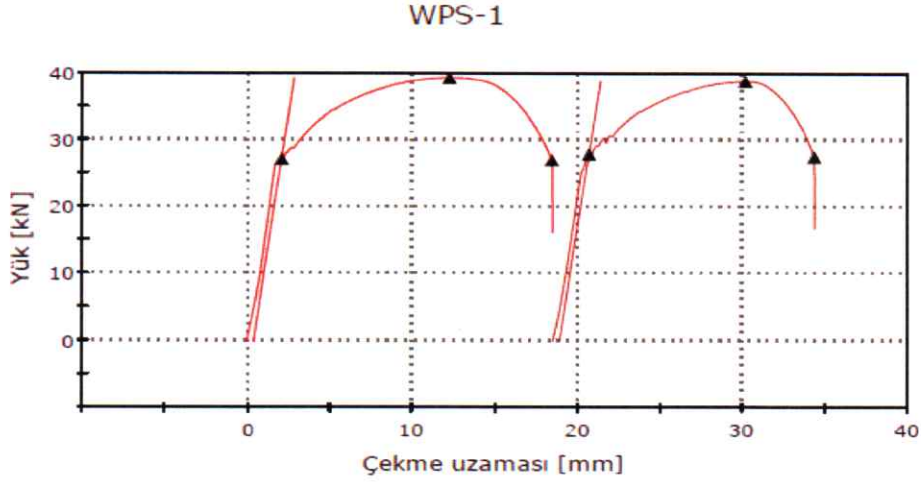
11.05.2018





**TS EN ISO 4136 'ya göre Çekme Deneyi Raporu**  
Transverse Tensile Test Report According to TS EN ISO 4136

Rapor No/Report Nr. : 1731-18-ÇEKME-  
Müşteri/Customer : GÜNAL GEMİ  
Proje adı/Project name : ...  
Test Parçası Tanımı / Test Piece Designation : WPS-1 HEAT NR Y1175303 HL045 141+136  
Ürün Formu/Form of product : PIPE Ø4"X8,56 mm  
Ortam sıcaklığı/ Ambient temp. : 23°C  
DolguMetali/Filler metal : ...  
Ana Metal /Parent metal : S235 JR  
Cihaz Bilgisi /Device Information : INSTRON 5989-600kN  
Deneyin Amacı: Kaynaklı malzemenin mekanik değerlerini ölçmek.  
Purpose of the examination: Welded material's mechanical values of the measure.

**ÇEKME DENEY GRAFİKLERİ**  
Tensile Test Charts

Test Numune No Test Piece No	Boyutlar Size of Specimen mm <sup>2</sup>	Akma Dayanımı %0,2 (Yield Strength) N/mm <sup>2</sup>	Çekme Dayanımı (Tensile Strength) N/mm <sup>2</sup>	Maks. Yük (Max. Load) kN	Kırılma Bölgesi (Location of fracture)	Notlar; Çatlak Kırılma Görünüşü (Remarks e.g. fracture appearance)
1	90,19	301	436	39	AM	...
2	90,19	309	431	39	AM	...
..	..	..	..	..	..	..

**NOTLAR** Malzeme bilgisi müşteri beyanıdır.. (Material information was given by Customer)  
**NOTES** Kopyalanamaz, tüm hakları gizlidir. (Can not be copied, all rights reserved.)

TARİH  
Date

11.05.2018

SURVEYÖR



OPERATÖR  
(Performed by)

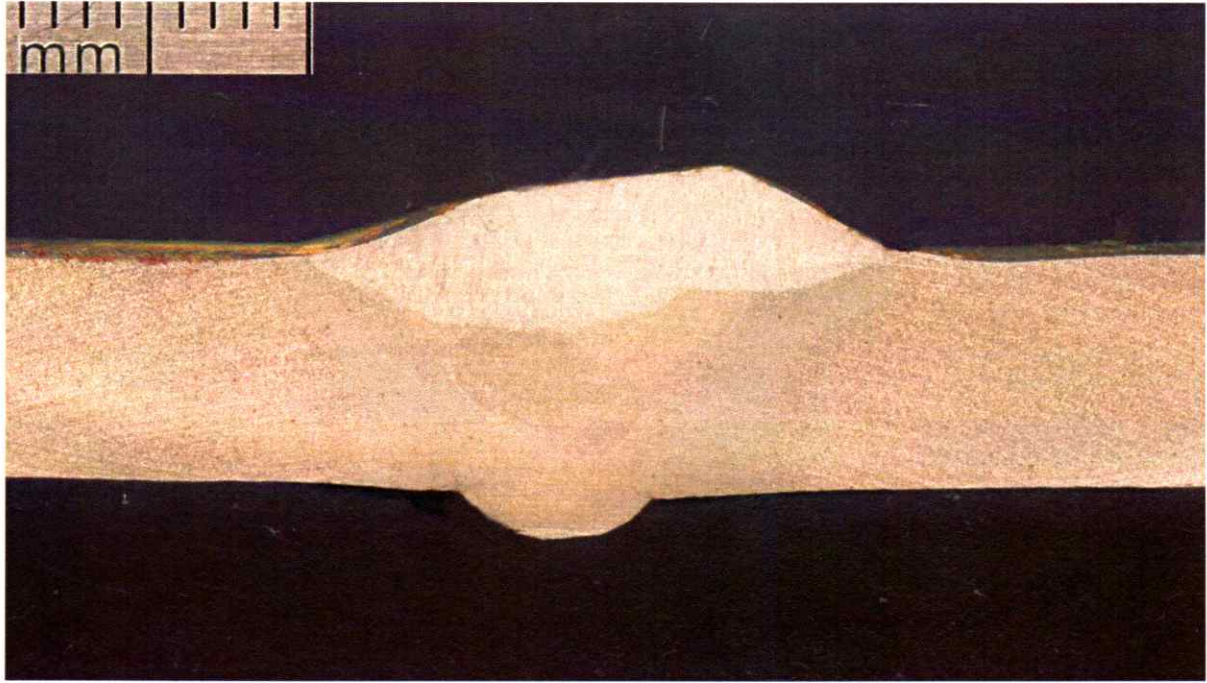


MEK. TEST LAB. YÖNETİCİSİ  
(Mech. Testing Lab. Manager)



**TS EN ISO 17639'a göre Makro İnceleme Deney Raporu**  
*Macro Examination Test Report According to TS EN ISO 17639*

**Rapor No/Report Nr.** : 1734-18-MAKRO-  
**Müşteri/Customer** : GÜNAL GEMİ  
**Proje adı/Project Nr** : ...  
**Test Parçası Tanımı / Test Piece Designation** : WPS-1 HEAT NR Y1175303 HL045 141+136  
**Ürün Formu/Form of product** : PIPE Ø4"X8,56 mm  
**Ortam sıcaklığı/ Ambient temp.** : 20°C  
**Dağlama Çözeltisi/Eaching solution** : NİTAL %10  
**DolguMetalİ/Filler metal** : ...  
**Ana Metal /Parent metal** : S235 JR  
**Cihaz Bilgisi/Device information** : EPSON V 500 PHOTO  
**Deneyin amacı/Purpose of examination** : WPQR

**MAKRO YAPI GÖRÜNTÜLERİ**  
*Macro Structure Spectrum*

**NOTLAR** Malzeme bilgisi müşteri beyanıdır. (Material information was given by Customer)  
**NOTES** Kopyalanamaz, tüm hakları gizlidir. (Can not be copied, all rights reserved.)

**TARİH**  
Date

11.05.2018

**OPERATÖR**  
Performed by



**MEK. TEST LAB. YÖNETİCİSİ**  
Mech. Testing Lab. Manager



**İmkosan Mühendislik Ltd. Şti.**

**Adres:** Güzelyalı mh. Alinteri sk. No:4 Pendik/İstanbul (34903)

**Tel:** 0216 392 82 78 (92) **Faks:** 0216 392 82 79

1

[www.imkosan.com.tr](http://www.imkosan.com.tr)

LAB.F.003/04.06.2012/Rev.02-25.01.2017





**Mekanik Test Laboratuvarı**  
*Mechanical Testing Laboratory*  
**TS EN 5173'e göre Eğme Deneyi Raporu**  
*Bend Test Report According to EN 5173*

Rapor No/Report Nr. : 1732-18-EĞME-  
Müşteri/Customer : GÜNAL GEMİ  
Proje adı/Project name : ...  
Test Parçası Tanımı / Test Piece Designation : WPS-1 HEAT NR Y1175303 HL045  
Ürün Formu/Form of product : PIPE Ø4"X8,56 mm  
Ortam sıcaklığı/ Ambient temp. : 23 °C  
Dolgu Metali/Filler metal : ...  
Ana Metal /Parent metal : S235JR  
Deneyin amacı/Purpose of examination : WPQR  
Cihaz Bilgisi /Device Information : INSTRON 5989-600kN

Test Numune No	Deney Türü	Boyutlar	Mandrel çapı	Mesnetler arası mesafe	Eğme açısı	Notlar; Çatlak Kırılma Görünüşü
Test Pice No	(Type of test)	(Dimensions) w x t x l (mm)	(Former diameter) mm	(Distance between rollers) mm	(Bend angle degrees)	(Remarks e.g. fracture apperance)
1	ROOT	8,56x30x300	34	55	180	ACCEPTABLE
2	ROOT	8,56x30x300	34	55	180	ACCEPTABLE
3	FACE	8,56x30x300	34	55	180	ACCEPTABLE
4	FACE	8,56x30x300	34	55	180	ACCEPTABLE
5						
6						

**NOTLAR** Malzeme bilgisi müşteri beyanıdır. (Material information was given by Customer)  
**NOTES** Kopyalanamaz, tüm hakları gizlidir. (Can not be copied, all rights reserved.)  
Numune ölçülerinde BV kuralları baz alınmıştır.

**TARİH**  
Date

11.05.2018

**SURVEYOR**



**OPERATÖR**  
(Performed by)



**MEK. TEST LAB. YÖNETİCİSİ**  
(Mech. Testing Lab. Manager)

