

DAFTAR PUSTAKA

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LAMPIRAN

Lampiran 1 Testing report pada pengujian Tarik stainless steel 316L

	PT. BAKRIE PIPE INDUSTRIES Jl. Raya Perjuangan, Medan Satria Bekasi 17131 Indonesia Telp : 021 88882095 Fax : 021 88882094	
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TESTING REPORT

Testing Report No : TR/LAB/12-21/005	1Page : 1 of 2
Customer : Mr. Ahmad Sopandi (NPM: 41187001150075)	Date Tested : 27 December 2021
Address : -	PO No : -
Client Name : -	Sample Marking : 12.MHS.5
Project : -	Work Order No : -
Object to be tested : (as received)	

Test Piece Description : All specimen was taken from stainless steel pipe joint test sample Matrial Spec : A312 TP 316L
Size Pipe : Ø 2.00 Inchi Thickness : 4.00 mm , Welding Process : GTAW, Welding position : 6G

TEST RESULT
See Attachment
TESTING MACHINE



Type of Test	Test Method	Reference Code	Testing Machine Used	ID No.	Serial No.
Tensile	ASME Sect. IX	ASME Sect. IX	Hung Ta	B.02.04	HT-2101

Approved Signatory

Lise Maitner
Laboratory Technician

Attention
1. Don't copy part of this certificate, make any copies of the form and purpose that can be detrimental to the laboratory, without the written approval of the laboratory. All agents or clients, and third parties to use this report, should be subject to and governed by the terms and conditions specified by the laboratory.
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Form No : LAB-QP-18A-Rev. 1
The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

ampiran 2 Attachment Testing Report pada pengujian Tarik stainless steel 316L

	PT. BAKRIE PIPE INDUSTRIES Jl. Raya Perjuangan, Medan Satria Bekasi 17131 Indonesia Telp : 021 88882095 Fax : 021 88882094	
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ATTACHMENT TESTING REPORT


Testing Report No : TR/LAB/12-21/005 Reference Code : ASME Sect. IX Test Method : ASME Sect. IX Room Temperature : 24°C	Page : 2 of 2 Date Tested : 27 December 2021 Sample Marking : 12.MHS.5 Humidity : 54%
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TENSILE TEST (MATERIAL)							
Sample Identification	Measured Diameter (mm)	Measured Thickness (mm)	Measured Width (mm)	Effective Area (mm ²)	Yield Load (N)	Yield Strength (Mpa)	Tensile Load (N)
TS - 1 (A)	-	3.98	13.01	51.78	22425	433.08	35408.95
TS - 2 (B)	-	3.96	13.05	51.68	20538	397.42	34408.36
TS - 3 (C)	-	3.99	13.02	51.95	20799	400.37	34129.68

Sample Identification	Tensile Strength (Mpa)	Gauge Length (mm)	Final Gauge Length (mm)	Elongation (%)	Final Diameter (mm)	Final of Area (mm ²)	Reduction of Area (%)
TS - 1 (A)	683.8	-	-	-	-	-	-
TS - 2 (B)	665.8	-	-	-	-	-	-
TS - 3 (C)	656.9	-	-	-	-	-	-

Remarks : -
Test Conducted By : Mr.Wahyudin

Approved Signatory



Lise Maitner
Laboratory Technician

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 1. Don't copy part of this certificate, make any copies of the form and purpose that can be detrimental to the laboratory, without the written approval of the laboratory. All agents or clients, and third parties to use this report, should be subject to and governed by the terms and conditions specified by the laboratory.
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Form No : LAB-QP-19A-Rev.1
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Lampiran 3 Hasil pengujian tarik (Gas Tungsten Arc Welding) GTAW specimen
1



**Bakrie Pipe
Industries**

PT. BAKRIE PIPE INDUSTRIES

Jl. Raya Perjuangan Km.27, Medan Satria, Bekasi, 17131

Test Date : 12/27/2021

Data Machine

Machine Name : HT 2101
Serial No : 2271
Operator : WAHYUDIN

Standard Reference : ASME Sect. IX : 2017

Data Order

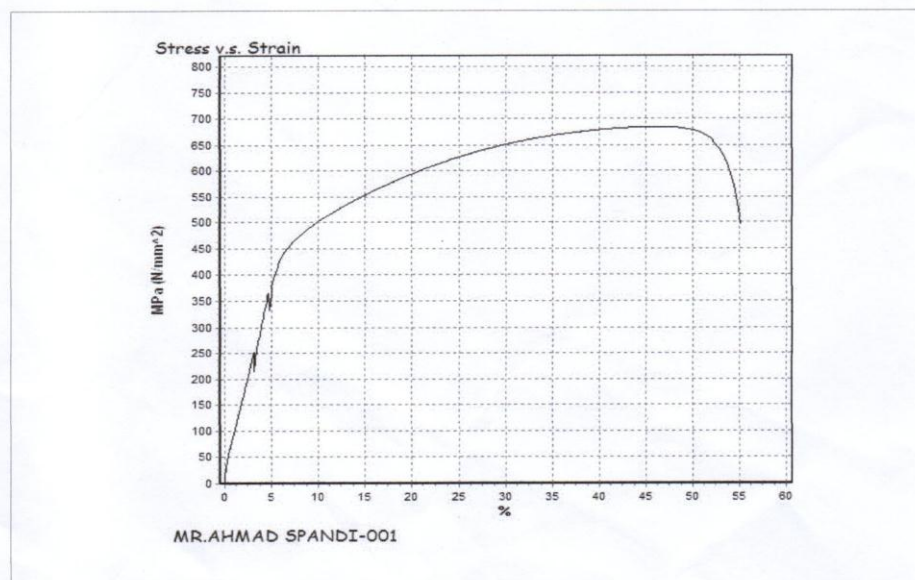
Customer : Mr.Ahmad Sopandi
PO NO / SPK : 12.MHS.5
Size : Ø 2.00" x 4.00 mm
Specification : A312 TP 316L
ID NO : A
Heat No : -
Coil No : -

Specimen Parameter

Materials : PIPE
Direction : -
Location : WELD GTAW 6G
Specimen Type : PLATE
Width : 13.01 mm
Thickness : 3.98 mm
Area : 51.78 mm²

Result

Max Load : 35408.95 N
Tensile Strength : 683.8 MPa
Yield Point : 22425 N
Yield Strength : 433.08 MPa



Witnessed / Reviewed By

Inspected / Reviewed By

Prepared By

(Handwritten signature)

Lampiran 4 Hasil pengujian tarik (Gas Tungsten Arc Welding) GTAW specimen
2



**Bakrie Pipe
Industries**

PT. BAKRIE PIPE INDUSTRIES

Jl. Raya Perjuangan Km.27, Medan Satria, Bekasi, 17131

Test Date : 12/27/2021

Data Machine

Machine Name : HT 2101
Serial No : 2271
Operator : WAHYUDIN

Standard Reference: ASME Sect. IX : 2017

Data Order

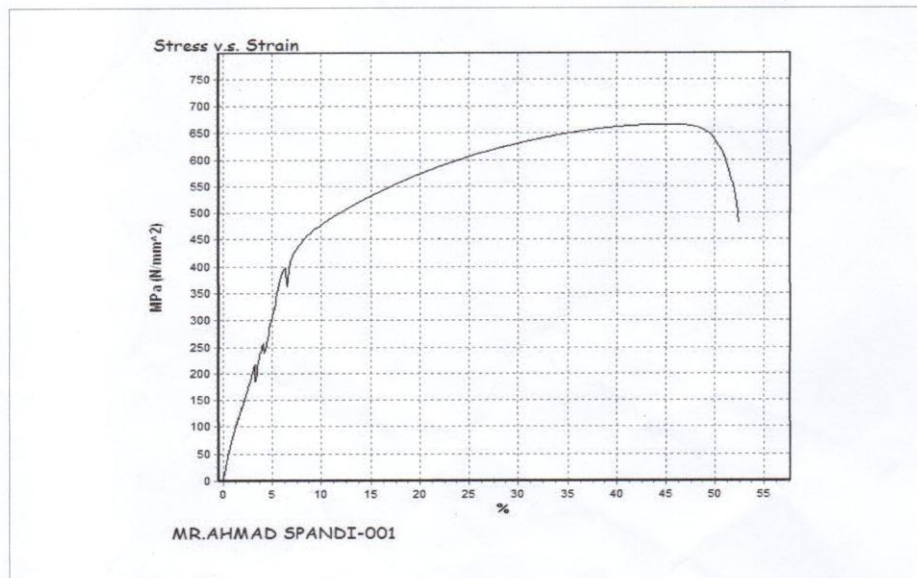
Customer : Mr.Ahmad Sopandi
PO NO / SPK : 12.MHS.5
Size : Ø 2.00" x 4.00 mm
Specification : A312 TP 316L
ID NO : B
Heat No : -
Coil No : -

Specimen Parameter

Materials : PIPE
Direction : -
Location : WELD GTAW 6G
Specimen Type : PLATE
Width : 13.05 mm
Thickness : 3.96 mm
Area : 51.68 mm²

Result

Max Load : 34408.36 N
Tensile Strength : 665.8 MPa
Yield Point : 20538 N
Yield Strength : 397.42 MPa




Witnessed / Reviewed By

Inspected / Reviewed By

Prepared By

(Handwritten signature)

Lampiran 5 Hasil pengujian tarik (Gas Tungsten Arc Welding) GTAW specimen
3



PT. BAKRIE PIPE INDUSTRIES
Jl. Raya Pejuang Km.27, Medan Satria, Bekasi, 17131

Test Date : 12/27/2021

Data Machine

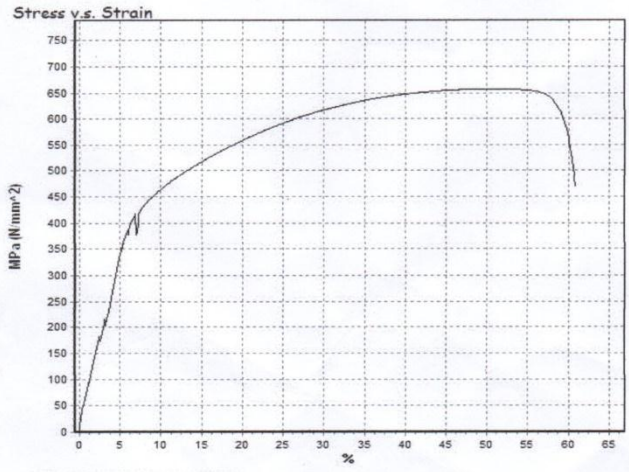
Machine Name	: HT 2101	Standard Reference	: ASME Sect. IX : 2017
Serial No	: 2271		
Operator	: WAHYUDIN		

Data Order

Customer	: Mr.Ahmad Sopandi	Specimen Parameter	
PO NO / SPK	: 12.MHS.5	Materials	: PIPE
Size	: Ø 2.00" x 4.00 mm	Direction	: -
Specification	: A312 TP 316L	Location	: WELD GTAW 6G
ID NO	: C	Specimen Type	: PLATE
Heat No	: -	Width	: 13.02 mm
Coil No	: -	Thickness	: 3.99 mm
		Area	: 51.95 mm ²

Result

Max Load	: 34129.68 N
Tensile Strength	: 656.9 MPa
Yield Point	: 20799 N
Yield Strength	: 400.37 MPa



MR.AHMAD SPANDI-001

Witnessed / Reviewed By _____ Inspected / Reviewed By _____ Prepared By _____

(Signature)

Lampiran 6 WPS Hasil pengelasan (Gas Tungsten Arc Welding) GTAW

PT. GEMALA SARANAUPAYA
Manufacture of pressure vessel, mining, oil, gas & transport equipment and steel cutting

WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-200.1, Section IX, ASME Boiler and Pressure Vessel Code - Edition 2013)

Company Name PT. GEMALA SARANAUPAYA		By _____	
Welding Procedure Specification No. 16/GSU/WPS/ASME/2017		Date March 30th, 2017	
Supporting PQR No. (s) 18/GSU/PQR/ASME/2017		Date March 29th, 2017	
Revision No. 0		Date _____	
Welding Process(es) GTAW		Type MANUAL	

<p>JOINT (QW-402)</p> <p>Joint Design SINGLE "V" GROOVE</p> <p>Root Spacing 1.6 - 3.2 mm</p> <p>Backing Yes _____ No <u>V</u></p> <p>Backing Material (Type) N/A</p> <p><input type="checkbox"/> Metal <input type="checkbox"/> Nonfusing metal <input type="checkbox"/> Nonmetal <input type="checkbox"/> Other</p> <p><small>Sketches, Production Drawings, Weld Symbols, or Written Description should show the general arrangement of the parts to be welded. Where applicable, the detail of weld groove may be specified.</small></p> <p><small>(At the option of the manufacturer, sketches may be attached to illustrate joint design, weld layout, and bead sequence (e.g., for notch toughness procedures, for multiple process procedures, etc.)</small></p>	<p style="text-align: center;">Details</p>
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*BASE METALS (QW-403)			
P-No. 8	Group No. 1	P-No. 8	Group No. 1
OR			
Specification and type/grade or UNS Number		A312 TP 316L	
to specification and type/grade or UNS Number		A312 TP 316L	
OR			
Chem. Analysis and Mech. Prop.		N/A	
to Chem. Analysis and Mech. Prop.		N/A	
Thickness Range			
Base Metal	Groove	1.5 - 14.22 mm	
Maximum Pass Thickness ≤ 1/2 in. (13 mm)		(Yes) _____	(No) <u>V</u>
Other _____			

*FILLER METALS (QW-404)	
Process	GTAW
Spec. No. (SFA)	A5.9
AWS No. (Class)	ER316L
F-No.	8
A-No.	8
Size of Filler Metals	Ø 2.4mm
Filler Metals Product Form	-
Supplemental Filler Metal	-
Weld Metal	-
Thickness Range	Max 14.22 mm
Groove	-
Fillet	-
Electrode-Flux (Class)	-
Flux Type	-
Flux Trade Name	-
Consumable Inert	-
Other	-





*Each base metal filler metal combination should be tested separately.

Jl. Sempur Timur No.3 - Cilingkir, Jakarta 14130, INDONESIA Telp. 021 - 4403065 - 4406526 Fax. 021 - 4403062 www.gsu.co.id

No. Reg. 177 / 73-09 / WPS / 2017
Tanggal: 13 APR 2017



PT. GEMALA SARANAUPAYA
 Manufacture of pressure vessel, mining, oil, gas & transport equipment and steel cutting

WPS No. : 18/GSU/WPS/ASME/2017		Rev. : 0																									
POSITION (QW-405) Position (s) of Groove : <u>All Position</u> Welding Progression : Up <u>✓</u> Down <u>-</u> Position (s) of Fillet : <u>All</u> Other : <u>-</u>		POSTWELD HEAT TREATMENT (QW-407) Temperature Range : <u>N/A</u> Time Range : <u>N/A</u> Other : <u>-</u>																									
PREHEAT (QW-406) Preheat Temperature, Minimum : <u>Removal Moisture</u> Interpass Temperature, Maximum : <u>150 °C</u> Preheat Maintenance : <u>-</u> Other : <u>-</u> (Continue or special heating, where applicable, should be recorded)		GAS (QW-408) <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th colspan="3" style="text-align: center;">Percent Composition</th> </tr> <tr> <th></th> <th style="text-align: center;">Gas(es)</th> <th style="text-align: center;">(Mixture)</th> <th style="text-align: center;">Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Shielding</td> <td style="text-align: center;">ARGON</td> <td style="text-align: center;">99.99%</td> <td style="text-align: center;">8-20l/min</td> </tr> <tr> <td>Tailing</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td>Backing</td> <td style="text-align: center;">ARGON</td> <td style="text-align: center;">99.99%</td> <td style="text-align: center;">8-20l/min</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>			Percent Composition				Gas(es)	(Mixture)	Flow Rate	Shielding	ARGON	99.99%	8-20l/min	Tailing	-	-	-	Backing	ARGON	99.99%	8-20l/min	Other	-	-	-
	Percent Composition																										
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Other	-	-	-																								
ELECTRICAL CHARACTERISTIC (QW-409)																											
Weld Peak Test	Welding Process	Filler Metal		Current Type and Polarity	Amps (Range)	Wire Feed Speed (Range) m/min	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g., Remarks, Comments, Post Weld Addition, Technique, Torch Angle, etc.)																	
	GTAW	ER316L	Ø 2.4	DC-EN	78 - 110	-	-	8 - 13	85 - 89	-																	
	GTAW	ER316L	Ø 2.4	DC-EN	85 - 125	-	-	8 - 13	111 - 151	-																	
	GTAW	ER316L	Ø 2.4	DC-EN	89 - 129	-	-	8 - 14	84 - 115	-																	
	GTAW	ER316L	Ø 2.4	DC-EN	95 - 137	-	-	8 - 14	73 - 88	-																	
Amps and wire feed power or energy range should be recorded for each electrode size, position, and technique, all.				Pulsing Current : <u>DCEN</u> Heat Input (Max.) : <u>1.18 kJ/min</u>		Tungsten Electrode Size and Type : <u>N/A</u>		Mode of Metal Transfer for GMAW (FCAW) : <u>N/A</u>		Other : <u>-</u>																	
TECHNIQUE (QW-410)																											
String or Weave Bead					: <u>String and Weave</u>																						
Orifice, Nozzle, or Gas Cup Size					: <u>-</u>																						
Initial and Interpass Cleaning (Brushing, Grinding, etc.)					: <u>Brushing and Grinding</u>																						
Methods of Back Gouging					: <u>N/A</u>																						
Oscillation					: <u>N/A</u>																						
Contact Tube to Work Distance					: <u>N/A</u>																						
Multiple or Single Pass (Per Side)					: <u>Multiple Pass</u>																						
Multiple or Single Electrode					: <u>Single</u>																						
Peening					: <u>N/A</u>																						
Other					: <u>-</u>																						
PT. GEMALA SARANAUPAYA Prepared By:   <u>ALI KHARIDOLOH</u> Welding Engineer																											
13 APR 2017 Approved:   No. Reg. 177/KS-04/WB/2017 Mengalahkan Direktur Teknik dan Lingkungan Migas Dr. Ir. Patuan Alfan S., MM, MKKK4 NIP. 196810281993031013																											

