

WELDING PROCEDURE SPECIFICATION

WELDING PROCEDURE SPECIFICATION No: WPS-GASTECH-03 Page 1/2

SUPPORTED BY PROCEDURE QUALIFICATION RECORD No: **PQR-GASTECH-03**

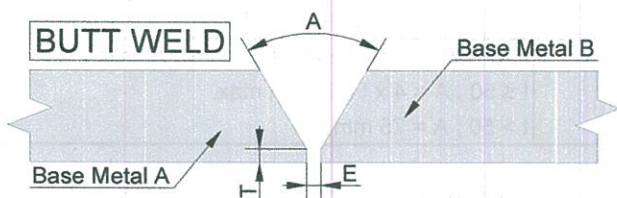
Welding process :	GTAW +SMAW	Type :	Manual/Mechanized	Joint design :	BW/FW
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QW-403 Base Metals		NE	Base material:		ASTM A240 Gr 304/304L or Equivalent	to	ASTM A240 Gr 304/304L or Equivalent
	.11	E	P. Number	8	to	8	Min. Impact Test applications : N/A
	.5	SE	Group Number	Any	to	Any	SE Variable applicable : N/A
	.8/.6	E/SE	Thickness range	Groove	5 mm to 28 mm	Fillet	All
			Pipe Ø range :	Groove	All	Fillet	All
.9	E	Thickness range limitation (t weld > 13mm)		N/A			

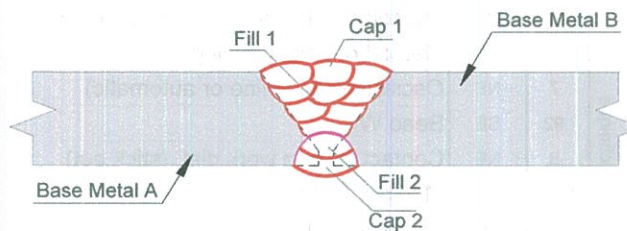
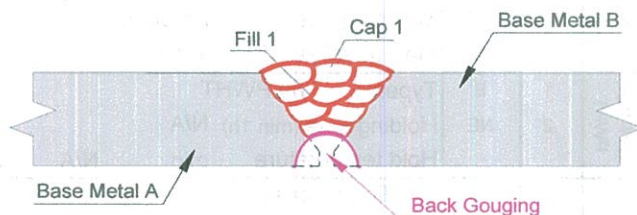
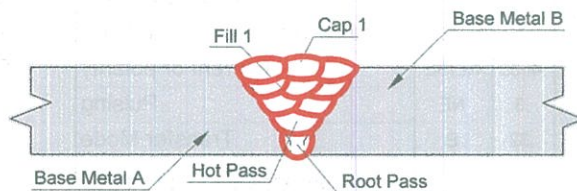
QW-402 Joints	.1	NE	Groove design A=60°±10° T=0 to 1.5 mm E=4 ±1mm		Preparation method : Machining / Thermal Cutting / Grinding Tack welds : Process: GTAW Location: In groove or bridge Removal method Grinding
	.4	NE	Deletion of Backing	Not allowed	
	.5	NE	Addition of Backing	Allowed	
	.10	NE	Root spacing	N/A	
	.11	NE	Retainers	N/A	

WELD PREPARATION

WELDING SEQUENCES / PASS LOCATION



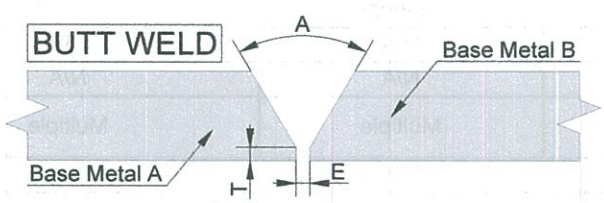
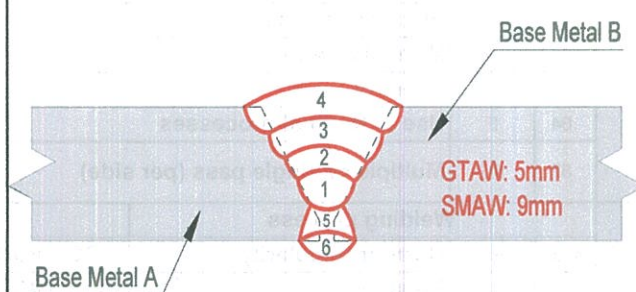
Sketches, production drawings, weld symbols, or written description should show the general arrangement of the parts to be fused. Where applicable, the details of the joint groove may be specified.



QW-404 Filler Metals	QW-404			.33/ NE	.12 SE	.4 E	.5 E	.23 E	.50 NE	
	Process		Trade name	Manufacturer	Classification	AWS	F-No	A-No	Product form	Flux
	GTAW		KOVET-T308	KOVET	ER 308	A5.9	6	8	Wire	N/A
	SMAW		E308-16	Atlantic	E308-16	A5.4	5	8	Flux-coated electrode	N/A
	.14/.22	E	Welding without filler metal is not allowed			Other requirements				
	.27	NE	Alloy Elements	N/A						
	.9/.35	NE	Flux/Wire class.	N/A						

		Manufacturer : GAS TECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED Add: 2274/9/12 NGUYEN VAN TAO ST, APT 18, HIEP PHUOC COMMUNE, HO CHI MINH CITY, VIETNAM WELDING PROCEDURE SPECIFICATION				Stainless Steel Code : ASME IX-2025		
		WELDING PROCEDURE SPECIFICATION No: WPS-GASTECH-03						
SUPPORTED BY PROCEDURE QUALIFICATION RECORD No: PQR-GASTECH-03						Page 2/2		
WELDING PARAMETERS								
QW-405 Positions	.1 .3	NE NE	Weld Layer		Root Pass	Hot Pass	Fill/Cap/Pass	
			Welding process		GTAW	GTAW	SMAW	
			Welding positions		All	All	All	
			Welding progress		Up hill for 3G	Up hill for 3G	Up hill for 3G	
QW-404	.3/.6 .30	NE E	Trade name		0	0	E308-16	
			Filler Metal Ø (mm)		2.4	2.4	3.2	
			Max "t" deposited		10 mm		18 mm	
QW-408 Gas	.2 .3	E NE	Shielding Nature		Ar (min 99,99%)	Ar (min 99,99%)	N/A	
			gas Flow rate (l/min)		10 to 25	10 to 25	N/A	
	.9 .5	E NE	Backing Nature		N/A	N/A	N/A	
			gas Flow rate (l/min)		N/A	N/A	N/A	
	.10 .1	E NE	Trailing Nature		N/A	N/A	N/A	
			Flow rate (l/min)		N/A	N/A	N/A	
QW-409 Electrical Characteristics	.8	NE NE	Amperes (A)		115 to 141	117 to 143	108 to 132	
			Volts (V)		11.2 to 12.8	11.2 to 12.8	21.4 to 24.6	
	.1 .4/.30	SE NE/SE	Welding speed (mm/min)		44 to 60	48 to 66	52 to 79	
			Energy U x I x 60 / V (kJ/mm)		1.29 to 2.45	1.20 to 2.27	1.75 to 3.76	
	.3 .32	NE E	Current or polarity		DC (-)	DC (-)	DC (+)	
			Pulsing		N/A	N/A	N/A	
	.12	NE	Transfer Mode		N/A	N/A	N/A	
			Tungsten Electrode (type)		Tungsten Electrode SFA 5.12 (EWP;EWTh-2...)		N/A	
Tungsten Electrode (Ø mm)		2.4	2.4	N/A				
QW-406 Preheat	.1 .2 .3	E NE SE	Preheat T°: Ambient (30°C)		ISO 13916 : temperature to be measured : t ≤ 50 : A = 4 x t , 50 mm max. t > 50 : A = 75 mm.			
			Min interpass T°: Ambient					
			Maxi interpass T°: 175°C					
QW-407 PWHT	.1 .2	E NE	Type: no PWHT		Heating rate N/A After N/A Cooling rate N/A Up to N/A			
			Holding time (min 1h) N/A					
QW-410 Technique	.1 .3 .5 .6 .7 .92 .8 .9/.87 .10 .11 .25 .26/.15 .64	NE NE NE NE NE SE NE NE/SE SE E NE NE/NE E	Welding process:		0	SMAW		
			String/Weave method		String/Weave	String/Weave		
			Orifice, cup or nozzle size		4,5,6,7,8	N/A		
			Method of initial and interpass cleaning		Grinding / Brushing	Grinding / Brushing		
			Method of back gouging		N/A	N/A		
			Oscillation (Machine or automatic)		N/A	N/A		
			Bead Width		max 8 mm	max 18 mm		
			Contact tube to work dist. (stick out)		N/A	N/A		
			Multiple or single pass (per side)		Multiple	Multiple		
			Single to multiple electrodes		Single	Single		
			Vacuum chamber welding		N/A	N/A		
			Manual, Automatic, Semi automatic		Manual	Manual		
			Peening/ Electrode spacing		N/A	N/A		
			Use of thermal processes		N/A	N/A		
Notes : 1/ E = Essential variable : Can not be changed / SE = Supplementary Essential variable : Can not be change on impact tested welds NE = Non Essential Variable : Guideline, could be changed with QAQC approval, if permitted by Client Specification 2/ Surfaces to be cleaned on both sides of weld preparation : 15mm								
0	8/Jan/2026	Manufacturer		GTC TECHNICAL CONSULTANCY CO., LTD.				
		Prepared by:		Reviewed by:				
Rev	Date	Inspector: BUI VAN THUAN GTC CSWIP 3.2: 3487002 CWI: 17050871		Approved by:  Ho Van Gruong DIRECTOR				

QW-402 Joints	.1	NE	Groove design A=60° T=0.5 mm E=3.5 mm		Preparation method : Tack welds : Machining / Grinding Process: GTAW Location: bridge Removal method : Grinding
	.5	NE	Addition of Backing	N/A	
	.10	NE	Root spacing	N/A	
	.11	NE	Retainers	N/A	

WELD PREPARATION		WELDING SEQUENCES / PASS LOCATION	
Weld			
			

QW-403 Base Metals		NE	Base material: ASTM A240 Gr 304/304L		to ASTM A240 Gr 304/304L	
	.5	SE	Group Number	1	to	1
	.11	E	P-No. Qualified	8	to	8
	.6	SE	T Limits	Groove		14
	.8	E	T Qualified	Groove		14
			Pipe Ø range :	Groove	N/A	
			Min. Impact Test applications :		N/A	
			SE Variable applicable :		N/A	
			Fillet		N/A	
			Fillet		N/A	

QW-404 Filler Metals	QW-404					.33/ NE		.12 SE	.4 E	.5 E	.23 E		.50	
	Process		Trade name		Manufacturer		Classification		AWS	F-No	A-No	Product form		Flux
	GTAW		KOVET-T308		KOVET		ER 308		A5.9	6	8	Wire		N/A
	SMAW		E308-16		Atlantic		E308-16		A5.4	5	8	Flux-coated electrode		N/A
	Welding process					GTAW		SMAW		QW-404 Filler Metals	.14	E	Welding without filler metal is not allowed	
			Filler Metal	Trade name		KOVET-T308		E308-16						
	.3	NE		Ø (mm)		2.4		3.2						
	.30	E		Max "t" deposited		5		9						
											.22	E	No Consumable insert	

QW-405 Positions	.1	NE	Welding positions	1G	1G	Other requirements
	.3	NE	Welding progress	N/A		

QW-406 Preheat	.1	E	Preheat T°:	Ambient (30°C)	ISO 13916 : temperature to be measured : t ≤ 50 : A = 4 x t, 50 mm max. t > 50 : A = 75 mm.	
	.2	NE	Min interpass T°:	Ambient (30°C)		
	.3	SE	Maxi interpass T°:	120°C		

QW-407 PWHT	.1	E	Type:	N/A					
	.2	NE	Holding time (min 1h) :	N/A		Heating rate	N/A	After	N/A
			Hold temperature	min	N/A	Cooling rate	N/A	Up to	N/A

QW-408 Gas	.2	E	Shielding	Nature	Ar (99,99%)									
	.3	NE	gas	Flow rate (l/min)	15 to 20									
	.9	E	Backing	Nature	N/A									
	.5	NE	gas	Flow rate (l/min)	N/A									
	.10	E	Trailing	Nature	N/A									
	.1	NE		Flow rate (l/mn)	N/A									

WELDER, WELDING OPERATOR QUALIFICATION TEST CERTIFICATE

Applicable Code/Standard: **ASME Section IX, 2025 Edition**

WPQ Certificate number: **WE-GT-26-02**

Employer's name: **GAS TECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED**

Welder name: **DANG THANH TRUNG (GT-01)**

Address: 274/9/12 NGUYEN VAN TAO ST, APT 18, HIEP PHUOC COMMUNE, HO CHI MINH CITY, VIETNAM

Identification number: **094096013935**

Test date: **29-Dec-2025**



Test Description

Identification of PQR followed: **PQR-GASTECH-03**

Revision No.: **0**

☒ Test coupon ☐ Production weld

Specification and type/grade or UNS Number of base material(s): **ASTM A240 Gr 304/304L**

Thickness: **14 mm**

Testing Variables and Qualification Limits

Welding Variables (QW-403)	Actual Values	Range Qualified
Welding process (es)	GTAW+ SMAW	GTAW/SMAW
Type (i.e.; manual, semi-automatic) used	Manual	Manual
Backing (with/ without)	With	With (for CJP)
☒ Plate ☐ Pipe (enter diameter if pipe or tube)		Plate and Pipe
Base metal P-Number to P-Number	P-No.8 to P-No.8	P-No.1 through P-No.15F
Filler metal or electrode specification(s) (SFA) (info. only)	A5.9/A5.4	GTAW: All class SMAW: F1 to F4 with backing/backgouging
Filler metal or electrode classification(s) (info. only)	ER 308/E308-16	
Filler metal F-Number(s)	6/4	
Consumable insert (GTAW or PAW)	N/A	N/A
Filler Metal Product Form (solid/metal or flux-cored/powder)	-	-
Deposit thickness for each process	-	-
Process 1 GTAW 3 layers minimum ☐ Yes ☒ No	5 mm	Max: 10 mm
Process 2 SMAW 3 layers minimum ☒ Yes ☐ No	9 mm	Max: 18 mm
Position qualified (2G, 6G, 3F, etc.) (Table QW-461.9)	1G	Groove: F for Plate & Pipe (OD ≥ 73 mm). Fillet: F; H for Plate and Pipe
Vertical progression (uphill or downhill)	N/A	N/A
Type of fuel gas (OFW)	N/A	N/A
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 Welding current type/polarity (AC, DCEP, DCEN)	DCEN	DCEN

RESULTS

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

☐ Transverse face and root bends [QW-462.3(a)]

☒ Side bends (QW-462.2) , Report: **05/01/26-03./KQTN**

☐ 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(b)]

☐ Plate specimen, macro test for fusion [QW-462.5(e)]

Type	Result	Type	Result	Type	Result	Type	Result
-	-	-	-	-	-	-	-

Alternative volumetric examination results (QW-191): RT ☐ or UT ☒

Report No.: **GTC- GT/WPS - UT - 003**

Fillet weld – fracture test (QW-181.2): **N/A**

Length and percent of defects: **N/A**

☐ Fillet welds in plate [QW-462.4(b)] Report:

☐ Fillet welds in pipe [QW-462.4(c)]

Other tests: **N/A**

Film or specimens evaluated by: **N/A**

Company: **N/A**

Mechanical tests conducted by: **Nguyen Trong Thai**

Laboratory test no.: **HOA BINH LAB (LAS-XD 265)**

Welding supervised by: **Nguyen Dac**

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

GAS TECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED

GTC TECHNICAL CONSULTANCY CO., LTD.

Verified by:

Full Name:

Signature:

Date: 14- Jan- 2026

Inspector: **BUI VAN THAO**

GTC CSWIP 3.2: 348700/2

CWI: 17050871

Date: 14- Jan- 2026

Approved by:

Wu Van Truong

GTC

ANIT PHO CHINH MINH

Date: 14- Jan- 2026



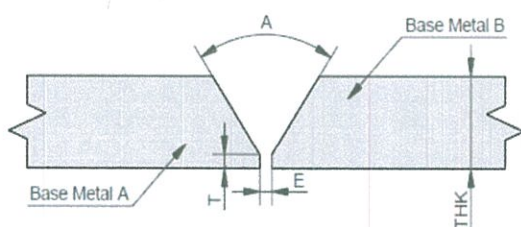
WELDING MONITORING REPORT ASME IX-2025

GAS TECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED

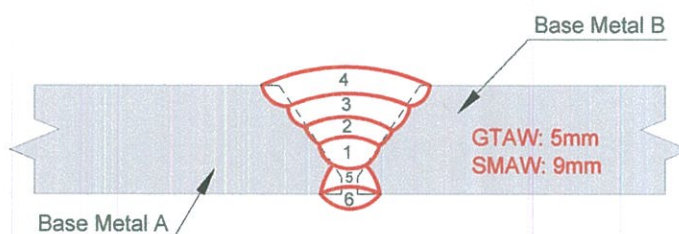
Add: 274/9/12 NGUYEN VAN TAO ST, APT 18, HIEP PHUOC COMMUNE, HO CHI MINH CITY, VIETNAM

PQR no: PQR-GASTECH-03 Support for WPS: WPS-GT-03	Welding Process: GTAW + SMAW	Welder Name: DANG THANH TRUNG	Welder Stamp : 094096013935
Clampmeter No. (calibrated machine) Kyoritsu KEW 2055	Thermometer No. FLUKE 62 MAX	Oxygenmeter N° : N/A	Weld Machine S/N°: WSE-400 (GTAW) MZ1000 (SAW)
Shielding Gas: Argon	Backing Gas: Argon	Shield. Gas Flow Rate: N/A	Backing Gas Flow Rate: N/A
Welding Position: 1G			
Monitored by: GTC TECHNICAL CONSULTANCY CO., LTD.	Position : TPI INSPECTOR	Name : NGUYEN DAC	Signature : Monitoring Date: 29-Dec-2025

T= 0.5 E= 3.5 A= 60 Bevel: 30



Material: ASTM A240 Gr 304/304L, Plate 14mm



Weld preparation

Welding Sequence

Travel Speed= Length(cm) / Time(min)

Arc Energy= 0,06xVolts(V)xAmps(A) / Travel Speed (mm/min)

Layer / Pass n°	Filler Metal		Interpass Temp. (°C)	Amps (A)	Volts (V)	Weld Length (mm)	Welding Arc Time (min)		Travel Speed (mm/min)	Heat Input (kJ/cm)	Bead Width (mm)	Remark
	AWS Class	Diameter (mm)					Minutes	Second				

Side 1:

1	ER 308	2.4		128	12.0	450	8	38	52	1.77	6	
2	ER 308	2.4	58	130	12.0	450	7	52	57	1.64	8	
3	E308-16	3.2	100	120	23.0	450	6	38	68	2.44	14	
4	E308-16	3.2	120	120	23.0	450	7	24	61	2.72	18	

Side 2: after backgouging & grinding

5	E308-16	3.2	80	120	23.0	450	7	14	62	2.66	6	
6	E308-16	3.2	120	120	23.0	450	6	32	69	2.40	9	

Comments: Consummable, GTAW :
SAW

KOVET-T308
ER308L (TIEN TAI) TW-308L/TFS300

	ULTRASONIC EXAMINATION REPORT		Report No.: GTC- GT/PQR - UT - 003
			Page 1 of 1
			Request No.: N/A
			Date of inspection: 31/12/2025
Project name: WELDING PROCEDURE SPECIFICATION (WPS)		Client name: GASTECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED	
Acceptance criteria: ASME IX_ 2025 Edition		Procedure No.: GTC - NDT - ASME - P02	
Item: PLATE/1G	WPS.: PQR-GASTECH-03	Drawing No.: N/A	

Ultrasonic Flaw Detector: USM 35 DAC		Serial No.: 17525		Working Area: RED DEER WORKSHOP			
Material information		Probe angle beam		0°	45°	60°	70°
Surface condition :	Brushing	Brand	PHOENIX	OLYMPUS	OLYMPUS	OLYMPUS	OLYMPUS
Joint preparation :	BUTT JOINT	Model	TC	A4MR	A4MR	A4MR	A4MR
Material base :	A240 Gr. 304/304L	Serial	21302	567178	566428	567818	567818
Welding process :	GTAW+SMAW	Frequency (MHz)	4	4	4	4	4
Calibration and reference blocks		Size (mmx mm)	Φ10	8x9	8x9	8x9	8x9
Calibration block :	V1	Range	100	100	100	140	140
Serial No.:	A22468	PRL (dB)	30.5	40	48.5	49.5	49.5
Reference block :	V1- Φ3.0 mm	Transfer correction (dB)	-	4	4	4	4
Couplant :	Cellulose	Scanning level (dB)	+6	+6	+6	+6	+6

EVALUATION										
WELDING IDENTIFICATION	WELDER ID.	Length (mm)	Thk. (mm)	Amplitude	INTERPRETATION			Type of defect	Result	Remarks
					Location (mm)	Length (mm)	Depth (mm)			
DANG THANH TRUNG	094096013935	400x450	14	-	-	-	-	-	ACC	

ABBREVIATION:	ACC-Accepted	REJ-Rejected	SP:Spherical
	RW-To Cut Or Reweld	CL:Cylindrical	PL : Planar

GTC TECHNICAL CONSULTANCY CO.,LTD Evaluated by: NGUYEN D Signature: Date: 31/12/2025	REVIEWED BY GASTECH Reviewed by: Signature : Date:	REVIEWED BY OWNER Reviewed by: Signature: Date:
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CÔNG TY CỔ PHẦN TƯ VẤN THIẾT KẾ KIỂM ĐỊNH XÂY DỰNG HÒA BÌNH
Địa chỉ: Số 964/1 Đường Lò Gốm, Phường Bình Tiên, Tp.Hồ Chí Minh
PHÒNG THÍ NGHIỆM VẬT LIỆU VÀ KIỂM ĐỊNH CÔNG TRÌNH XÂY DỰNG LAS-XD 265
Địa chỉ: 161B/81/2A Lạc Long Quân, Phường Bình Thới, Tp.Hồ Chí Minh
Email: Las265.hoabinh@gmail.com - Hotline: 0937836265 - 0962109262

Số: 05/01/26-01 ./KQTN

PHIẾU KẾT QUẢ THÍ NGHIỆM

Trang: 1/2

Số PYC: 050126-01

PHIẾU KẾT QUẢ THÍ NGHIỆM / TEST REPORT

XÁC ĐỊNH CƠ LÝ VẬT LIỆU THÉP/ DETERMINING MECHANICAL OF STEEL MATERIAL

- Đơn vị yêu cầu / Client : GASTECHNICAL AND MECHANICAL ENGINEERING COMPANY LIMITED
- Địa điểm / Location : 274/9/12 NGUYEN VAN TAO, St, APT 18, HIEP PHUOC COMMUNE, HO CHI MINH CITY, VIET NAM
- P.Pháp thử/ Test method : TCVN 197-2014, TCVN 198-2008, ASME IX_2025
- Thiết bị TN / Test Equipment : Máy kéo -nén- uốn thép WA-1000B, thước lá, cân kỹ thuật, một số dụng cụ khác...
- Ngày nhận mẫu / Recrived : 05/01/2026
- Ngày thí nghiệm / Tested : 05/01/2026
- Tên mẫu/Name of sample : MỐI HÀN THÉP TẮM / WELDING STEEL PLATE
: MẪU QUY TRÌNH HÀN/ PQR NO : PQR-GASTECH-03
: TÊN THỢ HÀN/ WELDER NAME : DANG THANH TRUNG
: MÃ SỐ THỢ HÀN/ WELDER ID : 094096013935
: PHƯƠNG PHÁP HÀN/ WELDING PROCESS :GTAW+SMAW
: VẬT LIỆU/ MATERIAL : ASTM A240 Gr. 304/304L
: VỊ TRÍ HÀN/ WELDING POSITION : 1G
: CHIỀU DÀY/ THICKNESS: 14 mm
- Số lượng/Quantity (mẫu) : 01 (Thép tấm : 450x400X14 mm)

Kết quả thí nghiệm xem trang sau / experimental results see next page:

TP.Hồ Chí Minh, ngày 05 tháng 01 năm 2026

CÔNG TY CP TV TK KIỂM ĐỊNH XÂY DỰNG HOÀ BÌNH

ĐD thí nghiệm

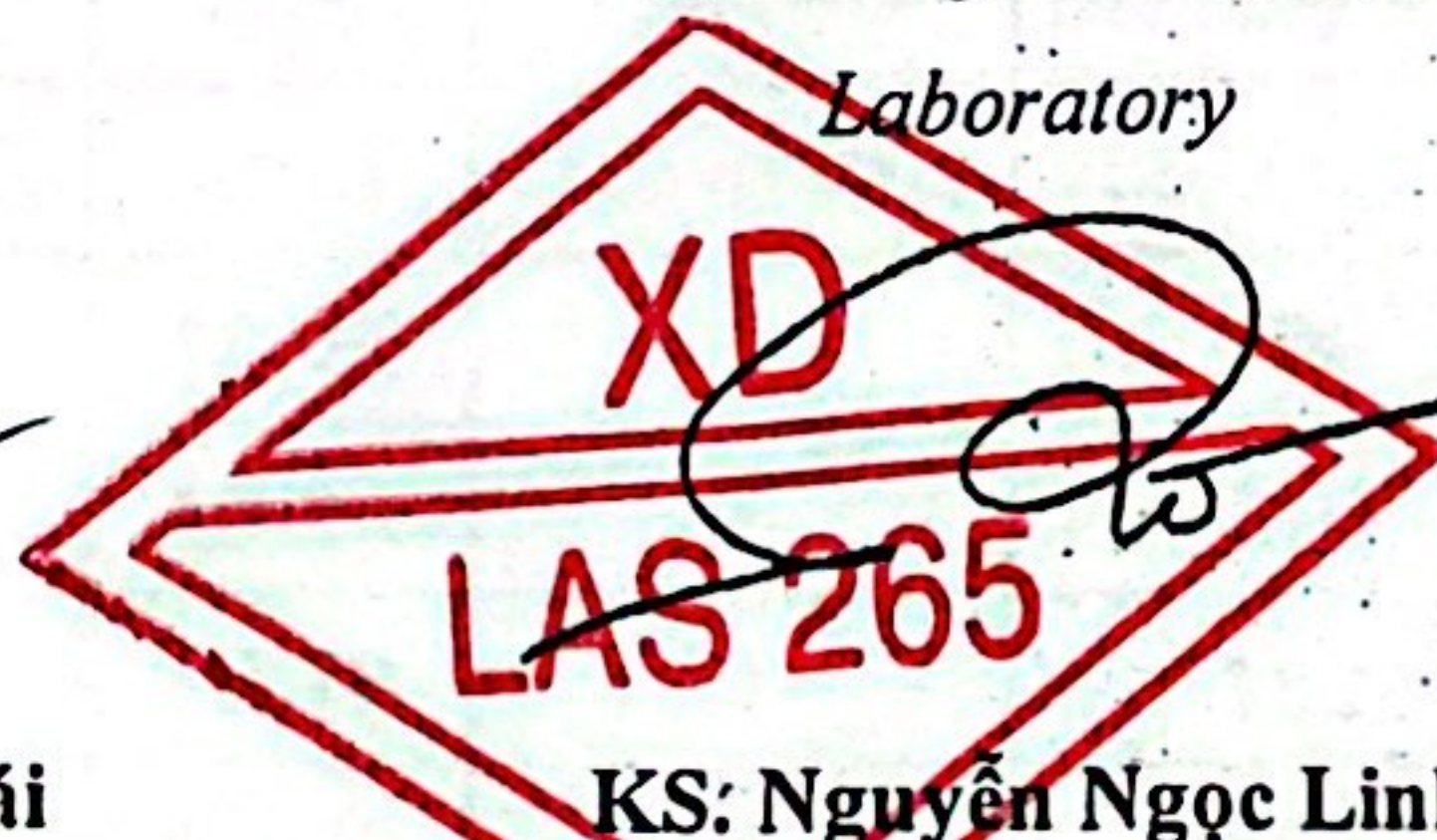
T. Phòng Thí Nghiệm

Tổng Giám Đốc

Tested by

Laboratory

Director



Nguyễn Trọng Thái

KS: Nguyễn Ngọc Linh

Nguyễn Việt Chánh

Ghi chú/ Notice

: 1. Mẫu do khách hàng cung cấp, kết quả chỉ có giá trị trên mẫu thử /

Specimens were supplied by client, test result is valid namely submitted specimens only

2 Các thông tin về mẫu, tên công trình, tên khách hành, hạng mục do khách hàng cung cấp /

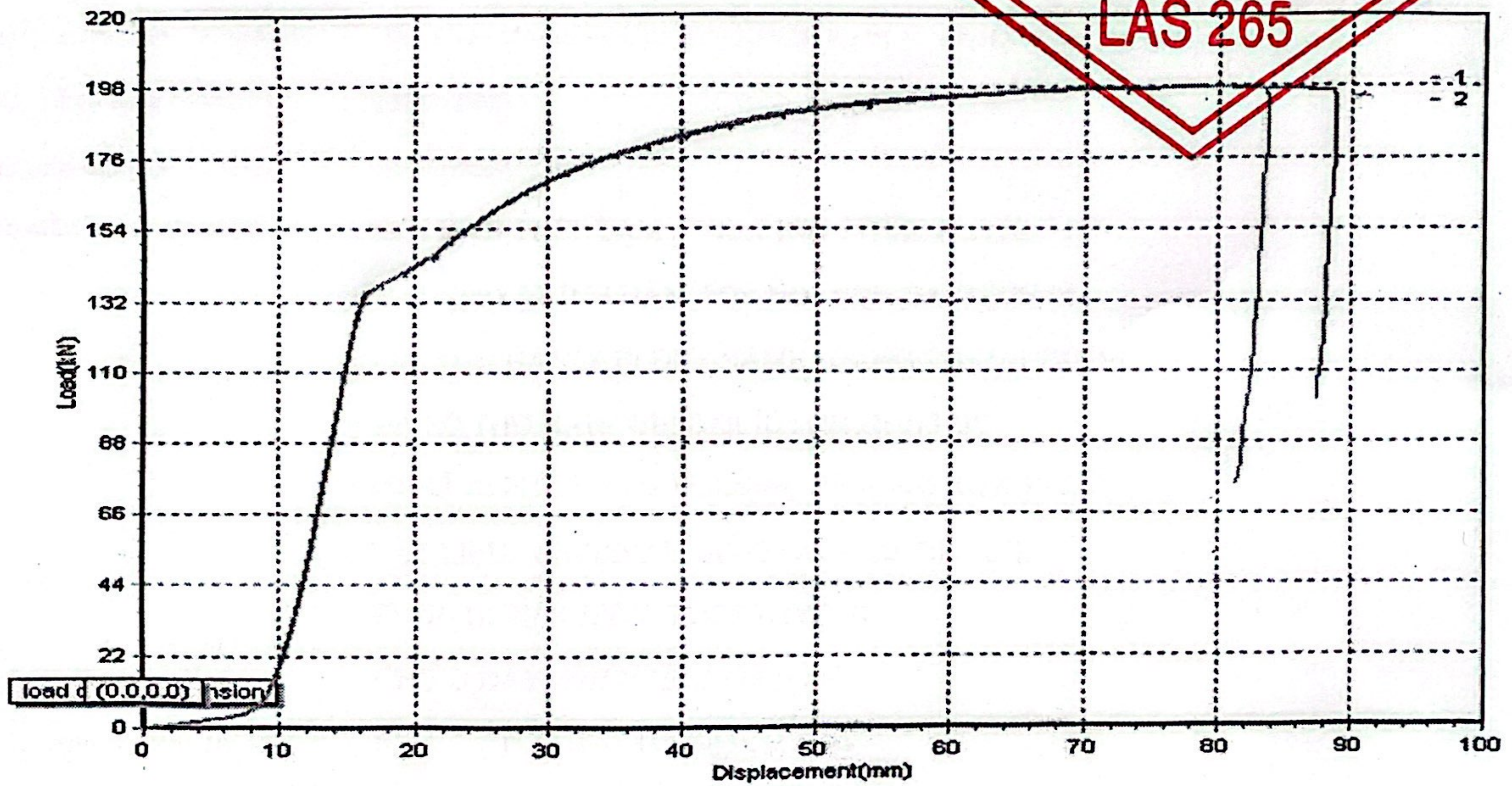
Information of specimens , project , client , item , were supplied by client

II. KẾT QUẢ THÍ NGHIỆM/ TEST RESULTS (tt):

STT	Mẫu thép Test Specimen	Mặt cắt ngang	Lực kéo chảy	Giới hạn chảy	Lực kéo đứt	Giới hạn bền	Vị trí bị đứt
No	(Bề dày) x (C. rộng) Thick x Width)	Cross Section	Force at yield point	Yield Strength	Maximum force	Tensile Strength	Notice
	mm x mm	(mm ²)	(kN)	(N/mm ²)	(kN)	(N/mm ²)	
1	14.00 x 25.03	350.4	138.70	396	197.2	563	(3)
2	14.00 x 25.14	352.0	139.22	396	197.4	561	(3)

Ghi chú/ Notice: Mẫu được thử nghiệm với sự chứng kiến của các bên liên quan/ Test was witnessed in the presence of Concerned Parties.

- (1) :Đứt tại mối hàn/ Weld Metal
- (2) :Đứt ở vùng ảnh hưởng nhiệt/ Fractured at heat affected zone
- (3) Đứt tại vật liệu cơ bản/ Base Metal



II. KẾT QUẢ THỬ UỐN NGUỘI / TEST RESULT OF BEND :

Stt/	Mẫu thử/ Specimens			Số lượng	Góc uốn	Đường kính gối uốn	Kết quả thử uốn nguội
No	Ký hiệu mẫu	Dày	Rộng	Quantity	Bending angle	Diameter of angle	Test Result of bend
	Sample ID	Thickness	width	Thanh/ Bars	(Độ/ Degree)	(mm)	
1	Side bend	14.00	10.36	1	180°	40	Không Nứt / No Crack
2	Side bend	14.00	10.24	1	180°	40	Không Nứt / No Crack
3	Side bend	14.00	10.19	1	180°	40	Không Nứt / No Crack
4	Side bend	14.00	10.29	1	180°	40	Không Nứt / No Crack