



P.M.S CO., LTD
'Pioneer Manufacturing & Supply'

711 Byucksan digital valley, #303, Daedong-ro,
Sasang-ku, Busan, Korea
TEL : 82-51-713-8300 FAX : 82-51-713-8397

CERTIFICATE LIST

Client : FARNIKAN
Project : HX-127
Shipper : P.M.S

Date : 2024. 11. 29
Ref. No. :
P/O. No. : PMS-24-050

- DESCRIPTION : GIRTH & STD FLANGE, BOLT & NUT

APPLICATION NO. : T-402

*** ENCLOSED CERTIFICATE**

		PAGE	Ref. No.
Inspection Item List (T-402)	-----	(1)	()
1. GIRTH FLANGE			
1) Inspection Certificate	-----	(2~8)	()
2) Ultrasonic Examination Report (UT)	-----	(9)	()
3) Dimension Check Sheet	-----	(10~12)	()
2. STD FLANGE			
1) Inspection Certificate	-----	(13~19)	()
2) Ultrasonic Examination Report (UT)	-----	(20~21)	()
3. BOLT & NUT			
1) Marterial Test Certificate	-----	(22~28)	()
2) NDE Qualification Cert	-----	(29~33)	()
3) Calibration Cert	-----	(34~42)	()

*** REMARKS**

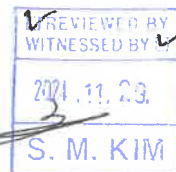
결	담	팀	이	전	사
재	당	장	사	무	장

Inspection Item List

Project : HX-127

T-402

No.	Equip.	Item	Material	Description	Q'ty	Heat No.	Remark
1	HX-127	GIRTH FLANGE	SA350 LF2 CL1	OD 760 x ID 600 x 90T	2	S85072	
2	HX-127	GIRTH FLANGE	SA266 Gr.2N	OD 760 x ID 600 x 90T	2	S98858	
3	HX-127	TEST FLANGE	SA266 Gr.2N	OD 760 x ID 600 x 65T	1	S98858	
4	HX-127	STD FLANGE	SA105N	#150, 3" x S/80, WNRF	4	S09581	
5	HX-127	STD FLANGE	SA350 LF2 CL.1	#300, 2"x16.6Tx230L,LWNRF	2	S09581	
6	HX-127	STD FLANGE	SA350 LF2 CL.1	#300, 2" x S/160, WNRF	10	S09581	
7	HX-127	STD FLANGE	SA350 LF2 CL.1	#300, 3" x S/160, WNRF	2	S09581	
8	HX-127	STD FLANGE	SA350 LF2 CL.1	#300, 4" x S/120, WNRF	2	S09581	
9	HX-127	STD FLANGE	SA350 LF2 CL.1	#300, 6" x S/80, WNRF	2	S09581	
10	HX-127	STUD BOLT + 2 H/H NUTS	SA320 L7 SA194 4	M22 x 260L	42	S50430/C55433	
11	HX-127	JACK SCREW	SS304	5/8" x 110L	12	S50117	
12	HX-127	DOWEL PIN	SS304	OD16 x 129L	2	6Z051	
13	HX-127	HEX. NUT FOR TIE-ROD	SA194 2H	M10	24	SA63109	
14	HX-127	EYE BOLT	SA36 or Equal	1" x 8UNC	4		
15	HX-127	PLUG	SS304	1"x 8UNC	4	6W385	
16	HX-127	SETTING BOLT + 3 H/H NUT	SA193 B7 SA194 2H	M20 x 150L	16	S55467/22313176	
TOTAL					131		



SAMBU STAINLESS FORGING CO., LTD.
17 Hwaajonsandan 5-ro 14beon-gil,
Gangseo-gu, Busan, Korea
Tel: 051316-3241 Fax: 051316-3242

Notes :	#1 --- Tensile Test : Y,S=Yield Strength, T,S=Tensile Strength, E,L=Elongation, R,R=Reduction of Area, G,L=Gauge Length(mm), D=Diameter(ϕ) Location : L=Longitudinal, T=Transverse, R=Radial, P=Perpendicular, H=Heat Analysis, P=Product Analysis, Tr=Trace Element #2 --- Chemical Composition : H=Heat Analysis, P=Product Analysis, Tr=Trace Element #3 --- Heat Treatment : N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S=Solution Treated, S,R=Stress Relieved, S,T=Stabilization Heat Treatment #4 --- F,C=Furnace Cooled, O,C=Oil Cooled, AC,C=Accelerated Cooled #5 --- Surface Condition : A,F=As Forged, R,M=Rough Machined, F,M=Finish Machined

검사증명서 MILL TEST CERTIFICATE



당진제철소 : 충남 당진시 송악읍 복부산로 1480
1480 Bulksanup-Ro, Songak-Eup, Dangjin-Si, Chungnam, Korea

주문번호
Order No. : D231009267

품명
Commodity : Slab
고객사
Customer : 현대아이에프씨㈜

제품규격
Specification : ASTM A105-A350LF2
주문자
Contractor : 현대아이에프씨㈜

증명서 번호
Certificate No. : 20231024-CN-0003-001

발행일자
Date of Issue : 2023-10-24

제품차수 Dimension	수량 Quantity	중량 Weight (Kg)	재간번호 Heat No.	제품번호 Product No.	화학성분 Chemical Composition(%)														단위 Unit						
																			2 : x 100 3 : x 1,000 4 : x 10,000 5 : x 100,000						
					Division	C	Si	Mn	P	S	Cr	Ni	B	Ca	Cu	Mo	N	Nb	Ti	V	Sd -Al	CEQ			
300 x 2000 x 5940	1	27,510	S85072	S85072 01	L	1,963	230	1,002	115	25	2	2	4	4	3	2	4	3	3	3					
300 x 2000 x 5930	1	27,460	S85072	S85072 04	L	1,963	230	1,002	115	25	2	2	3	1	15	0	44	0	1	3	370				
300 x 2000 x 5830	1	27,480	S85072	S85072 05	L	1,963	230	1,002	115	25	2	2	3	1	15	0	44	0	1	3	370				
Sub Total(001)					3	82,430(Kg)																			
Grade Total					3	82,430(Kg)	G = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5																		
Last Item																									

606-81-95003

(주)평산에틸 신진옥

부산광역시 강서구 낙산화로 93(송정동)

제조 도매 청강빌드업구조재

부품 용 산 해매, 입 대



원본과 같음을 확인함
2024년 9월 10일
SANGBU STAINLESS FORGING CO., LTD.
대표이사 김 경
SANGBU STAINLESS FORGING CO., LTD.
Sang ha, Ju T.+82-51-510-3241

REVIEWED BY
WITNESSED BY D
2023. 11. 23
S. M. KIM

WITNESSED BY
PMS
REVIEWED BY
Q.A

* Division - P: Product analysis, L: Ladle analysis


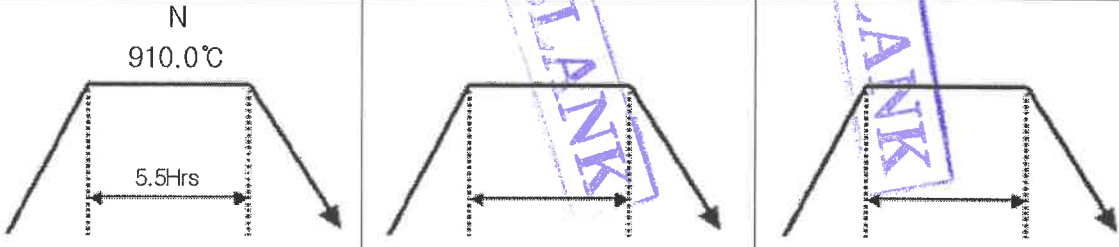



* THE SLAB IS FULLY KILLED, FINE-GRAIN PRACTICE, BASIC OXYGEN PROCESS AND VACUUM DEGASSING PROCESS WERE APPLIED.
* ANY WELDING SHALL NOT BE PERFORMED FOR THE ORDERED MATERIAL.
* The Certificate has been issued in compliance with EN 10204 Type 3.1.

WE HEREBY CERTIFY THAT THE MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND THE REQUIREMENTS.

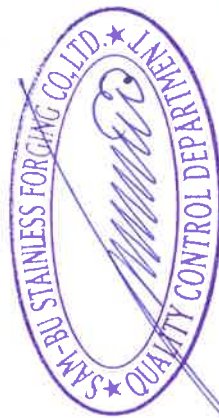
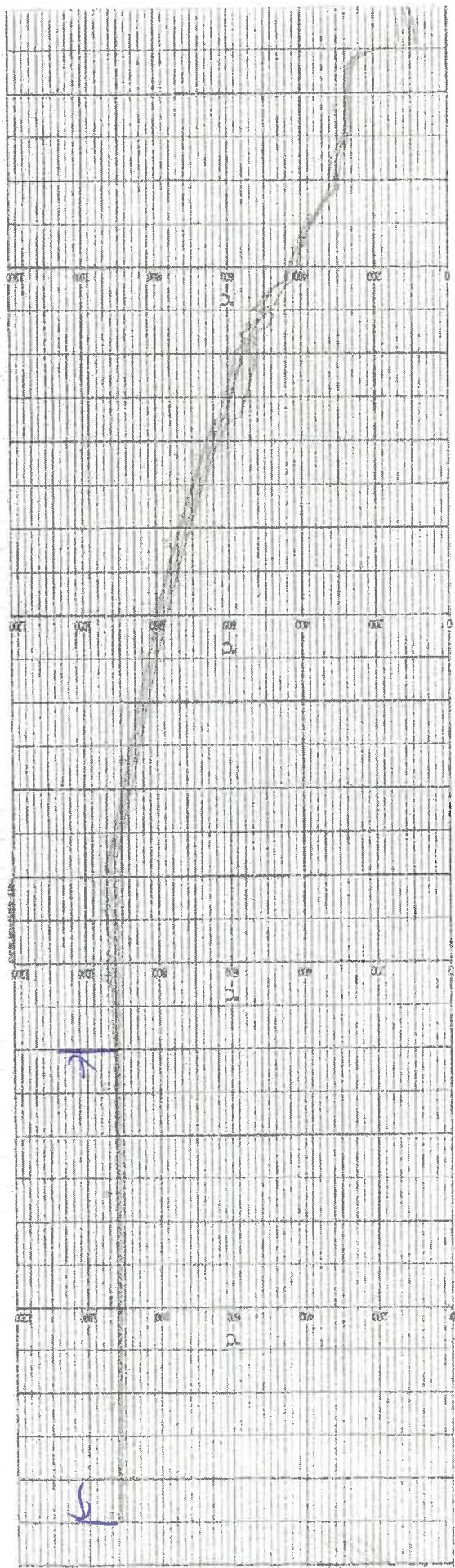
Signature
J. Hee Jun
Chief Of Steel Making Quality Team

* 본 검사증명서는 원본인 전자문서(전자서명 정보 포함)로부터 출력된 사본입니다. 전자문서의 내용은 원본과 동일함을 고객으로부터 확인하실 수 있습니다. (http://sm.hyundai-steel.com/cs/cn/login.jsp)
* This Mill Test Certificate is a copy that has been printed from original electronic document (with digital signing). You are able to check an original electronic document at hyundasteel's customer portal (http://sm.hyundai-steel.com/cs/cn/login.jsp) * QRcode scanner App : 'Qfileal'
* [서명용 주위사항] 본 검사증명서에 영기된 규격 외 사항시 제품손상 및 안전상 문제가 발생할 수 있습니다.
* [Caution for Use] Damage on products and safety problems may arise if used other than to the spec stated in this Mill Test Certification.

HEAT TREATMENT REPORT

 SAMBU STAINLESS FORGING CO., LTD. 17, Hwajeonsandan 5-ro 14beon-gil, Gangseo-gu, Busan, Korea Tel : 051)316-3241 Fax : 051)316-3242		REPORT NO	HTR202409-128-001	
		ISSUE DATE	2024/09/10	
		CUSTOMER	피엠에스(주)	
MATERIAL	SA350LF2CL1		HEAT ID NO	SEE BELOW
DATE OF WORK	2024.09.03			
JOB NO	SBQ2024090301			
H/T METHOD	N			
HOLDING TEMP	910.0℃			
HOLDING TIME	5.5Hrs			
COOLING METHOD	A.C			
N:Normalizing, A:Annealing, Q:Quenching, T:Tempering, S:Solution, P:PWHT Simulation, S.R:Stress Relieved, S.T:Stabilization Heat Treatment, A.C:Air Cooled, F.C:Furnace Cooled, W.C:Water Cooled, O.C:Oil Cooled, AC.C:Accelerated Cooled				
HEATING CYCLE				
* Description OD650*T60 OD760*ID600*T90				
<div style="display: flex; justify-content: space-around;"> <div>2EA 2EA</div> <div>S85072 S85072</div> <div>A202408-315-001 A202408-315-002</div> </div>				
* Remark				
<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <div style="border: 1px solid black; padding: 5px; display: inline-block;"> REVIEWED BY WITNESSED BY 2024.11.23. S. M. KIM </div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> PMS Q.A </div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 10px;"> WITNESSED BY REVIEWED BY  </div> </div> </div>				
REVIEWED BY <input type="checkbox"/> WITNESSED BY <input type="checkbox"/>	_____ Surveyor		 General Manager of QM Dep't	

N: 910°C for 1hrs AC



원본대조필

SAMBU STAINLESS FORGING CO., LTD.
5828 BB, JU T-82-51-316-3241

PMS	<input type="checkbox"/> WITNESSED BY
Q.A	<input checked="" type="checkbox"/> REVIEWED BY

<input checked="" type="checkbox"/> REVIEWED BY WITNESSED BY	2024. 11. 23
S. M. KIM	

INSPECTION CERTIFICATE
(EN 10204 - 3.1)

Certificate No. : IC202409-129-001
Date : 2024/09/10
P.O No. : PMS-24-050-03

Mat'l Specification : ASME SA268GR2N (2023 ED)
Customer : 피엠에스(주)
Project Name : HX-127

SAMBU
SAMBU STAINLESS FORGING CO.,LTD
17,Hwajeonsandan 5-ro 14beon-gil,
Gangseo-gu, Busan, Korea
Tel : 051316-3241 Fax : 051316-3242

Description		MFG Heat I.D No.	Tensile Test * 1						Hardness (HBW)	Impact Test			Bend Test	Order Entry No			
			Specimen	Y.S	T.S	E.L	R.A	Temp.		Notch	Unit						
												D			G.L	MPa	%
Heat No	Spec	Max	Min	Y.S	T.S	E.L	R.A	Temp.	Notch	Unit	Size	Min.	Avg.				
0D760*ID600*T90	T	12.5	50	304	514	36.9	72.1	197	137	1	2	3	Avg.				
0D760*ID600*T65	**	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****				
A202408-315-003 A202408-315-004																	

REVIEWED BY
WITNESSED BY
2024.11.23.
S. M. KIM

WITNESSED BY
PMS
Q.A

Q.A

SAM-BU STAINLESS FORGING CO.,LTD.

QUALITY CONTROL DEPARTMENT

QM General Manager

Customer's Requirement														
Chemical Composition(%) * 3														
Heat No	Spec	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Nb	V	N	AI
S98858	Min	0.15	0.40											
	Max	0.30	0.35	1.05	0.025	0.025								
	H	0.1933	0.238	0.959	0.0144	0.0018	0.02	0.04	0.00	0.022	0.001	0.003	0.0045	0.027
	P													
Heat Treatment *4 N : 910℃ X 5.5Hrs A.C		Dimension & Visual		GOOD		UT		MT		PT		N/A (N/A)		
NDE * 5														
We hereby certify that the material herein has been manufactured, tested and inspected in accordance with the above specification.														
Surveyor														

Notes : ※1 -- Tensile Test : Y.S=Yield Strength, T.S=Tensile Strength, E.L=Elongation, R.A=Reduction of Area, G.L=Gauge Length(mm), D=Diameter(φ)
※2 -- Location : L=Longitudinal, Tr=Transverse, T=Tangential, R=Radial, U=Hubbed Tension Test 6.25x25.0mm (ASME SEC VIII Div.1 PARA UW-13.3)
※3 -- Chemical Composition : H=Heat Analysis, P=Product Analysis, Tr=Trace Element
※4 -- Heat Treatment : N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S=Solution Treated, S.R=Stress Relieved, S.I=Stabilization Heat Treatment, A.C=Air Cooled, W.C=Water Cooled, F.C=Furnace Cooled, O.C=Oil Cooled, AC.C=Accelerated Cooled
※5 -- Surface Condition : A.F=As Forged, R.M=Rough Machined, F.M=Finish Machined

검사증명서
MILL TEST CERTIFICATE



당진제철소 : 충남 당진시 송악읍 북부산업로 1480
1480 Bukhusanup-ro, Songak-Eup, Dangjin-Si, Chungnam, Korea

주공번호 Order No. : D240214584
품명 Commodity : Slab
제품규격 Specification : ASTM A105-A350LF2
고객사 Customer : 현대아이에프씨㈜
주문자 Contractor : 현대아이에프씨㈜
증명서 번호 Certificate No. : 20240409-CN-0003-001
발행일자 Date of Issue : 2024-04-09

제품차수 Dimension	수량 Quantity	중량 Weight (Kg)	재간번호 Heat No.	제품번호 Product No.	화학성분 Chemical Composition(%)															단위 Unit			
					C	Si	Mn	P	S	Cr	Ni	B	Ca	Cu	Mo	N	Nb	Ti	V	Sr	As	CEQ	2:x100 3:x1,000 4:x10,000 5:x100,000
300x2000x5810	1	27,370	S98847	S98847 04	4	3	3	4	4	2	2	4	4	3	2	4	3	3	3	3	3	3	
300x2000x5830	1	27,460	S98858	S98858 03	L	1,918	235	954	117	32	2	1	3	2	0	41	1	1	2	35	357		
300x2000x5850	1	27,550	S98858	S98858 52	L	1,933	238	959	144	18	4	2	3	1	22	0	45	1	3	27	365		
300x2000x5830	1	27,460	S98858	S98858 53	L	1,933	238	959	144	18	4	2	3	1	22	0	45	1	3	27	365		
*** Sub Total(001)***					4	109,840(kg)																	

*** Grade Total *** 4 109,840(kg) Ceq(CE), G=C+Mn/6+(N+Cu)/15+(Cr+Mo+V)/5
*** Last Item ***

원본과 같음을 확인함
2024년 9월 10일
SANGBU STAINLESS FORGING CO., LTD.
대표이사 김 경
SANGBU STAINLESS FORGING CO., LTD.
Sang-ha, Ju T. 82-51-316-3241

원본대조필
상하사 613
010-7300-4410
6673110 PSM, CO., KR.

REVIEWED BY
WITNESSED BY □
2024. 11. 23
S. M. KIM

* Division - P: Product analysis, L: Ladle analysis


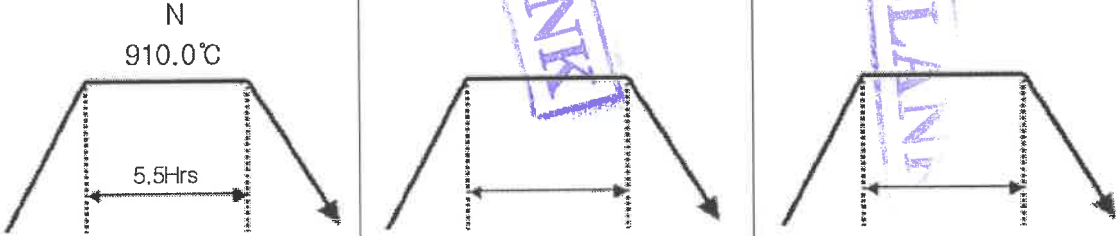


NOTE

* THE SLAB IS FULLY KILLED, FINE-GRAIN PRACTICE. BASIC OXYGEN PROCESS AND VACUUM DEGASSING PROCESS WERE APPLIED.
* ANY WELDING SHALL NOT BE PERFORMED FOR THE ORDERED MATERIAL.
* The Certificate has been issued in compliance with EN 10204 Type 3.1

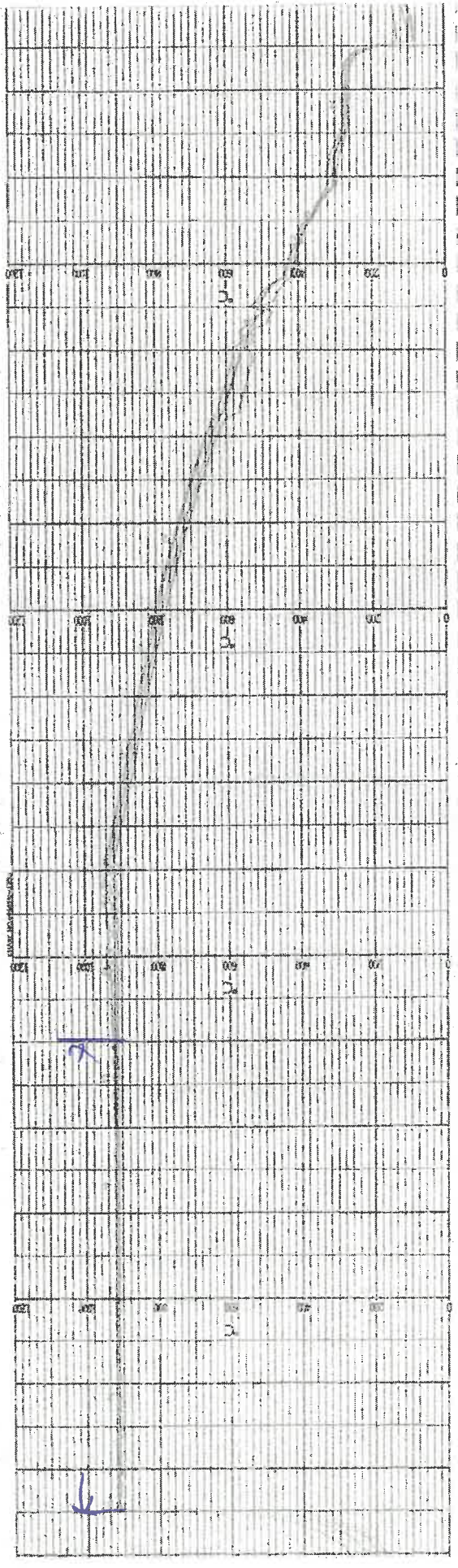
WE HEREBY CERTIFY THAT THE MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND THE REQUIREMENTS
Signature Ju. Hee Jun
Chief Of Steel Making Quality Team

* 본 검사증명서는 원본인 전자문서(전자서명 정보 포함)로부터 출력된 사본입니다. 전자문서의 내용은 원본과 동일하며, 고객으로부터 확인하실 수 있습니다. (http://sm.hyundai-steel.com/cs/cn/login.jsp)
* This Mill Test Certificate is a copy that has been printed from original. electronic document with digital signing.
* You are able to check an original electronic document at hyundai-steel's customer portal (http://sm.hyundai-steel.com/cs/cn/login.jsp) * QRcode scanner App : 'QRcode'
* (사실상 후의사정) 본 검사증명서에 명시된 규격 외 사용시 제품손상 및 안전상 문제가 발생할 수 있습니다.
* [Caution for Use] Damage on products and safety problems may arise if used other than to the spec stated in this Mill Test Certificate.

HEAT TREATMENT REPORT

 SAMBU STAINLESS FORGING CO., LTD 17, Hwajeonsandan 5-ro 14beon-gil, Gangseo-gu, Busan, Korea Tel : 051)316-3241 Fax : 051)316-3242		REPORT NO		HTR202409-129-001	
		ISSUE DATE		2024/09/10	
		CUSTOMER		피엠에스(주)	
MATERIAL	SA266GR2N			HEAT ID NO	SEE BELOW
DATE OF WORK	2024.09.03				
JOB NO	SBQ2024090301				
H/T METHOD	N				
HOLDING TEMP	910.0°C				
HOLDING TIME	5.5Hrs				
COOLING METHOD	A.C				
N:Normalizing, A:Annealing, Q:Quenching, T:Tempering, S:Solution, P:PWHT Simulation, S.R:Stress Relieved, S.T:Stabilization Heat Treatment, A.C:Air Cooled, F.C:Furnace Cooled, W.C:Water Cooled, O.C:Oil Cooled, AC.C:Accelerated Cooled					
HEATING CYCLE					
* Description OD760*ID600*T90 2EA S98858 A202408-315-003 OD760*ID600*T65 1EA S98858 A202408-315-004					
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div>  <div style="border: 1px solid black; padding: 5px; text-align: center;"> REVIEWED BY WITNESSED BY 2024.11.23 S. M. KIM </div> </div> <div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> PMS <input type="checkbox"/> WITNESSED BY Q.A <input checked="" type="checkbox"/> REVIEWED BY </div> </div> </div>					
* Remark					
REVIEWED BY <input type="checkbox"/> WITNESSED BY <input type="checkbox"/>		<div style="text-align: center;">  General Manager of Q.C. Dep't </div>			

Nr: 910 (X55hrs AC




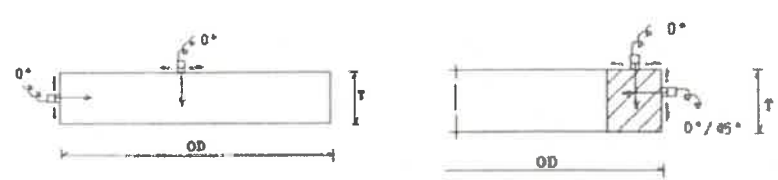
✓	REVIEWED BY
	WITNESSED BY □
2024.11.23	
S. M. KIM	

PMS	<input type="checkbox"/> WITNESSED BY
Q.A	<input checked="" type="checkbox"/> REVIEWED BY

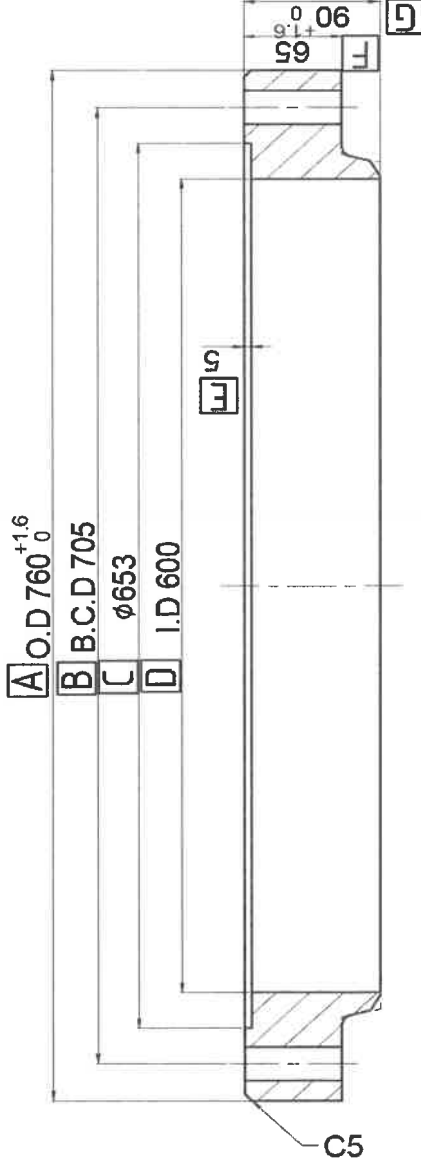


원본대조필

SAMBU STAINLESS FORGING CO., LTD.
Sangha, Ju T-82-51-316-3241

<div></div> <div>초음파탐상검사보고서 Ultrasonic Examination Report</div>					Report No.: BK-PMS-U-241015-01				
					Page No. : 1 OF 1				
Owner/Customer (주문주/고객) Pioneer Manufacturing & Supply Co., Ltd.			Project Name (공사명) HX127			Project No. (공사번호) T-401			
Item Name (제품명) SEE BELOW			Code(규격) : ASME SA388 ASME SEC.VIII DIV.2 PARA. 3.3.4.			Procedure (절차서) NEP(BK)-UT-ASME-001 Rev.1			
Item No. (제품번호) SEE BELOW			Drawing No. (도면번호) N / A			Test Time (검사시기) <input checked="" type="checkbox"/> After H.T <input type="checkbox"/> Before H.T			
Material (재질) SEE REMARK			Surface Condition (표면상태) <input checked="" type="checkbox"/> As Rough Machined (황삭) <input type="checkbox"/> As Welded			Couplant(접촉매질) <input checked="" type="checkbox"/> Oil(오일) <input type="checkbox"/> Water(물) <input type="checkbox"/> CMC			
Maker (제조사) : G E Model (모 델) : USN 60 Control No. (관리번호) : E-20039 Due Date. (유효일자) : 15. Aug. 2025.			Test Method Mode (검사방법) <input checked="" type="checkbox"/> Straight Beam(수직) <input type="checkbox"/> Angle Beam(사각)			Test Mode (형태) <input checked="" type="checkbox"/> 접촉법(Contact) <input type="checkbox"/> 수침법(Immerse)			
Equipment Calibration (장비 교정) ASTM E317 FIG1,BLOCK (S/No.:21-1334)			Standard Block(표준시험편) <input checked="" type="checkbox"/> IIW-V1(S/No.:B10265) <input type="checkbox"/> STB-A1(SS)			Reference Block (S/No.) (대비시험편) <input checked="" type="checkbox"/> Back Reference Method <input checked="" type="checkbox"/> 60°V Notch			
Equipment Linearity (장비 직선성) A.C.L within ±10% / S.H.L within ±5% FSH			Straight Beam Standard Sensitivity : Back Reference Method (B1: 80 %)			Straight Beam Scanning Sensitivity Level +6 dB Above The Primary Ref' Level			
			Angle Beam Standard Sensitivity : 60° V Notch (DAC: 100 %)			Angle Beam Scanning Sensitivity Level +6 dB Above The DAC Level			
Transducer 탐촉자	Type 형태	Angle 교정각도	Frequency 주파수	Size 크기	Type 형태	Angle 교정각도	Frequency 주파수	Size 크기	
	TKS2.25CFN (NCGA130)	0 °	2.25MHz	Ø1"		°	MHz		
	1C20X22A45 (AAXB47)	45°	1 MHz	20x22 mm		°	MHz		
*UT Condition									
Sketch *EXAMINATION AREA : ENTIRE VOLUME									
Identification No. 확인번호 (Part No./ Item / Size)			Q.TY 수량	Accept 합격	Reject 불합격	Interpretation 판정		Remark (Heat No.) /Material)	
1	#1) TUBESHEET OD650 x 60T		2EA	V		NO RECORDABLE INDICATION		S85072 / SA350LF2CL.1	
2	#7) GIRTH FLANGE OD760 x ID600 x 90T		2EA	V		"		S85072 / SA350LF2CL.1	
3	#8) GIRTH FLANGE OD760 x ID600 x 90T		2EA	V		"		S98858 / SA266 Gr.2N	
4	#16) TEST FLANGE OD760 x ID600 x 65T		1EA	V		"		S98858 / SA266 Gr.2N	
						-BLANK-			
SKETCH ON LINE, IF NECESSARY OR <input type="checkbox"/> ATTACHED 필요시 실선안에 스케치하거나 또는 첨부할 것.									
Examined by 시험자	이인섭 I. S. LEE			LEVEL II	Date of Examination 검사일자 Oct 15, 2024.		Customer QA Manager		
Approved by 승인자	김두진 D. J. KIM			LEVEL III	Date of Report 보고서 일자 Oct 15, 2024.				
				<input type="checkbox"/> Witnessed by 입회자		<input type="checkbox"/> Witnessed by PMS Q.A			
				<input type="checkbox"/> Reviewed by 검토자		<input type="checkbox"/> Reviewed by			

DIMENSION CHECK SHEET



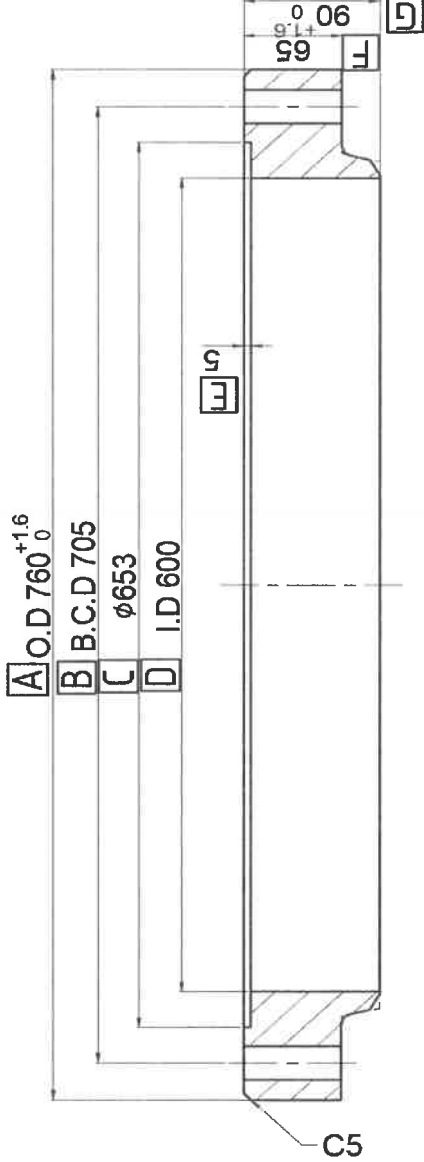
TITLE	2) GIRTH FLANGE
DATE	2024-10-30
EQUIP NO.	HX-127
MATERIAL	SA350 LF2CL1
Q'TY	2 EA
HEAT NO.	S85072
H)BOLT HOLE	No.20-Ø25
I) JACK SCREW HOLE	No.3-5/8"X11UNC
REMARK	

DESCRIPTION	2) OD 760 x 90T														UNIT : mm
CHECK POINT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
TOLERANCE	+1.6 0	±0.8	±0.4	±0.4	±0.4	+1.6 0	+1.6 0								
STANDARD	760.0	705.0	653.0	600.0	5.0	65.0	90.0	20-Ø25	3-5/8"						
MEASUREMENT	1	760.4	705.0	653.1	600.1	65.7	90.1	OK	OK						
	2	760.2	705.0	653.2	600.2	65.5	90.4	OK	OK						
DESCRIPTION															
STANDARD															
MEASUREMENT															
*VISUAL INSPECTION : GOOD															
RESULT : ACCEPT															

Marking : HX-127 #7, SA350 LF2CL1, S85072, 1&2															
Marking :															
Inspected by :															
Approved by :															

DIMENSION CHECK SHEET

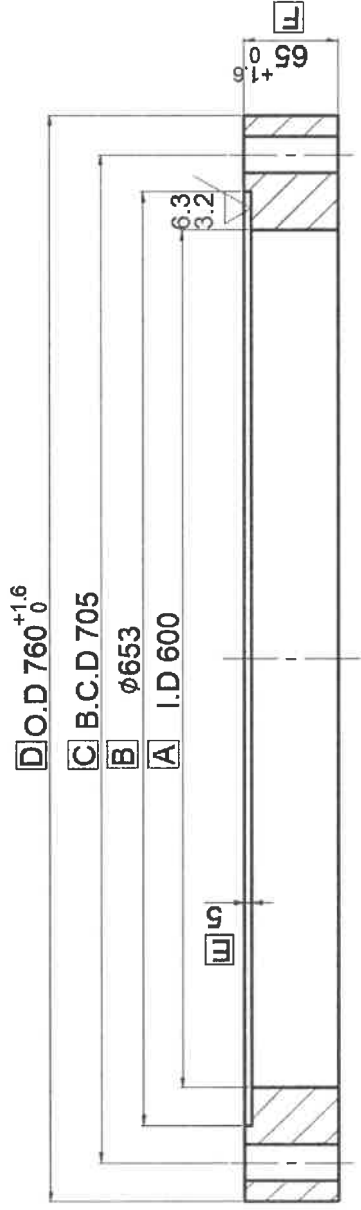
TITLE		3) GIRTH FLANGE	
DATE		2024-10-30	
EQUIP NO.		HX-127	
MATERIAL		SA266 Gr.2N	
Q'TY		2 EA	
HEAT NO.		S98858	
H)BOLT HOLE		No.20-Ø25	
I) JACK SCREW HOLE		No.3-5/8"X11UNC	
REMARK			



DESCRIPTION		3) OD 760 x 90T														UNIT : mm	
CHECK POINT	A	B	C	D	E	F	G	H	I	J	K	L	M	N			
TOLERANCE	+1.6 0	±0.8	±0.4	±0.4	±0.4	+1.6 0	+1.6 0										
STANDARD	760.0	705.0	653.0	600.0	5.0	65.0	90.0	20-Ø25	3-5/8"								
MEASUREMENT	1	760.2	705.0	653.1	600.1	5.1	65.5	90.8	OK	OK							
	2	760.4	705.0	653.1	600.2	5.0	65.6	90.6	OK	OK							
<div>REVIEWED BY WITNESSED BY DATE: 11/23 S. M. KHAN</div>																	
DESCRIPTION																	
STANDARD																	
MEASUREMENT																	

Marking : HX-127 #8, SA266 Gr.2N, S98858, 1&2		Inspected by :
Marking :		Approved by :

DIMENSION CHECK SHEET



	4) TEST RING	
DATE	2024-10-30	
EQUIP NO.	HX-127	
MATERIAL	SA266 Gr.2N	
Q'TY	1 EA	
HEAT NO.	S98858	
G)BOLT HOLE	No.20-Ø25	
REMARK		

[illegible]

Marking: HX-127 #16, SA266 Gr.2N, S98858

Marking:

Pioneer Manufacturing & Supply



CERTIFICATE MATERIAL TEST REPORT
(CERTIFICATE TO EN 10204 3.1)



10, Hamansandan 3-gil, Gunbuk-myeon,
Haman-gun, Gyeongsangnam-do, Korea
Tel. : + 82 - 55 - 585 - 2830
Fax. : + 82 - 55 - 585 - 2836
<http://www.ShinWoolMetal.net>

Page : 1 of 1

Certificate No.: SWM-20241016-001

Order NO. : PMS-24-050-12

Customer : PMS

Project Name : HX-127

Material : ASME SEC. II PART A SA105N (2023ED)


Issued date : October, 16, 2024

Heat No.	Spec	Chemical Composition(%)														UT *5	GOOD	ESU-SW-240926-01	
		C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Nb	AL	CEQ					
S09581	Min	-	0.10	0.60	-	-	-	-	-	-	-	-	-	-	-	-	MT *5	N/A	
	Max	0.35	0.35	1.05	0.035	0.040	0.40	0.30	0.12	0.08	0.40						PT *5	N/A	
	H	0.1877	0.257	0.933	0.0098	0.0030	0.02	0.02	0.00	0.001	0.032	0.000	0.030		0.35		Dimension	GOOD	
	P																Visual		

Heat treatment report No. : SWH-20241016-001
MPS No. : M24-050-04SF Rev.0

UT : ASTM A388/ASME Sec.VIII Div.2, Part3, Para.3.3.4

No.	Description or Dimension	Q'ty	Mechanical Properties	*3 Tension Test Y.S. MPa	T.S. MPa	(Φ12.5×50L) E.L. %	R.A. %	Hardness Test (HBW)	Impact Test Test Temp : Notch :	(10×10×55L) Unit : °C	Bend Test Radius : Angle :
1.	ASME B16.5 150# WN RF 3" S/80	4 EA	Specification Lot NO I12-01	Min Max L	250 - 340	485 - 513	22 - 30	30 - 67	- 197 143,144	Avg. 	
									Minimum : 1 2 3		
			SIMULATION P.W.H.T	#1 #2 #3							



REVIEWED BY	
WITNESSED BY □	
2024.11.23	
S.M. KIM	

Heat Treatment	*4	Normalizing	910 °C	5.3 hrs	A.C	tempering	°C	hrs	Quenching	°C	hrs
		Solution	°C <td>hrs <td></td> <td>Stabilization</td> <td>°C <td>hrs <td>Annealing</td> <td>°C <td>hrs</td> </td></td></td></td>	hrs <td></td> <td>Stabilization</td> <td>°C <td>hrs <td>Annealing</td> <td>°C <td>hrs</td> </td></td></td>		Stabilization	°C <td>hrs <td>Annealing</td> <td>°C <td>hrs</td> </td></td>	hrs <td>Annealing</td> <td>°C <td>hrs</td> </td>	Annealing	°C <td>hrs</td>	hrs

We hereby certify that the material herein has been made and tested in accordance with as above specification and also with the requirement called for the above order.

PMS	<input type="checkbox"/> WITNESSED BY
QA	<input checked="" type="checkbox"/> REVIEWED BY

Managerial Control

Note : *1. H=Heat Analysis, P=Product Analysis
*2. L=Longitudinal, T=Tangential, Tr=Transverse, R=Radial.
*3. Tensile Test : Y.S=Yield Strength(0.2% Offset), T.S=Tensile Strength, E.L=Elongation, R.A=Reduction of Area.
*4. A.C=Air Cooled, F.C=Furnace Cooled, W.C=Water Cooled, O.C=Oil Cooled.
*5. UT : Ultrasonic Examination, MT : Magnetic Examination, PT : Penetrant Testing





ISO 9001/14001
OHSAS 18001/PED
CERTIFIED



CERTIFICATE MATERIAL TEST REPORT

(CERTIFICATE TO EN 10204 3.1)



SHIN WOO METAL CO., LTD.

10, Hamansandan 3-gil, Gunbuk-myeon,
Haman-gun, Gyeongsangnam-do, Korea
Tel. : + 82 - 55 - 585 - 2830
Fax. : + 82 - 55 - 585 - 2836
http://www.ShinWooMetal.net

Certificate No.: SWM-20241016-002

Order NO. : PMS-24-050-12

Customer : PMS

Project Name : HX-127

Material : ASME SEC.II PART A SA350 LF2 CL1

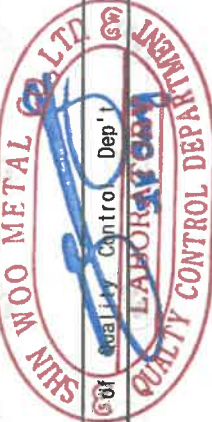
Issued date : October, 16, 2024

Page : 1 of 1

Heat No.	Spec	Chemical Composition(%)											UT *5	GOOD	ESU-SM-240926-01		
		C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Nb				AL	CEQ
S09581	Min	-	0.15	0.60	-	-	-	-	-	-	-	-	-	-	-	-	
	Max	0.30	0.30	1.35	0.035	0.040	0.40	0.30	0.12	0.08	0.40	0.02	-	-	-	-	
	H	0.1877	0.257	0.933	0.0098	0.0030	0.02	0.02	0.00	0.001	0.032	0.000	0.030	-	-	-	
	*1															0.35	
	P															GOOD	
▶ Remark Heat treatment report No. : SWH-20241016-002 MPS No. : M24-050-13SF Rev.0																	
No.	Description or Dimension		Q'ty		Mechanical Properties		*3 Tension Test			Hardness Test			Impact Test		Bend Test		
2.	ASME B16.5 300# LWN RF 2" L/230		2	EA	Specification		Min	250	485	22	30	-	197	1	2	16	
3.	ASME B16.5 300# WN RF 2" S/160		10	EA	Lot NO		Max	-	655	-	-	-	143, 144	68	70	3	
4.	ASME B16.5 300# WN RF 3" S/160		2	EA	112-01		L	340	513	30	67	-	143, 144	68	70	59	
5.	ASME B16.5 300# WN RF 4" S/120		2	EA												65.6	
6.	ASME B16.5 300# WN RF 6" S/80		2	EA	SIMULATION		#1										
					P.W.H.T		#2										
							#3										
Heat Treatment *4		Normalizing 910 °C	5.3	hrs	A.C	Tempering	°C	hrs	Quenching	°C	hrs	hrs	hrs	hrs	hrs	hrs	
		Solution	°C	hrs	hrs	Stabilization	°C	hrs	Annealing	°C	hrs	hrs	hrs	hrs	hrs	hrs	

We hereby certify that the material herein has been made and tested in accordance with as above specification and also with the requirement called for the above order.

WITNESSED BY
PMS
Q.A. *Q.A.*

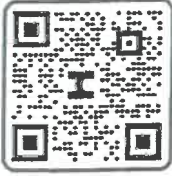


Manager of Quality Control Dep't

Note : *1. H=Heat Analysis, P=Product Analysis
*2. L=Longitudinal, T=Tangential, Tr=Transverse, R=Radial.
*3. Tensile Test : Y.S=Yield Strength(0.2% Offset), T.S=Tensile Strength, E.L=Elongation, R.A=Reduction of Area.
*4. A.C=Air Cooled, F.C=Furnace Cooled, W.C=Water Cooled, O.C=Oil Cooled.
*5. UT : Ultrasonic Examination, MT : Magnetic Examination, PT : Penetrant Testing

검사증명서

MILL TEST CERTIFICATE



HYUNDAI STEEL

당진제철소 : 충남 당진시 송악읍 북부산업로 1480
1480 Bukusanup-Ro, Songak-Eup, Dangjin-Si, Chungnam, Korea

주문번호
Order No. : D211103880

품명
Commodity : Slab

세금규격
Specification : ASTM A105-A350(F2

고객사
Customer : (주)평산엠텍

주문자
Contractor : 현대아이에프씨 주식회사

증명서 번호
Certificate No. : 20211118-CN-0013-002

발행일자
Date of Issue : 2021-11-18

제품시수 Dimension	수량 Quantity	중량 Weight (Kg)	제강번호 Heat No.	제품번호 Product No.	화합성분 Chemical Composition(%)																	단위 Unit							
																						2: x 100 4: x 10,000				3: x 1,000 5: x 100,000			
					C	Si	Mn	P	S	Cr	Ni	B	Ca	Cu	Mo	N	Nb	Ti	V	Sd -Al	CEQ								
300 x 300 x 5530	1	27.460	S29581	S29581 03	1.877	267	933	98	30	2	2	3	3	3	32	0	35	0	1	1	30	351							

*** Grade Total *** 2 54,970(Kg) Ceq(CEV): C = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5

*** Last Item ***

606-81-95003

(주)평산엠텍 신진옥

부산광역시 강서구 녹산화전로 93(송정동)
제조: 도매 철강및금속구조재
부품: 동산 매대, 입대



CERTIFIED TRUE COPY

ACCEPT	REJECT
REVIEWED BY	WITNESSED BY
SHIN WOO METAL CO. LTD.	SHIN WOO METAL CO. LTD.

REVIEWED BY	WITNESSED BY
2021. 11. 23.	
S. M. KIM	



반허리각 (도) 0.2-730 44/0

* Division - P: Product analysis, L: Ladle analysis

N O T E

* THE SLAB IS FULLY KILLED, FINE-GRAIN PRACTICE. BASIC OXYGEN PROCESS AND VACUUM DEGASSING PROCESS WERE APPLIED.

* ANY WELDING SHALL NOT BE PERFORMED FOR THE ORDERED MATERIAL.

* The Certificate has been issued in compliance with EN 10204 Type 3.1

상기의 제품온 검사의 결과 지정된 규격에 합격한 것을 증명합니다.

WE HEREBY CERTIFY THAT THE MATERIAL HAS BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND THE REQUIREMENTS

Signature

Y. H Kim

Chief Of Quality Assurance Team

* 본 검사증명서는 원본인 검사원서(전자서명)를 복사한 사본(복사본)을 제외하고, 전자증명서의 내용을 인쇄하여 고객사로부터 확인하십시오. (http://smhyundai-steel.com/cs/cm/login.jsp)
* This Mill Test Certificate is a copy that has been printed from original electronic document (with digital signature).
* You are able to check an original electronic document at hyundai's customer portal (http://smhyundai-steel.com/cs/cm/login.jsp) * DHcode scanner App : 'QReal'
* [사용상 주의사항] 본 검사증명서와 밀가공 규격 및 사용시 제품안전 및 안전성 문제가 발생할 수 있습니다.
* [Caution for Use] Damage on products and safety problems may arise if used other than to the spec stated in this Mill Test Certification.

HEAT TREATMENT REPORT



SHIN WOO METAL CO., LTD.

#10, HAMANSANDAN 3-GIL, GUNBUK-MYEON,
HAMAN-GUN, GYENGANGNAM-DO, KOREA

Tel. : 055-585-2830 Fax. : 055-585-2836

Page : 1 of 1
Report No. : SWH-20241016-001
Order No. : PMS-24-050-12
Issued Date : October, 16, 2024

Customer : PMS		Heating No. : SH24-112	
Material : ASME SEC.II PART A SA105N (2023ED)		Date Of Work : 20240912	
Heat No. : S09581		Job No. : 33-2408-18	

No.	Description or Dimension	Q'ty	HEAT TREATMENT METHOD						HEATING CYCLE		
1	ASME B16.5 150# WN RF 3" S/80 <div>BLANK</div>	4 EA	<input checked="" type="checkbox"/>	Normalizing	HOLDING TEMP.	910 °C			Normalizing		
			<input type="checkbox"/>	Quenching	HOLDING TIME	5.3 hrs					
			<input type="checkbox"/>	Solution	COOLING METHOD	A.C					
			<input type="checkbox"/>	Tempering	HOLDING TEMP.	°C					
			<input type="checkbox"/>	Annealing	HOLDING TIME	hrs					
			<input type="checkbox"/>	Stabilization	COOLING METHOD						
			HARDNESS DATA.								
N0.	x1	x2	x3	x4							
1	143	144									
2											

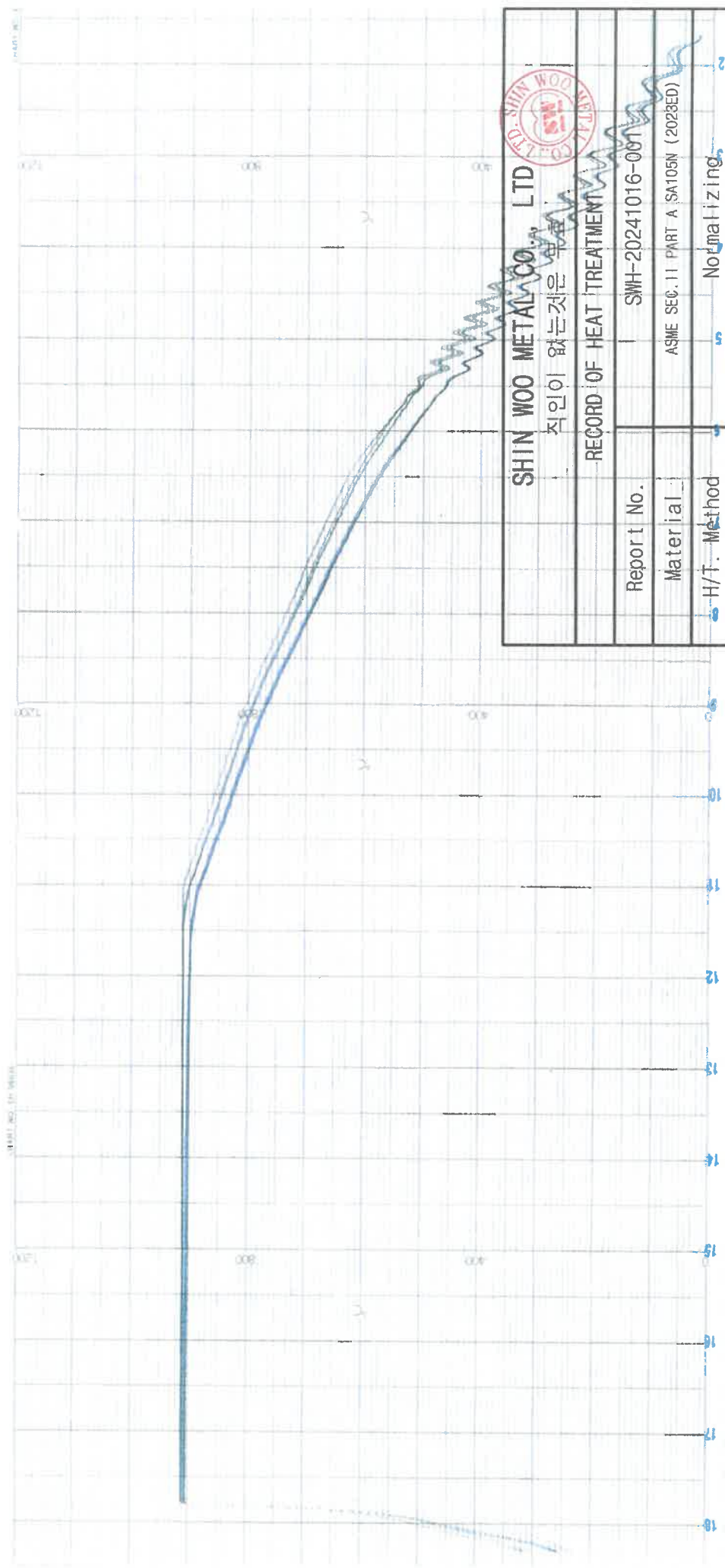
▶ Remark

REVIEWED BY	WITNESSED BY
2024.11.23	
S.M. KIM	

PMS	WITNESSED BY
Q.A.	REVIEWED BY

Manager of Quality Control Dep't

HEAT TREATMENT CHART



SHIN WOO METAL CO., LTD

직인이 없는것은 무효

RECORD OF HEAT TREATMENT

Report No.	SWH-20241016-001
Material	ASME SEC. II PART A SA105N (2023ED)
H/T. Method	Normalizing
Customer	PMS
Job No.	33-2408-18
Heat No.	S09581
Q'ty	4 EA
Date of Work	2024-09-12

✓ REVIEWED BY
WITNESSED BY □
2024.11.23
S. M. KIM

PMS
Q.A
WITNESSED BY
REVIEWED BY
[Signature]

HEAT TREATMENT REPORT



SHIN WOO METAL CO., LTD.

#10, HAMANSANDAN 3-GIL, GUNBUK-MYEON,
HAMAN-GUN, GYENGSAANGNAM-DO, KOREA

Tel. : 055-585-2830 Fax. : 055-585-2836

Page : 1 of 1
Report No. : SWH-20241016-002
Order No. : PMS-24-050-12
Issued Date : October, 16, 2024

Customer	: PMS	Heating No.	: SH24-112
Material	: ASME SEC.II PART A SA350 LF2 CL1 (2023ED)	Date Of Work	: 20240912
Heat No.	: S09581	Job No.	: 33-2408-18

No.	Description or Dimension	Q'ty	HEAT TREATMENT METHOD				HEATING CYCLE	
2	ASME B16.5 300# LWN RF 2" L/230	2 EA	<input checked="" type="checkbox"/> Normalizing	HOLDING TEMP.	910 °C		Normalizing	
3	ASME B16.5 300# WN RF 2" S/160	10 EA	<input type="checkbox"/> Quenching	HOLDING TIME	5.3 hrs			
4	ASME B16.5 300# WN RF 3" S/160	2 EA	<input type="checkbox"/> Solution	COOLING METHOD	A.C			
5	ASME B16.5 300# WN RF 4" S/120	2 EA	<input type="checkbox"/> Tempering	HOLDING TEMP.	°C		Hardness Data	
6	ASME B16.5 300# WN RF 6" S/80	2 EA	<input type="checkbox"/> Annealing	HOLDING TIME	hrs			
			<input type="checkbox"/> Stabilization	COOLING METHOD				
			HARDNESS DATA					
			NO.	x1	x2	x3		
			1	143	144			
			2					

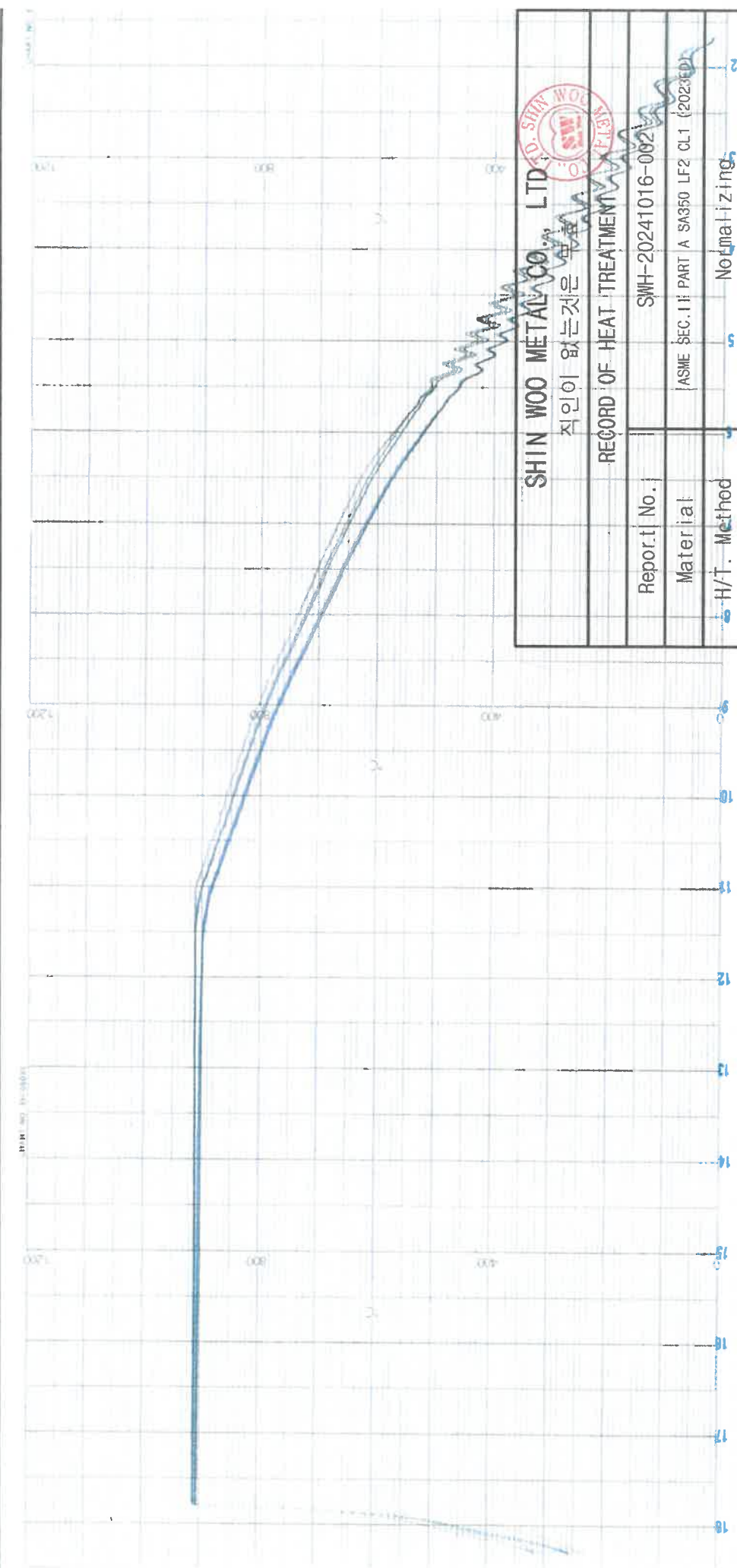
▶ Remark

REVIEWED BY
WITNESSED BY □
2024.11.23
S. M. KIM

PMS
Q.A
WITNESSED BY
REVIEWED BY
Jmk

Manager of Quality Control Dep't

HEAT TREATMENT CHART



SHIN WOO METAL CO., LTD.	
직인이 없는것은 무효	
RECORD OF HEAT TREATMENT	
Report No.	SWH-20241016-002
Material	ASME SEC. III PART A SA350 LF2 CL1 (2023ED)
H/T Method	Normalizing
Customer	PMS
Job No.	33-2408-18
Heat No.	S09581
Q'ty	18 EA
Date of Work	2024-09-12

WITNESSED BY
PMS
Q.A
REVIEWED BY
Q.A
S.M. KIM

REVIEWED BY
WITNESSED BY
2024.11.23
S.M. KIM

ULTRASONIC EXAMINATION REPORT

초음파탐상검사보고서

보고서번호 Report No.

ESU-SM-240926-01

시험날짜 Date of Exam

2024. 09. 26

페이지번호 Page No

1 of 2

주문주/고객 Owner/Customer

P.M.S CO.,LTD

공사번호/공사명 Project No./Name

HX-127 (*PO No. : PMS-24-050-12)

제품번호/제품명 Item No./Name

FLANGE

도면번호 / Drawing No.

N / A

적용 규격 App. Code

ASTM A388 / ASME SEC.VIII DIV.2 PART3 PARA 3.3.4

적용 절차서번호 App.Procedure No.

N / A

Rev.No

두께 Thickness

☐ mm

재질 / Material

SEE BELOW

☐ inch

SEE REMARKS

용접방법 Weld Method

☐ SMAW ☐ SAW ☐ FCAW ☐ GTAW

표준시험편 Standard Block

IIW-V1

검사시기 Examination Time

After Rough Machined

표면조건 Surface Condition

☐ As Welded ☐ As Ground ☒ As Machined

장비 Equipment

탐촉자 Probe

교정시험편 Calibration Block

ID No. : EU-EC-01

Maker

Model

MHz

Size

Angle

Serial No.

Type

Serial No.

Model : USN 60 SW

KDE

SZ2.25-1

2.25

Ø1 inch

0°

221-007

IIW-V1

L01229

Maker : GE

Serial No. : 01X5P7

Due Date : 2025. 01. 01

직선성

Screen Height Linearity : Within ± 5 %

증폭성

Amplitude Control Linearity : Within ± 10 %

Setting Sensitivity Method (감도설정방법)

시험온도 Test Temp.

Probe (탐촉자)

Method (방법)

Standard (표준감도)

Scanning (주사감도)

28 °C

SZ2.25-1

Back Ref

80%

+6dB

접촉매질 Couplant

☐ C.M.C

☐ Glycerine

☒ Oil

• EXAMINATION AREA : ENTIRE VOLUME



ShinWoo Metal Q.C Dep't

☐ Witnessed by

☒ Reviewed by J.K. Jang

확인번호 Identification No.
(Item / Size)

수량
QTY

합격
Accept

불합격
Reject

평가
Interpretation

비고 Remarks
(Material)

1 ASME B16.5 150# WNRF 3" S/80

4EA

V

NO RECORDABLE INDICATION

SA105N

2 ASME B16.5 300# LWNRF 2" L/230

2EA

V

NO RECORDABLE INDICATION

SA350 LF2 CL1

3 ASME B16.5 300# WNRF 2" S/160

10EA

V

NO RECORDABLE INDICATION

SA350 LF2 CL1

4 ASME B16.5 300# WNRF 3" S/160

2EA

V

NO RECORDABLE INDICATION

SA350 LF2 CL1

5 ASME B16.5 300# WNRF 4" S/120

2EA

V

NO RECORDABLE INDICATION

SA350 LF2 CL1

검사자 K. J. PARK / 박 경 재

Examined By Level II

2024.09.26

Date

☐ 주문주/고객 Owner/Customer

☐ 검토 Reviewed

☐ Third Party Inspector

☐ S. M. KIM

☐ ANI / AI 공인검사관

☐ 검토 Reviewed

☐ 임회 Witnessed

승인자 J. B. NAM / 남 정 부

Approved By Level III

2024.09.26

Date

ULTRASONIC EXAMINATION REPORT

초음파탐상검사보고서

보고서번호 Report No.

ESU-SM-240926-01

시험날짜 Date of Exam

2024. 09. 26

페이지번호 Page No.

2

of

2

[illegible]



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujinco@yujinco-metal.com

MATERIAL TEST REPORT

Customer : P.M.S CO., LTD
Product Name : STUD BOLT+2 HEAVY HEX NUTS
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K01
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

ASME SEC. II SA-320/SA-320M Gr.L7																				
Specification :																				
1. BOLT																				
No.	ITEM	Mechanical Properties						Impact Test		Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)						
		Division	Tensile Strength	Yield Strength*	Elongation	Reduction of Area	Hardness	Quenching		Tempering	C			Si	Mn	P	S	Cr	Mo	
								°C	°F											
		Unit	860	725	16	50	-	-	-	593		0.38	0.15	0.75	-	0.80	0.15			
		Spec	Min	Max	Min	Max	Min	Avg	27	-	-	0.48	0.35	1.00	0.035	0.040	1.10	0.25		
		Size					35													
1	STUD BOLT	M22x2.5P x 260L	926.1	799.7	20.4	55.3	28	27.33	27.91	925	710	42	SS0430	0.40	0.242	0.796	0.010	0.0042	0.95	0.212

2. NUT		ASME SEC. II SA-194/SA-194M Gr.4																					
No.	ITEM	Division		Proof Load		Hardness		Heat Treatment			Sample Nut Test				Quantity (EA)	Heat No.	Chemical Composition (wt. %)						
		Unit	Spec	Min	Max	HRC	24	35	°C	595	94	°C	Temp (°C)	Time (hr)			C	Si	Mn	P	S	Cr	Mo
	HEAVY HEX NUT	M22x2.5P	Accept	30	870	640	98	590	24	84	C55433	0.42	0.25	0.79	0.008	0.006	-	-	-	0.21			

Remark :
* Yield Strength : 0.2% offset.
* According to EN10204 3.1
* App. Code : ASME SEC. II 2021Ed.
* Dimension & Visual Exam. : GOOD
* Macroetch Exam. : GOOD
* Surface : Hot Dip Galvanizing

We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI.

Approved by : *Changhee Lee*
Manager of Quality Assurance Team

QSP-091-04(Rev.1)



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujinco@yujinco-metal.com

MATERIAL TEST REPORT

Customer : P.M.S CO., LTD
Product Name : JACK SCREW
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K02
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

1. BOLT

Specification : ASME SEC. II SA-479 Type304

No.	ITEM	Division	Mechanical Properties				Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)						
			Tensile Strength ksi	Yield Strength* ksi	Elongation %	Reduction of Area %	Quenching °C	Tempering °C			C	Si	Mn	P	S	Ni	Cr
		Unit															
		Spec															
		Size															
1	JACK SCREW	5/8"-11UNC x 110L	105.0	89.0	46.0	72.0	CARBIDE SOLUTION TREATMENT		12	S50117	0.053	0.533	1.898	0.0335	0.0286	8.049	18.044

Remark :

- * Yield Strength : 0.2% offset
- * According to EN10204 3.1
- * App. Code : ASME SEC. II 2021Ed.
- * Dimension & Visual Exam. : GOOD

We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI.



Changhee Lee

Approved by : Changhee Lee
Manager of Quality Assurance Team



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujinco@yujinco-metal.com

MATERIAL TEST REPORT

Customer : P.M.S CO., LTD
Product Name : DOWEL PIN
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K03
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

1. PRODUCT

Specification : ASME SEC. II SA-479 Type304

No.	ITEM	Division	Mechanical Properties					Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)							
			Tensile Strength MPa	Yield Strength* MPa	Elongation %	Reduction of Area %	Quenching °C	Tempering °C	C			Si	Mn	P	S	Ni	Cr		
1	DOWEL PIN	Ø16 x 129L	699.5	622.6	35.2	62.4	CARBIDE SOLUTION TREATMENT		2	6Z051	0.08	1.00	2.00	0.045	0.030	10.5	20.0	18.49	

Remark :

- * Yield Strength : 0.2% offset.
- * According to EN10204 3.1
- * App. Code : ASME SEC. II 2021Ed.
- * Dimension & Visual Exam. : GOOD

REVIEWED BY	WITNESSED BY D
2024. 11. 23	
S. M. KIM	

We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI.

PMS	WITNESSED BY
Q.A	REVIEWED BY

Approved by : Changhee Lee

Changhee Lee

Manager of Quality Assurance Team



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujinco@yujinco-metal.com

MATERIAL TEST REPORT

Customer : P.M.S. CO., LTD
Product Name : HEX NUT
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K04
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

1. NUT
Specification : ASME SEC. II SA-194/SA-194M Gr.2H

No.	ITEM	Division	Proof Load		Hardness		Heat Treatment		Sample Nut Test			Heat No.	Chemical Composition (wt. %)							
			kN	Min Max	HRC	24 35	°C	°C	HRB	Temp (°C)	Time (hr)		C	Si	Mn	P	S	Ni	Cr	Mo
-	HEX NUT	M10x1.5P	Accept	31	880	490	540	24	0.40	0.40	1.00	0.040	0.050	-	-	-	-	-		

Remark :
* Yield Strength : 0.2% offset
* According to EN10204 3.1
* App. Code : ASME SEC. II 2021Ed.
* Dimension & Visual Exam. : GOOD
* Macroetch Exam. : GOOD

We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI

WITNESSED BY

Q.A.

WITNESSED BY

Q.A.

Approved by : Changhee Lee
Manager of Quality Assurance Team

Changhee Lee



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujingo@yujincometal.com

MATERIAL TEST REPORT

Customer : P.M.S CO., LTD
Product Name : PLUG
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K05
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

1. PRODUCT

Specification : ASME SEC. II SA-276 Type304

No.	ITEM	Division	Mechanical Properties					Heat Treatment		Heat No.	Chemical Composition (wt. %)								
			Tensile Strength ksi	Yield Strength* ksi	Elongation %	Reduction of Area %	Quenching °C	Tempering °C	C		Si	Mn	P	S	Ni	Cr			
		Unit	Min	Max															
		Spec	75	30	30	40	-	-	-			0.08	1.00	2.00	0.045	0.030	11.0	18.0	20.0
		Size																	
1	PLUG	1"	103.2	91.9	34.9	62.5	CARBIDE SOLUTION TREATMENT			6W385	0.060	0.440	1.820	0.033	0.026	8.05	18.19		

Remark :

- * Yield Strength : 0.2% offset.
- * According to EN10204 3.1
- * App. Code : ASME SEC. II 2021Ed.
- * Dimension & Visual Exam. : GOOD

We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI.



Approved by : **Changhee Lee**
Manager of Quality Assurance Team

Changhee Lee



MATERIAL TEST REPORT

285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
TEL +82-51-314-0757 FAX +82-51-314-0759
yujinco@yujincometal.com

Customer : P.M.S CO., LTD
Product Name : SETTING BOLT+3HEAVY HEX NUT
Project Name : N/A
Project No. : HX-127

Cert. No. : YM2024-1115-K06
Issue Date : 2024. 11. 15
P/O No. : PMS-24-050-17
Item No. : N/A

1. BOLT

Specification : ASME SEC. II SA-193/SA-193M Gr.B7

No.	ITEM	Division	Mechanical Properties					Heat Treatment			Quantity	Heat No.	Chemical Composition (wt. %)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			Tensile Strength MPa	Yield Strength* MPa	Elongation %	Reduction of Area %	Hardness HRC	Quenching °C	Tempering °C	C			Si	Mn	P	S	Ni	Cr	Mo																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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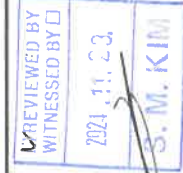
2. NUT

Specification : ASME SEC. II SA-194/SA-194M Gr.2H

No.	ITEM	Division	Proof Load		Hardness	Heat Treatment			Sample Nut Test			Quantity (EA)	Heat No.	Chemical Composition (wt. %)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			kN	HRC		Quenching °C	Tempering °C	Hardness HRB	Temp (°C)	Time (hr)	C			Si	Mn	P	S	Ni	Cr	Mo																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Remark :

- * Yield Strength : 0.2% offset
- * According to EN10204 3.1
- * App. Code : ASME SEC. II 2021Ed.
- * Dimension & Visual Exam. : GOOD
- * Macroetch Exam. : GOOD
- * Surface : Hot Dip Galvanizing



We hereby certify that the Material described here in has been satisfactorily tested as above in accordance with the specification.
Our quality system is certified in accordance with ISO 9001:2015 by SMI.



Approved by : **Changhee Lee**
Manager of Quality Assurance Team

28

Certificate of Compliance

Certificate No : YMCOFC2024-1115-K01

Date : 2024. 11. 15

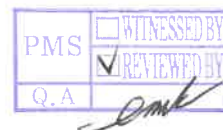
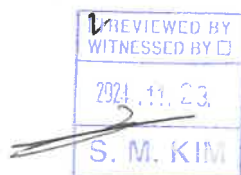
Customer : P.M.S CO., LTD.

P/O No. : PMS-24-050-17

Project No. : HX-127

No.	Description	Material	Size	Q'ty (EA)	Remark.
1	EYE BOLT	SA36 or Equal	1"-8UNC	4	H.D.G
TOTAL				4	

We hereby certify that the contents of this report are correct and accurate and that all test and examination results and operations performed by YUJINCOMETAL CO., LTD.
and our subcontractors are in compliance with the requirments of the Customer's procurement.



Approved by : Changhee Lee

Changhee Lee

Manager of Quality Assurance Team





ISO/IEC 17024
Personnel Certification Program
#0544



ASNT Certification Services LLC.

Be it known that

Du Jin Kim

Has met the established and published Requirements for Certification by ASNT Certification Services LLC. as

NDT Level III

In the following Nondestructive Testing Methods:

Method	Issue Date	Expiration Date
Liquid Penetrant Testing	2/22	2/27
Magnetic Particle Testing	2/22	2/27
Radiographic Testing	2/22	2/27
Ultrasonic Testing	2/22	2/27
Visual Testing	2/22	2/27



✓ REVIEWED BY WITNESSED BY	2/23 11:23
S. M. KIM	

206623

Certificate Number

John G. Perry
Certification Management Committee
Chair

ASNT Certification Services, LLC, President

Note: All ASNT NDT Level III exams are developed and maintained in accordance with ISO/IEC 17024 guidelines for certification of persons. The following exams are currently accredited by the American National Standards Institute (ANSI) - BASIC, ET, MT, PT, RT, UT, and VT. This certificate is the property of ASNT Certification Services LLC., is not official without ASNT Certification Services LLC.'s raised gold seal, and is subject to revocation prior to the listed expiration date. This certificate shall be verified on <https://asntcertification.org> or by contacting ASNT Certification Services LLC.

Certificate No: II-2013018

☐ New ☒ Re



NDE CERTIFICATE

Korea Machinery Inspection E&C Co., Ltd.

That is to certify that the individual named below has successfully completed experience, training and examination requirements in accordance with the provisions of KMI E&C Co., Ltd. Procedure for NDE personnel Qualification and Certification KMIQ-P6225 (Rev.9) which meets the requirements of SNT-TC-1A & CP-189 (2016 Ed.).

In Sub, Lee

is hereby certified to perform the following Nondestructive Examination Method(s)

Method	Technique	Level	Limitation (if any)	Certification Date	Expiration Date
Radiographic Testing	Radiography	II	-	03/04/2022	03/03/2027
Ultrasonic Testing	Manual	II	-	03/04/2022	03/03/2027
Magnetic Particle Testing	-	II	-	03/04/2022	03/03/2027
Liquid Penetrant Testing	-	II	-	03/04/2022	03/03/2027
Visual Testing	-	II	-	03/04/2022	03/03/2027



Du Jin, Kim

(ASNT CERT NO:206623)

Qualified by Designated NDE Level III

03/04/2022

Date

Moo Ung, Yoon

President of KMI E&C Co., Ltd

03/04/2022

Date

KMI Co., Ltd. (KMIQ-F6251-01, Rev.1)



ISO/IEC 17024
Personnel Certification Program
#0644



ASNT Certification Services LLC.

Be it known that

Jeong-Boo Nam

Has met the established and published Requirements for Certification by ASNT Certification Services LLC. as

NDT Level III

In the following Nondestructive Testing Methods:

Method	Issue Date	Expiration Date
Liquid Penetrant Testing	8/22	8/27
Magnetic Particle Testing	8/22	8/27
Radiographic Testing	8/22	8/27
Ultrasonic Testing	8/22	8/27
Visual Testing	8/22	8/27



202308

Certificate Number

Jeong-Boo Nam
Certification Management Committee
Chair

John J. Jeong
ASNT Certification Services, LLC, President

Note: All ASNT NDT Level III exams are developed and maintained in accordance with ISO/IEC 17024 guidelines for certification of persons. The following exams are currently accredited by the American National Standards Institute (ANSI) - BASIC, ET, MT, PT, RT, UT, and VT. This certificate is the property of ASNT Certification Services LLC., is not official without ASNT Certification Services LLC.'s raised gold seal, and is subject to revocation prior to the listed expiration date. This certificate shall be verified on <https://asntcertification.org> or by contacting ASNT Certification Services LLC.

Nondestructive Test Certificate

ndell-5722R1
Certificate No.

This is to certify that

PARK, KYUNG JAE

meets the qualification requirements of ASNT SNT-TC-1A 92 Edition through 2020 Edition and the company quality assurance procedure No. QAP-0302 Rev.16 for the following methods and levels.

TESTING METHOD	LEVEL	ISSUES	EXPIRES
Radiographic Testing	Level II	Aug. 22, 2022	Aug. 31, 2025
Ultrasonic Testing	Level II	Aug. 22, 2022	Aug. 31, 2025
Magnetic Particle Testing	Level II	Aug. 22, 2022	Aug. 31, 2025
Liquid Penetrant Testing	Level II	Aug. 22, 2022	Aug. 31, 2025
Visual Testing	Level II	Aug. 22, 2022	Aug. 31, 2025

REVIEWED BY WITNESSED BY	2021. 11. 23.
S. M. KIM	

 Aug/22/22

Level III Examiner J.B. NAM

 8/22/22

President I.H. KONG

Calibration Certificate

Q & Q Corporation

58, Hwajeonsandan 3-ro, Gangseo-gu, Busan, Korea
Tel : 051-292-0395, Fax : 051-292-0397

Certificate No : Q2403326-106-001

Page (1) of (2)



1. Client

Name : P.M.S Co., LTD

Address : 296, Dae Dong-Ro, Sasang-Gu, Busan, Korea

2. Calibration Subject

Description : Inside/Outside Caliper(Digital type)

Manufacturer & Type : Mitutoyo / (0 ~ 300) mm, 0.01 mm

Serial Number : 0023118



3. Date of Calibration : 12. Apr. 2024

4. Environment

Temperature : $(20.7 \pm 0.1) ^\circ\text{C}$

Humidity : $(48 \pm 2) \% \text{ R.H.}$

Location : ☒ Permanent Calibration Lab

☐ Mobile Lab

☐ On Site Calibration

[Address : 58, Hwajeonsandan 3-ro, Gangseo-gu, Busan, Korea]

5. Traceability

Calibration method and/or brief description

The above instrument has been calibrated according to the calibration instruction of Inside/Outside Calipers (QECI - LE601) using the below standard instrument which is established a traceability to National Metrology Institute.

List of used standards/specifications

Description	Manufacturer and Model	Serial Number	The due date of next calibration	Calibration laboratory
Caliper Checker	Mitutoyo, 660 mm	559	18. Sep. 2026.	Q & Q Corp.
Surface Plate	Kumsung, (1 000 × 750) mm	260919	21. Jan. 2025.	Q & Q Corp.
Surface Thermometer	TES, 1300	990407368	29. Jun. 2024.	Q & Q Corp.

6. Calibration result : Refer to the attached Calibration Result.

7. Measurement uncertainty : Refer to the attached Calibration Result.

Affirmation	Measurements performed by Name : Hyung Kyu Kim (signature)	Approved by Title : Technical Manager Name : Myeon Keol Kim (signature)
-------------	---	---

The above certificate of calibration is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.



15. Apr. 2024.

Q & Q Corporation
Accredited by KOLAS, Republic of KOREA

(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity etc. manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

Calibration Result

Q & Q Corporation

58, Hwajeonsandan 3-ro, Gangseo-gu, Busan, Korea
Tel : 051-292-0395, Fax : 051-292-0397

Certificate No : Q2403326-106-001

Page (2) of (2)



- * Manufacturer : Mitutoyo
- * Model Name : (0 ~ 300) mm, 0.01 mm
- * Serial number : 0023118

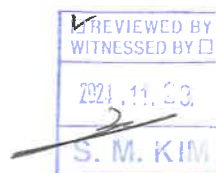
■ Inside/Outside Caliper(Digital type) Calibration

Graduation value (mm)	Correction value (mm)	
	Outside	Intside
0	0.00	-
20	-0.01	0.00
50	-0.01	0.00
100	0.00	0.00
150	0.00	-0.01
200	0.00	-0.01
300	-0.01	-0.02

Measurement uncertainty : 0.01 mm

(Coverage probability of approximately 95 % , $k = 2$)

※ The calibration value is obtained by adding the correction value to the graduation value.
The end.



* The recommended calibration interval is 12 month according to the KOLAS guide (KOLAS-G-008).

QE-R-002-1 (Rev. 3)

(210 × 297) mm



Calibration Certificate

Korea Instruments Co., Ltd. Branch

45, Gwangjang-ro 56beon-gil, Sasang-gu, Busan, Korea

Tel : 051-322-0880, Fax : 051-322-4066

Certificate No : 24004678-1

Page : (1) of (2)



1. Client

Name : DAHAN METAL CO.,LTD.

Address : 32, Saenggoksandan 2-ro, Gangseo-gu, Busan

2. Calibration Subject

Description : Calipers,inside/outside

Manufacturer and Model Name : Mitutoyo / (0 ~ 1 000) mm, 0.01 mm

Serial Number : 0027937

3. Date of Calibration : 2024. 04. 13.

4. Environment

- Temperature : (20.2 ± 0.2) °C - Humidity : (38 ± 2) % R.H.

- Location ☒ Permanent Calibration Lab ☐ Mobile Lab ☐ On Site Calibration
(Address : 45, Gwangjang-ro 56beon-gil, Sasang-gu, Busan, Korea)

5. Traceability

Calibration method and/or brief description

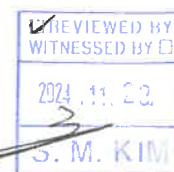
The above instrument is calibration obtained by using standard equipment which traceability is maintained to SI units by National Calibration Laboratory on the basis of the standard calibration procedure of Inside/Outside calipers (KIC-106-01-1).

List of used standards/specifications

Description	Manufacturer and Model	Serial Number	The due date of next calibration	Calibration Laboratory
Gauge blocks	Mitutoyo / 1 GRADE(47P)	1807548	2026.02.14	Korea Instrument Co., Ltd. Branch
Long gauge blocks	Mitutoyo / K GRADE(8P)	0004160	2025.03.17	KTL
Long gauge blocks	INSIZE / 1 GRADE(1P)	15032	2024.09.13	KRISS
Gauge block accessories	Mitutoyo / 12 mm	050101, 050103	2024.05.04	KTL

6. Calibration Result : Refer to Calibration Result

7. Measurement uncertainty : Refer to Calibration Result



affirmation	Measurements performed by	Approved by
	Name : Chi-Won Noh	Title : Technical Cal. Manager Name : Sang-Hyun Park

The above calibration certificate is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.



2024. 04. 13

Korea Instruments Co., Ltd. Branch Calibration Laboratory
Accredited by KOLAS, Republic of KOREA

(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.



Calibration Results

Korea Instruments Co., Ltd. Branch

45, Gwangjang-ro 56beon-gil, Sasang-gu,
Busan, Korea

Certificate No : 24004678-1

Tel : 051-322-0880, Fax : 051-322-4066



* Description : Calipers,inside/outside
* Manufacturer : Mitutoyo
* Serial Number : 0027937

1. Accuration calibration of graduations

Nominal value (mm)	Correction value (mm)	
	Outside	Inside
0	0.00	-
50	-0.01	-0.01
100	-0.01	-0.01
150	-0.01	-0.01
200	-0.01	-0.01
300	-0.01	-0.01
400	-0.01	-0.01
500	-0.01	-0.01
1 000	-0.01	-0.01

2. Measurement uncertainty (Confidence level is approximately 95 %. $k = 2$)

$$U = \sqrt{15^2 + (0.0031 \cdot l_0)^2} \mu\text{m} \quad (l_0 \text{ units of the mm}) \quad \text{End.}$$



CALIBRATION CERTIFICATE

Q & Q Corporation

58, Hwajeonsandan 3-ro, Gangseo-gu, Busan, Korea
Tel : 051-292-0395, Fax : 051-292-0397

Certificate No : Q2403326-105-005

page (1) of (2)



1. Client

Name : P.M.S Co., LTD

Adress : 296, Dae Dong-Ro, Sasang-Gu, Busan, Korea

2. Calibration Subject

Description : Stylus type roughness tester

Manufacturer and Model Name : Mitutoyo, SJ-210

Serial Number : 200741305

3. Date of Calibration 12. Apr. 2024.

4. Environment

Temperature : (20.7 ± 0.1) °C

Humidity : (47 ± 2) % R.H.

Location : ☒ Permanent Calibration Lab

☐ Mobile Lab

☐ On Site Calibration

[Address : 58, Hwajeonsandan 3-ro, Gangseo-gu, Busan, Korea]

5. Traceability

Calibration method and/or brief description

The above Calibration object has been calibrated according to the Q&Q's calibration method for Stylus type roughness tester(QECI-SR517) with below Standards having traceability to National Measurement Institute (KRISS).

List of used standards / specifications

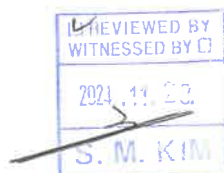
Description	Manufacturer and Model	SerialNumber	The due date of next Calibration	Calibration laboratory
Roughness standard specimen	Mitutoyo, Ra 2.94 μm, Rmax 9.3 μm	332260804	28. Jun. 2025.	Q&Q Corp
Surface Thermometer	TES, 1300	990407368	29. Jun. 2024.	Q&Q Corp.

6. Calibration result : Refer to the attached Calibration Result

7. Measurement uncertainty : Refer to the attached Calibration Result

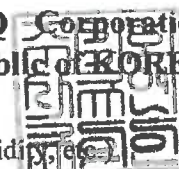
affirmation	Measurements performed by Name : Kwang Woo Son (signature)	Approved by Title : Technical Cal. Manager Name : Myeon Keol Kim (signature)
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The above calibration certificate is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC - MRA



15. Apr. 2024.

Q & Q Corporation
Accredited by KOLAS, Republic of Korea



(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity, etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

CALIBRATION RESULT

Q & Q Corporation

58, Hwajeonsadan 3-ro, Gangseo-gu, Busan, Korea
Tel : 051-292-0395, Fax : 051-292-0397

Certificate No : Q2403326-105-005

page (2) of (2)



* Manufacturer : Mitutoyo

* Model Name : SJ-210

* Serial Number : 200741305

1. Calibration Condition

* Probe Radius : 5 μm

* Length of Measurement : 12.5 mm

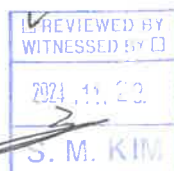
* Cutoff : 2.5 mm

* Filter : Gaussian

2. Calibration Result

Parameter	Roughness Standard value (μm)	Indication value (μm)	Deviation (μm)	Uncertainty (CL \approx 95 %)
Ra	2.865	2.934	0.069	0.140 μm ($k = 2$)
Rz	9.030	9.228	0.198	0.459 μm ($k = 2$)
Rsm	99.798	109.9	10.102	1.702 μm ($k = 2$)

The end.



* The recommended calibration interval is 24 month according to the KOLAS guide (KOLAS-G-008).



Calibration Certificate

Sam Jeong industry Co., Ltd. Certificate No. : SJ24-0576-043

32-4, Andabang-gil, Yangsan-si,
Gyeongsangnam-do, Republic of Korea

Tel : 055)384-1611, Fax : 055)384-1612

Page (1) of (2)



1. Client

Name : SHINWOO METAL. CO., LTD

Address : 10, Hamansandan 3-gil, Gunbuk-myeon, Haman-gun, Gyeongsangnam-do, Republic of Korea

2. Calibration Subject

Description : Inside/Outside calipers

Manufacturer and Model Name : Mitutoyo , (0 ~ 300) mm / 0.05 mm

Serial Number : 12135721

ShinWoo Metal Q.C Dep't
<input type="checkbox"/> Witnessed by
<input checked="" type="checkbox"/> Reviewed by <i>[Signature]</i>

3. Date of Calibration : 15. Jul. 2024

4. Environment conditions

Temperature : (22.8 ± 0.4) °C

Humidity : (50 ± 2) % R.H.

Location : ☐ Permanent Calibration Lab

☐ Mobile Lab

☒ On Site Calibration

Address : 10, Hamansandan 3-gil, Gunbuk-myeon, Haman-gun, Gyeongsangnam-do, Republic of Korea

5. Traceability

Calibration method and/or brief description

The above Calibration object has been calibrated according to the calibration method for

Inside/Outside calipers(SJ-CAL-10601-1) with below Standards having traceability to National Measurement Institute.

List of used standards / specifications

Description	Manufacturer and Model	Serial Number	The due date of next Calibration	Calibration laboratory
Caliper checker	Mitutoyo, 670 mm	2010050	12. Mar. 2027	BC&T Co., Ltd.
Digital Thermometer	Testo, 925	29514770	08. Mar. 2025	SJI Co., Ltd.

REVIEWED BY <i>[Signature]</i>
WITNESSED BY <input type="checkbox"/>
2024. 07. 23
S. M. KIM

6. Calibration result : Refer to the attached Calibration Result

7. Measurement uncertainty : Refer to the attached Calibration Result

affirmation	Measurements performed by Name : Hyun Seok Park <i>[Signature]</i>	Approved by Title : Technical Cal. Manager Name : Jin Jong Pyo <i>[Signature]</i>
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The above calibration certificate is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC - MRA.

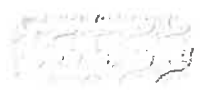
Accredited by KOLAS , Republic of KOREA

Sam Jeong industry Co., Ltd. Represent

16. Jul. 2024



(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity, etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration. Confirmation of the authenticity of the Calibration Certificate(Quality Manager, 055-384-1611)



Calibration Result

Sam Jeong industry Co., Ltd. Certificate No. : SJ24-0576-043

32-4, Andabang-gil, Yangsan-si,
Gyeongsangnam-do, Republic of Korea

Page (2) of (2)

Tel : 055)384-1611, Fax : 055)384-1612



- * Description : Inside/Outside calipers
- * Manufacturer and Model Name : Mitutoyo , (0 ~ 300) mm / 0.05 mm
- * Serial Number : 12135721

ShinWoo Metal Q.C Dep't	
<input type="checkbox"/> Witnessed by	
<input checked="" type="checkbox"/> Reviewed by	<i>[Signature]</i>

Calibration Value = Scale Value + Correction Value

Scale Value(mm)	Correction Value(mm)		Uncertainty of measurement (C.L. about 95 %, $k = 2$)
	Outside	Inside	
0	0.00	-	$\sqrt{30^2 + 0.0061^2} \times l^2 \mu\text{m}$ <p>(A unit of l is mm)</p>
50	0.00	0.00	
100	0.00	0.00	
150	0.00	0.00	
200	0.00	0.00	
300	0.00	0.00	

The end.

<input checked="" type="checkbox"/> REVIEWED BY
<input type="checkbox"/> WITNESSED BY
2024. 11. 20.
<i>[Signature]</i> S. M. KIM



Calibration Certificate

H-6

KCT CO., LTD. 97, Chasang-ro 150 beon-gil, Uichang-gu, Changwon-si, Gyung-sangnam-do. Tel : 055)238-9941, Fax : 055)238-9942	Certificate No : K2407-0577-005 Page (1) of (2)	
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1. Client

Name : SHINWOO METAL.CO.,LTD
Address : 10, Hamansandan 3-gil, Gunbuk-myeon, hanman-gun, Gyeongsangnam-do, Republic of Korea

2. Calibration Subject

Description : Bevel protractors
Manufacturer and Model Name : KAWASA , ± 90°
Serial Number : 19

ShinWoo Metal Q.C Dep't
☐ Witnessed by
☒ Reviewed by D. J. SHIN

3. Date of Calibration : 15. Jul. 2024

4. Environment conditions

Temperature : (20.2 ± 0.2) °C Humidity : (51 ± 1) % R.H.
Location : ☒ Permanent Calibration Lab ☐ Mobile Lab ☐ On Site Calibration
Address : 97, Chasang-ro 150 beon-gil, Uichang-gu, Changwon-si, Gyung-sangnam-do.

5. Traceability

Calibration method and/or brief description

The above Calibration object has been calibrated according to the calibration method for Bevel protractors(KCT-CI-10304) with below Standards having traceability to National Measurement Institute.

List of used standards / specifications

Description	Manufacturer and Model	Serial Number	The due date of next Calibration	Calibration laboratory
Angle gauge blocks	Starrett, (15, 30, 45)°	7175.1	22. Jul. 2025	SICT
Profile projectors	Mitutoyo / (200 × 100) mm	400104	18. Apr. 2026	KCT
Precision surface plates	ZUNG WOO, (2 000 × 1 000) mm	KCTL-124	04. Nov. 2026	KCT

REVIEWED BY
WITNESSED BY
2024.11.20
S. M. KIM

6. Calibration result : Refer to the attached Calibration Result

7. Measurement uncertainty : Refer to the attached Calibration Result

affirmation	Measurements performed by Name : Jong-Wook Lee	(signature)	Approved by Title : Technical Cal. Manager Name : Hee-Deok Lee	(signature)
-------------	---	-------------	--	-------------

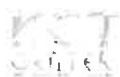
The above calibration certificate is the accredited calibration items by Korea Laboratory Accreditation Scheme, which signed the ILAC - MRA.

Accredited by KOLAS , Republic of KOREA

Korea Cal-Tech Center CO., LTD

(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity, etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.
Confirmation of the authenticity of the Calibration Certificate(Quality Manager, 055-238-9941)

16. Jul. 2024



Calibration Result

KCT CO., LTD.

97, Chasang-ro 150 beon-gil, Uichang-gu,
Changwon-si, Gyungsangnam-do.

Tel : 055)238-9941, Fax : 055)238-9942

Certificate No : K2407-0577-005

Page (2) of (2)



- * Description : Bevel protractors
- * Manufacturer and Model Name : KAWASA , $\pm 90^\circ$
- * Serial Number : 19

ShinWoo Metal Q.C Dept

☐ Witnessed by

☒ Reviewed by *P. J. Kim*

1. Calibration Value of bevel protractors

Scale Value	Correction Value(°)	Uncertainty of measurement (CL \approx 95 %, $k = 2$)
90° 00'	0.0	1.3'
75° 00'	0.0	
60° 00'	0.0	
45° 00'	0.0	
30° 00'	0.0	
15° 00'	0.0	
00° 00'	0.0	
15° 00'	0.0	
30° 00'	0.0	
45° 00'	0.0	
60° 00'	0.0	
75° 00'	0.0	
90° 00'	0.0	

The end.



※ The due date of next calibration : 15. Jul. 2025