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LAMPIRAN

Lampiran 1. WPS 17 PT. Cahaya Cemerlang Semesta

**PT. CAHAYA CEMERLANG SEMESTA****Fabrication – Production – Engineering**

Jl raya tubagus angeke, kompleks taman dutamas, Jl. Kusuma No. 20A Jakarta

Barat, Jakarta 11460

Tlp : 0812-9413-0302

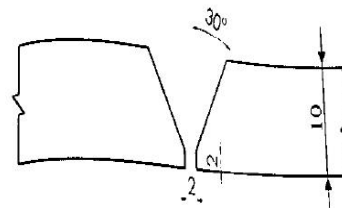
Email : CahayaCemerlangSemesta@gmail.com

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name PT CAHAYA CEMERLANG SEMESTA By Rizki Pratama
 Welding Procedure Specification No. 17/CCS/AWS/2017 Date 18 Juni 2017
 Supporting PQR No. 17/CCS/AWS/2017 Date 19 Juni 2017
 Revision No. 0 Date -
 Welding Process GTAW Type SEMI-AUTO

JOINT (QW-402)Joint Design : SINGLE "V" GROOVERoot Spacing : 2 mmBacking : Yes - No ✓Backing Material : N/A Metal Nonfusing Metal Nonmetal Other

Detail

**BASE METAL (QW-403)**Specification and type/grade or UNS Number B152 TP OFETo specification and type/grade or UNS Number B152 TP OFE

OR

Chem Analysis and Mech prop N/Ato Chem Analysis and Mech prop N/A

Thickness Range

Base Metal Groove -Maximum Thickness -Other -**FILLER METAL (QW-404)**Process GTAWSpec. No (SFA) A5.7AWS No. (Class) ERCuSize of Filler Metal 2.4 mmFiller Metal product Form -Support Filler Metal -Electrode-Flux -Flux Type -Flux Trade Name -Consumable Insert -Other -

WPS No. :17/CCS/AWS/2017		Rev :0							
POSITION (QW-405)				POSTWELD HEAT TREATMENT (QW-407)					
Position of Groove : <u>All Position</u>				Temperature Range : <u>N/A</u>					
Welding Progression : Up <u>√</u> Down <u>-</u>				Time Range : <u>N/A</u>					
Position of Fillet : <u>All</u>				Other : _____					
Other : <u>-</u>									
PREHEAT (QW-406)				GAS (QW-408)					
Preheat Temperature, minimum : <u>Removal Moisture</u>				Shielding <u>ARGON</u> <u>99.97%</u> <u>8 - 15 l/min</u>					
Interpass Temperature, maximum : <u>310 C</u>				Trading <u>-</u> <u>-</u> <u>-</u>					
Preheat Maintenance : <u>-</u>				Backing <u>ARGON</u> <u>99.97%</u> <u>8 - 15 l/min</u>					
Other : <u>-</u>				Other <u>-</u> <u>-</u> <u>-</u>					
ELECTRICAL CHARECTERISTIC (QW-409)									
Weld Pass	Welding Process	Filler Metal		Current Type and Polaritas	Ampere (Range)	Volt (Range)	Travel Speed (Range)	Energy of Power (Range)	Wire Feed Speed
		Class	Diameter						
Weld Plate (A)	GTAW	ERCu	Ø 2.4	DC-EN	80 - 150	8 - 13	30 - 100	-	-
Weld Plate (B)	GTAW	ERCu	Ø 2.4	DC-EN	80 - 150	8 - 13	30 - 100	-	-
Weld Plate (C)	GTAW	ERCu	Ø 2.4	DC-EN	80 - 150	8 - 13	30 - 100	-	-
Pulsing Current : <u>DCEN</u>				Heat Input (max) <u>3.15 kJ/min</u>					
Tungsten Electrode Size and Type : <u>Ceriated 2% (2.4 mm)</u>									
Other : <u>N/A</u>									
TECHNIQUE (QW-410)									
String or Weave Bead : <u>String and Weave</u>									
Initial and Interpas Cleaning : <u>Brushing and Grinding</u>									
Methode of Back Gouding : <u>N/A</u>									
Contact Tube to Work Distance : <u>N/A</u>									
Multiple or Single Pass : <u>Multiple Pass</u>									
Multiple or Single Electrode : <u>Single</u>									
Peanning : <u>N/A</u>									
Other : <u>-</u>									

PT. CAHAYA CEMERLANG SEMESTA

Prepared By



Rizki Pratama

Welding Engineer

Lampiran 2. PQTR PT. Cahaya Cemerlang Semesta

PERFORMANCE QUALIFICATION TEST RECORD

(GTAW)

Name Rizki Pratama Welder Welding Operator
 ID No. - WPS Used 17/CCS/AWS/2017
 Process(es) GTAW Transfer Mode (GMAW) -
 Test Base Metal Specification B 152 To -
 Material Number 31 To -
 Fuel Gas (OFW) -
 AWS Filler Metal Classification(s) ERCu F No. 31
 Backing: Yes No Double Side Single Side
 Current/Polarity: AC DCEP DCEN
 Consumable Insert: Yes No Backing Gas: Yes No
Test Weldment **Position Tested** **Weldment Thickness (T)**
 Groove: Pipe 1G 2G 5G 6G Thickness _____ Diameter _____
 Plate 1G 2G 3G 4G Thickness 10 mm
 Fillet: Pipe 1F 2F 2FR 4F 5F Thickness _____ Diameter _____
 Plate 1F 2F 3F 4F Thickness _____
 Cladding: 1C 2C 3C 4C 5C 6C Thickness _____
 Hardfacing: 1C 2C 3C 4C 5C 6C Thickness _____
 Progression: Vertical Up Vertical Down

Test Results **Remarks** _____
 Visual Test: Pass Fail N/A
 Brin Test: Pass Fail N/A
 Micro Test: Pass Fail N/A
 Break Test: Pass Fail N/A
 Radiographic Test: Pass Fail N/A

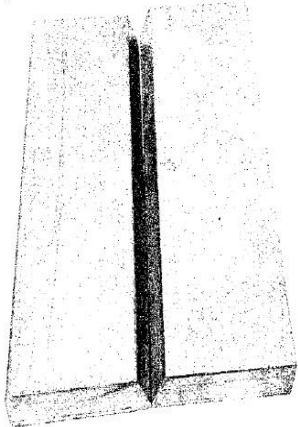


Qualification Limits
 Process(es) GTAW
Weldment **Position** **Deposit Thickness**
 Groove: Pipe F H V O All t min. _____ t max. _____ Dia. min. _____
 Plate F H V O All t min. _____ t max. _____
 Cladding: F H V O All t min. _____ t max. _____
 Hardfacing: F H V O All t min. _____ t max. _____
Base Metal Thickness
 Fillet: Pipe F H V O All T min. _____ T max. _____ Dia. min. _____
 Plate F H V O All T min. _____ T max. _____
 Progression: Vertical Up Vertical Down
 Base Metal M No(s) 31 Fuel Gas (OFW) -
 Filler Metal F No(s) 31 Backing: Yes No
 Current/Polarity: AC DCEP DCEN Consumable Insert: Yes No
 Backing Gas yes Transfer Mode (GMAW) -

I certify that the statements in this record are correct and the test welds were prepared, welded, and tested in accordance with the requirements of AWS B2.1/B2.1M, (2010), Specification for Welding Procedure and Performance Qualification.
 Date Tested 23 Juli 2022 Qualifier Signature _____

Lampiran 3. Report Penetrant Testing



PT. BAKRIE PIPE INDUSTRI

LIQUID PENETRANT EXAMINATION REPORT			
From : PT Inspector To : Final Inspector Material Examined : Cooper Alloy Size : P =100 mm Spec. : ASTM B152 Surface Condition : As Welded Stage of Examination : After Welding Welding Process : GTAW Scope of Examination : Base Material Date : 07 – 08 – 2022		SKETCH 	
Reference Procedure No. & Revision : Surface Condition : Smooth Surface Temperature : Location :			
Liquid Penetrant Materials PT Tchnique : Solvent Removable Penetrant Type : SKL-SP2 Cleaner (PT remover) : SKC-S Developer Type : SKD-S2			
Method Description Examination Method : Visible <input checked="" type="checkbox"/> Fluorescent <input type="checkbox"/> Pre-cleaning Method : Spraying Penetrant Application : Spraying Dwell Time : 10 Minutes Developer Application : Spraying Developing Time : 10 Minutes Light intensity : Lighting Equipment : Flashlight			
No Item	Plate Weld	Test Result	Remarks
1	Sample A (80 A, 50 mm/min)	ACC	
2	Sample B (100 A, 45 mm/min)	ACC	
3	Sample C (120 A, 40 mm/min)	ACC	
Note: ✓ : Accept R : Reject PT : Liquid Penetrant Exam.			
Prepared by,  PT Inspector		Checked by,  QC Supervisor	Reviewed / Witnessed by, _____ Inspector

Lampiran 4. Report Hardness Brinell



**WORKSHOP FAKULTAS TEKNIK
UNIVERSITAS ISLAM "45" BEKASI**

Jl. Cut Meutia No. 83 BEKASI 17113 Telp.(021) 8802015, 8801027

HARDNESS TEST REPORT BRINELL					
Testing Report No : TR/LAB/071022/003					
Test Equipment : Hardness Brinell Test					
Costumer : Heru Prastian					
Material Examined : Cooper Alloy					
Room Temperature : 24°C					
Size : P =100 mm					
Spec. : ASTM B152					
Surface Condition : As Welded					
Stage of Examination : After Welding					
Welding Process : GTAW					
Scope of Examination : BASE metal					
Date : 07 – 10 – 2022					
Method Description					
Test Method : ASTM E 10					
Material Size : Plate Thickness 10 mm					
Test Force : 1500 kgf					
Dwelling Time : 15 s					
Ball Indenter : 5 mm					
Method : 5/250					
Magification : AUTO					
Testing Machine : Laizou Huayin 200HB – 3000					
Location : BASE Metal					
Hardness Test Location BASE Metal (HB)					
No	Sample	titik	D1	D2	HB
1	80 A, 50 mm/min	1	2.767	2.737	240.8
		2	2.644	2.685	248.4
		3	2.648	2.669	249.6
2	100 A, 45 mm/min	1	2.755	2.736	232.6
		2	2.732	2.732	235.2
		3	2.749	2.698	236.8
3	120 A, 40 mm/min	1	2.563	2.544	272.5
		2	2.559	2.540	273.4
		3	2.547	2.528	276.2

Bekasi, 7 Oktober 2022

Staff Lab. Workshop T. Mesin

Akhmad Hanif H. A.Md.



WORKSHOP FAKULTAS TEKNIK UNIVERSITAS ISLAM "45" BEKASI

Jl. Cut Meutia No. 83 BEKASI 17113 Telp.(021) 8802015, 8801027

HARDNESS TEST REPORT BRINELL					
Testing Report No : TR/LAB/071022/003					
Test Equipment : Hardness Brinell Test					
Costumer : Heru Prastian					
Material Examined : Cooper Alloy					
Room Temperature : 24°C					
Size : P =100 mm					
Spec. : ASTM B152					
Surface Condition : As Welded					
Stage of Examination : After Welding					
Welding Process : GTAW					
Scope of Examination : HAZ					
Date : 07 - 10 - 2022					
Method Description					
Test Method : ASTM E 10					
Material Size : Plate Thickness 10 mm					
Test Force : 1500 kgf					
Dweling Time : 15 s					
Ball Indenter : 5 mm					
Method : 5/250					
Magification : AUTO					
Testing Machine : Laizou Huayin 200HB - 3000					
Location : HAZ Metal					
Hardness Test Location HAZ (HB)					
No	Sample	titik	D1	D2	HB
1	80 A, 50 mm/min	1	1.955	1.894	496.0
		2	1.895	1.929	502.8
		3	1.918	1.897	505.3
2	100 A, 45 mm/min	1	1.953	1.953	481.0
		2	1.948	1.948	483.6
		3	1.935	1.952	485.9
3	120 A, 40 mm/min	1	1.865	1.874	526.8
		2	1.859	1.878	527.4
		3	1.871	1.860	529.2

Bekasi, 7 Oktober 2022

Staff Lab. Workshop T. Mesin

Akhmad Hanif H. A.Md.



WORKSHOP FAKULTAS TEKNIK UNIVERSITAS ISLAM "45" BEKASI

Jl. Cut Meutia No. 83 BEKASI 17113 Telp.(021) 8802015, 8801027

HARDNESS TEST REPORT (BRINELL)					
Testing Report No : TR/LAB/071022/003 Test Equipment : Hardness Brinell Test Costumer : Heru Prastian Material Examined : Cooper Alloy Room Temperature : 24°C Size : P =100 mm Spec. : ASTM B152 Surface Condition : As Welded Stage of Examination : After Welding Welding Process : GTAW Scope of Examination : Weld Metal Date : 07 – 10 – 2022					
Method Description					
Test Method : ASTM E 10 Material Size : Plate Thickness 10 mm Test Force : 1500 kgf Dwelling Time : 15 s Ball Indenter : 5 mm Method : 5/250 Magification : AUTO Testing Machine : Laizou Huayin 200HB – 3000 Location : Weld Metal					
Hardness Test Location Weld Metal (HB)					
No	Sample	titik	D1	D2	HB
1	80 A, 50 mm/min	1	1.648	1.617	697.3
		2	1.616	1.627	707.1
		3	1.658	1.585	707.1
2	100 A, 45 mm/min	1	1.658	1.627	688.6
		2	1.669	1.606	692.9
		3	1.616	1.658	693.3
3	120 A, 40 mm/min	1	1.595	1.595	731.0
		2	1.606	1.585	731.4
		3	1.585	1.595	736.2

Bekasi, 7 Oktober 2022

Staff Lab. Workshop T. Mesin




Akhmad Hanif H. A.Md.

Lampiran 5. Report Metallurgy



**WORKSHOP FAKULTAS TEKNIK
UNIVERSITAS ISLAM "45" BEKASI**

Jl. Cut Meutia No. 83 BEKASI 17113 Telp.(021) 8802015, 8801027

<u>METALLURGY TEST REPORT</u>			
Testing Report No	TR/LAB/211022/009	Testing Method	Struktur Mikro
Customer	Heru Prastian	Standard	ASTM E3, ASTM E340
Material Examined	Cooper Alloy	Testing Machine	KEYENCE VH-Z100R.
Room Temperature	24°C	Sample code	80A (sample A)
Date	21 – 10 – 2022	Etching	Nitrit Acid 68%
Magnification	1000x	Picture's Location	Base, HAZ, Weld
MICRO EXAMINATION AND PHOTO			
Base Metal	HAZ	Weld Metal	
			

Bekasi, 21 Oktober 2022

Staff Lab. Workshop T. Mesin





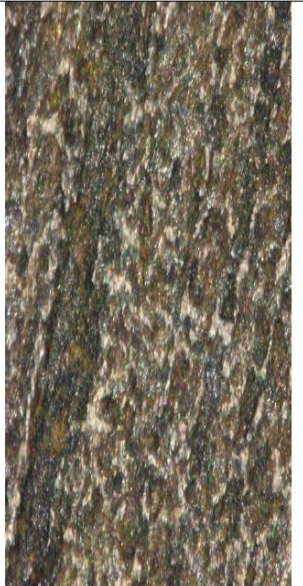
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Jl. Cut Meutia No. 83 BEKASI 17113 Telp.(021) 8802015, 8801027

METALLURGY TEST REPORT

Testing Report No	TR/LAB/211022/009	Testing Method	Struktur Mikro
Customer	Heru Prastian	Standard	ASTM E3, ASTM E340
Material Examined	Cooper Alloy	Testing Machine	KEYENCE VH-Z100R.
Room Temperature	24°C	Sample code	100A (sample B)
Date	21 – 10 – 2022	Etching	Nitrit Acid 68%
Magnification	1000x	Picture's Location	Base, HAZ, Weld
MICRO EXAMINATION AND PHOTO			
Base Metal	HAZ	Weld Metal	
			

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METALLURGY TEST REPORT

Testing Report No	TR/LAB/211022/009	Testing Method	Struktur Mikro
Customer	Heru Prastian	Standard	ASTM E3, ASTM E340
Material Examined	Cooper Alloy	Testing Machine	KEYENCE VH-Z100R.
Room Temperature	24°C	Sample code	120A (sample C)
Date	21 – 10 – 2022	Etching	Nitrit Acid 68%
Magnification	1000x	Picture's Location	Base, HAZ, Weld
MICRO EXAMINATION AND PHOTO			
Base Metal	HAZ	Weld Metal	
			

Bekasi, 21 Oktober 2022

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Akhmad Hanif H. A.Md.