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LAMPIRAN

Lampiran 1. Spesimen ASTM A36 setelah dilas.

Lampiran 1.1 Pengelasan 80 Ampere.



Lampiran 1.2 Pengelasan 90 Ampere.



Lampiran 1.3 Pengelasan 100 Ampere.



Lampiran 2. Pemotongan Spesimen Uji Kekerasan.

Lampiran 2.1 Pemotongan Spesimen 80 Ampere.



Lampiran 2.2 Pemotongan Spesimen 90 Ampere.



Lampiran 2.3 Pemotongan Spesimen 100 Ampere.



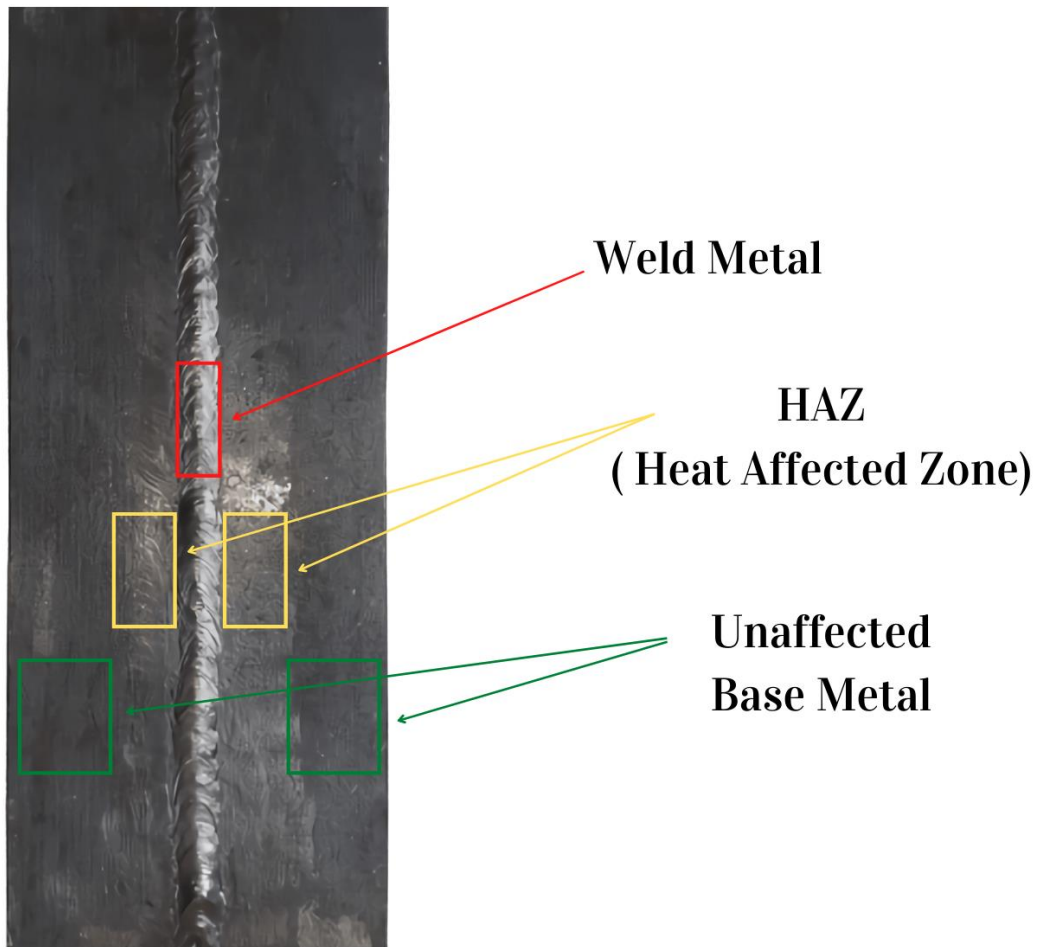
Lampiran 3. Pemotongan Spesimen Uji Struktur Mikro.

Lampiran 3.1 Pemotongan Spesimen Ampere 80 90 dan 100.





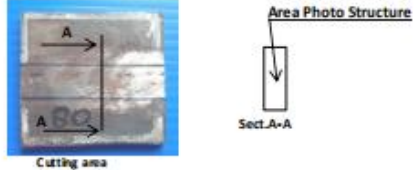
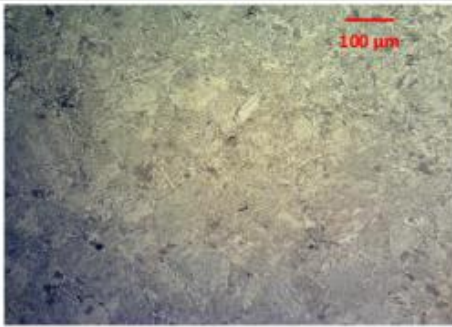
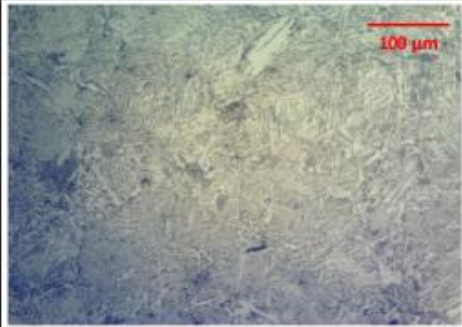
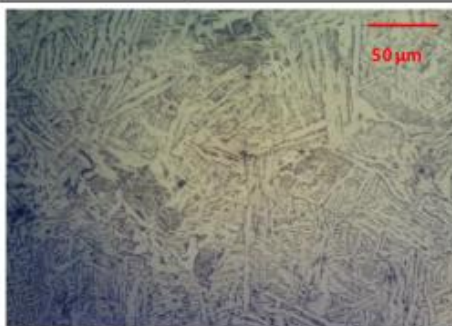
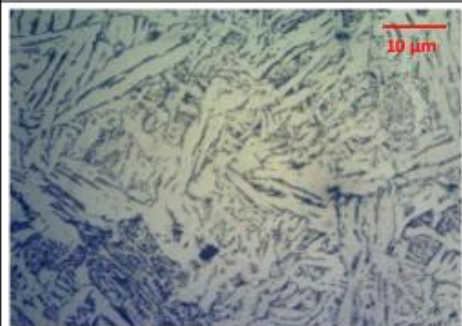
Lampiran 4. Posisi Weld Metal, Heat Affected Zone dan Unaffected Base Metal.

Lampiran 4.1 Hasil material ASTM A36 yang sudah di las dengan titik Weld Metal, Heat Affected Zone dan Unaffected Base Metal.



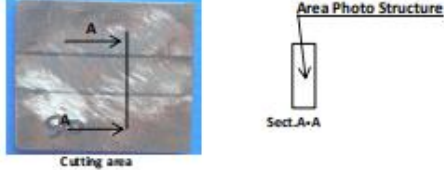
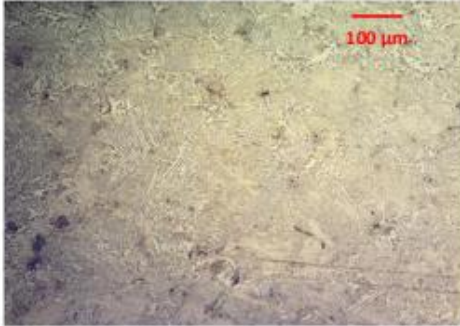
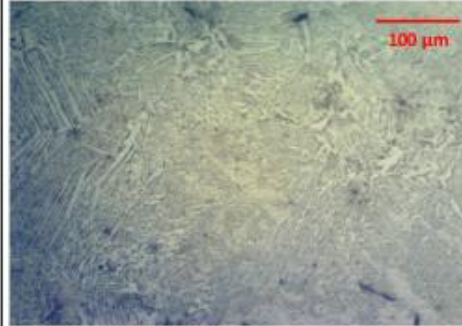
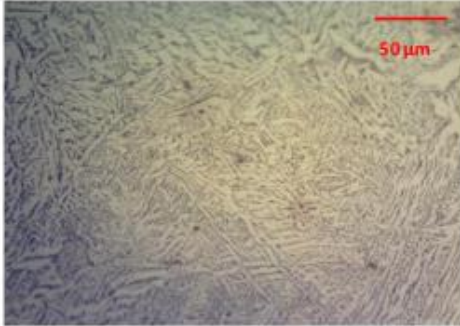
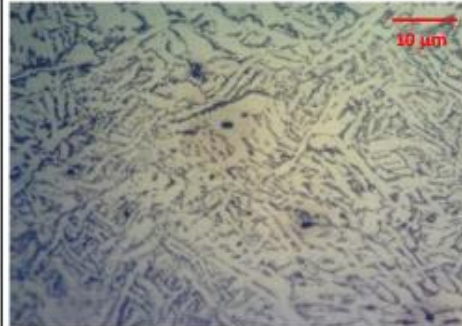


Lampiran 5. Hasil Pengujian Kekerasan dan Struktur Mikro.


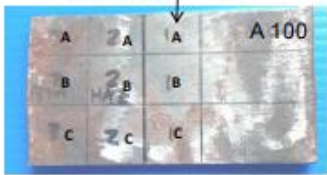

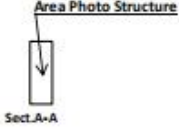
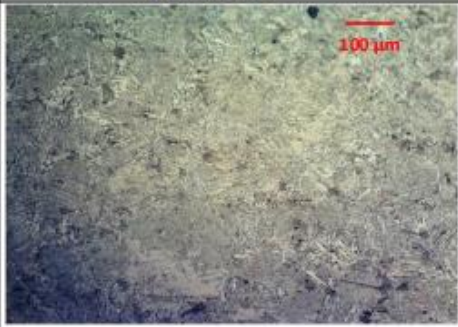
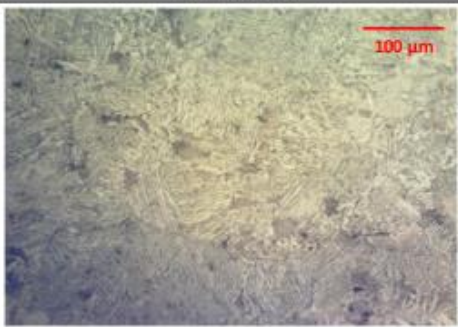
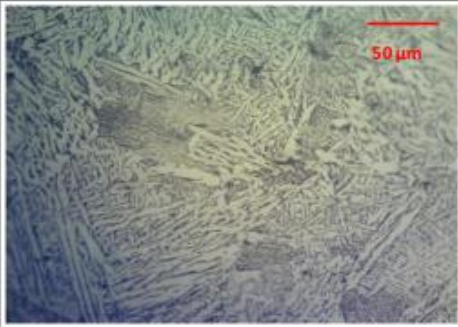
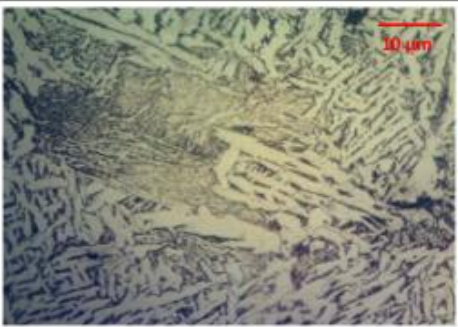
Lampiran 5.1 Hasil Pengujian Kekerasan dan Struktur Mikro 80 Ampere.

		TEST REPORT		TEST LABORATORY					
		PP4-FRM-05021							
		TEST DATE : 21 Juni 2022	PAGE : 1 / 1.						
1. PART NAME		: Steel Plate ASTM A36 (Ampere 80)							
2. KIND of TESTING		: Hardness Test & Photo Structure							
3. TEST EQUIPMENT		: Rockwell Hardness Tester & Microscope Metallurgy							
<p>Area Hardness</p>  <p>Area Photo Structure</p> 									
A.HARDNESS (Use Rockwell Hardness Tester ,Load 150Kg)									
Sample No.	Hardness (HRC)								
	Point								
	1A	1B	1C	2A	2B	2C	3A	3B	3C
1	21,5	16,8	14,8	16,8	18,2	15,2	12,3	12,9	11,8
2	21,3	22,4	15,9	12,9	15,8	16,2	12,8	12,4	11,9
3	22,2	23,1	23,9	20,8	21,1	17,9	14,1	15,1	16,2
B.PHOTO STRUCTURE (Use Metallurgical Microscope)									
Magnification 100X		Magnification 200X							
									
Magnification 500X		Magnification 1000X							
									

Lampiran 5.2 Hasil Pengujian Kekerasan dan Struktur Mikro 90 Ampere.

 TEST REPORT PP4-FRM-05021 TEST DATE : 21 Juni 2022		TEST LABORATORY							
			PAGE : 1 / 1.						
1. PART NAME	: Steel Plate ASTM A36 (Ampere 90)								
2. KIND of TESTING	: Hardness Test & Photo Structure								
3. TEST EQUIPMENT	: Rockwell Hardness Tester & Microscope Metallurgy								
<p>Area Hardness</p>  <p>Area Photo Structure</p> 									
A.HARDNESS (Use Rockwell Hardness Tester ,Load 150Kg)									
Sample No..	Hardness (HRC)								
	Point								
	1A	1B	1C	2A	2B	2C	3A	3B	3C
1	17,7	17,8	16,2	12,2	12,9	14,2	11,4	12,1	12,0
2	18,2	20,6	17,9	15,1	17,0	14,9	15,0	16,1	14,8
3	19,8	21,1	19,8	16,4	15,1	15,2	12,3	13,5	13,7
B.PHOTO STRUCTURE (Use Metallurgical Microscope)									
Magnification 100X		Magnification 200X							
									
Magnification 500X		Magnification 1000X							

Lampiran 5.3 Hasil Pengujian Kekerasan dan Struktur Mikro 100 Ampere.

 TEST REPORT PP4-FRM-05021 TEST DATE : 21 Juni 2022		TEST LABORATORY							
			PAGE : 1 / 1.						
1. PART NAME	: Steel Plate ASTM A36 (Ampere 100)								
2. KIND of TESTING	: Hardness Test & Photo Structure								
3. TEST EQUIPMENT	: Rockwell Hardness Tester & Microscope Metallurgy								
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Area Hardness</p>  </div> <div style="text-align: center;">  <p>Cutting area</p> </div> <div style="text-align: center;"> <p>Area Photo Structure</p>  <p>Sect. A-A</p> </div> </div>									
A.HARDNESS (Use Rockwell Hardness Tester ,Load 150Kg)									
Sample No.	Hardness (HRC)								
	Point								
	1A	1B	1C	2A	2B	2C	3A	3B	3C
1	22,2	20,8	22,4	17,2	18,5	21,1	15,1	17,2	15,4
2	20,7	22,8	21,4	17,2	17,8	16,9	14,6	15,0	15,7
3	20,5	19,9	23,7	19,1	20,5	20,6	17,2	18,0	18,9
B.PHOTO STRUCTURE (Use Metallurgical Microscope)									
Magnification 100X		Magnification 200X							
									
Magnification 500X		Magnification 1000X							
									

Lampiran 6. Sertifikat *Welder Performance Qualification*.

Lampiran 6.1 Sertifikat Pengelasan.

BASUKI

PT. BASUKI PRATAMA ENGINEERING
Jl. Kibinong (Basuki) Indah
Lakasa 11970-3
Phone: 021-7465117
Fax: 021-7465222

WELDER PERFORMANCE QUALIFICATIONS (W PQ)
Section IX, ASME Boiler and Pressure Vessel Code

Welder's name: SUPRIYONO Welder Stamp: SP 01

Test Description

Identification of WPS followed: 21 A / ASME / BPE 72004 Test coupon Production
Specification of base metal(s): A 106 Sch 40 Gr. B Thickness: 6 mm

Welding Variables (QW-350)	Actual Values	Range Qualified
Welding process(es)	GTAW	GTAW
Type (ie. manual, semi-automatic) used	MANUAL	MANUAL
Backing (With / without)	Without	With and Without
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	Pipe diameter 114.3 mm	73 mm up to unlimited
Base metal P- or S-Number to P- or S-Number	S. No 1 to S. No 1	P or S No 1, 11, 34, 4
Filler metal or electrode specification(s) (EFA) (info. only)	SPA 5 18	SPA 5 18
Filler metal F-Number(s) (info. only)	ER70S-G	All Class.
Consumable insert (GTAW or PAW)	F6	ALL F6
Flux type (solid/medal or flux core/powder) (GTAW or PAW)	Solid	Solid
Deposits thickness for each process	8 mm	Max 12 mm
Process 1 GTAW 3 layers min <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	-	-
Process 2 3 layers min <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	-	-
Position qualified (2G, 6G, 3F, etc.)	6 D	All Position
Vertical progression (uphill or downhill)	Uphill	Uphill
Type of fuel gas (OPW)	NONE	NONE
Inert gas backing (GTAW, PAW, GMAW)	N/A	N/A
Transfer mode (spray/globular or pulse to short circuit-GMAW)	N/A	N/A
GTAW current type/polarity (AC, DCEP, DCEN)	DCEN	DCEN

RESULTS

Visual examination of completed weld (QW-302.4) **ACCEPTED**

Transverse face and root bends [QW-462.3(a)] Longitudinal bend [QW-462.3(b)] Side bend [QW-462.2]

Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]

Plate bend specimen, corrosion-resistant overlay [QW-462.5(d)]

Pipe specimen, Macro test for fusion [QW-462.5(e)] Plate specimen, Macro test for fusion [QW-462.5(f)]

Type	Result	Type	Result
N/A	N/A	N/A	N/A

Alternative radiographic examination results (QW-101) Accepted report WQT No. 2/R1/03/04/09

Weld — fracture test (QW-180) N/A Length and percent of defects N/A

Macro examination (QW-184) N/A Fillet size (in.) N/A Convexity/concavity (in.)

Other tests N/A

Film or specimens evaluated by Indra Jaya Company PT GAMMA HEPSI

Mechanical tests conducted by N/A Laboratory test no. N/A

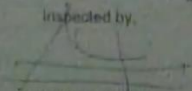
Welding supervised by A. Suheri

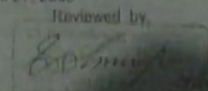
CERTIFICATE OF COMPLIANCE


Test Conducted by: **PT BASUKI PRATAMA ENGINEERING**

We certify that the statements in this record are correct and that the test coupons were prepared, welded, and tested with the requirements of Section IX of the ASME BOILER AND PRESSURE VESSEL CODE.

PT BASUKI PRATAMA ENGINEERING
Jakarta, April 27, 2009

Inspected by:  AHMAD SUHERI

Reviewed by:  PT GAMMA HEPSI

Approved by: 

Web site: <http://www.basukiengineering.com>
E-mail address: basuki@ptbpe.com

Lampiran 7. Welding Procedure Spesification.

Lampiran 7.1 Welding Procedure Spesification.

WELDING PROCEDURE SPESIFICATION (WPSs)						
WPS				WPS/Basuki /16-04-2022/001	00	16/04/2022
Company Name				WPS No.	Rev No.	Date
Supriyono		4/16/2022		No	No	
Authorize by		Date		Supporting PQR(s)	CVN Report	
BASE METALS	Spesification	Type or Grade	AWS Group No.	BASE METAL THICKNESS	As-Welded	With PWHT
Base Material	ASTM A36	-	I	CJP Groove Welds	-	-
Welded To	ASTM A36	-	I	CJP Groove w/CVN	-	-
Backing Material	-	-	-	PJP Groove Welds	-	-
Other	-	-	-	Fillet Welds	-	-
				DIAMETER	-	-
JOINT DETAILS				JOINT DETAILS (Sketch)		
Groove Type		Single V Groove Butt Joint				
Groove Angle		60°-70°				
Root Opening		2,6mm				
Root Face		2,6mm				
Backgouging		-				
Methode		-				
POST WELD HEAT TREATMENT						
Temperature		-				
Time at Temperature		-				
PROCEDURE						
Weld Layer(s)		1				
Weld Pass(es)		1				
Process		SMAW				
Type (Semiautomatics, Mechanized, etc)		Manual				
Position		1G				
Vertical Progression		-				
Filler Metal (AWS Spec)		A5.1				
AWS Classification		E6013				
Diameter		2,6				
Manufacture/Trade Name		-				
Shielding Gas Composition		-				
Flow Rate		-				
Nozzle Size		-				
Preheat Temperature		-				
Interpass Temperature		-				
Electrical Characteristics		-				
Current Type and Polarity		DCSP				
Transfer Mode (GMAW)		-				
Power Source Type (cc, cv, etc)		-				
Amps / Current		80 - 100				
Volts		60 - 70				
Wire Feed Speed		-				
Travel Speed (mm/s)		2-5				
Maximum Heat Input		-				
Technique		-				
Stringer or Weave		Stringer				
Multi or Single Pass (per side)		Multipass				
Oscillation (Mechanized/Automaic)		None				
Number of Electrodes		1				
Contact Tube to Work Dist.		-				
Peening		None				
Interpass Cleaning		Grinding or Brushing				
Others		-				