


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		


 REVIEWED BY
 WITNESSED BY
 2021.11.29.
 S. M. KIM

FAHAMEH
Eng. & Ind. Co.

Witnessed
Reviewed

INSPECTION CERTIFICATE

(EN 10204 - 3.1)



SAMBU STAINLESS FORGING CO.,LTD
 17,Hwajeonsandan 5-ro 14beon-gil,
 Gangseo-gu, Busan, Korea
 Tel : 051)316-3241 Fax : 051)316-3242

Reviewed
 Witnessed
 Approved

Report No.: IC202409-128-001
 Date: 2024/09/10
 Order No.: PMS-24-050-03

Mat'l Specification : ASME SA350LF2CL1 (2023 ED)
 Customer : 피엠에스(주)
 Project Name : HX-127

Description	MFG Heat I.D No.	Spec *2 Max Min	Tensile Test * 1						Hardness (HB)	Impact Test				Bend Test	Order Entry No
			Specimen		Y.S	T.S	E.L	R.A		Temp.	Notch	Unit			
			D	G.L	MPa		%			-46℃	2V	J			
					250	655 485	22	30		Size : 10x10x55(mm)	Min. 16 Avg. 20				
OD650*T60	S85072	T	12.5	50	301	518	37.5	70.3	142 / 144	45	54	49	49.3	N/A	A202408-315-001
OD760*ID600*T90															A202408-315-002
***** BLANK *****															

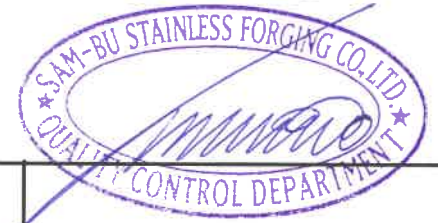
Heat No	Spec	Chemical Composition(%) * 3														Customer's Requirement
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Nb	V	N	Al		
		Min	0.15	0.60												
S85072	H	0.30	0.30	1.35	0.035	0.040	0.40	0.30	0.12	0.40	0.02	0.08				
	P	0.1963	0.230	1.002	0.0115	0.0025	0.02	0.02	0.00	0.015	0.000	0.003	0.0044	0.046		

WITNESSED BY
 REVIEWED BY
 PMS
 Q.A. *[Signature]*

Heat Treatment *4
 N : 910℃ X 5.5Hrs A.C

REVIEWED BY
 WITNESSED BY
 2024.11.23
 S. M. KIM

Dimension & Visual	NDE * 5		
	UT	MT	PT
GOOD	N/A (N/A)	N/A (N/A)	N/A (N/A)



Rev. _____
 Wit. _____
 Surveyor _____

We hereby certify that the material herein has been manufactured, tested and inspected in accordance with the above specification.

QM General Manager _____

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 6.25×25.0mm (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, O=Quenched, T=Tempered, S=Solution Treated, S.R=Stress Relieved, S.T=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

Reviewed
Witnessed
FAHAMEH
Eng & Mfg Co.
Specification

검사증명서 MILL TEST CERTIFICATE

HYUNDAI STEEL



당진제철소 : 충남 당진시 송악읍 북부산업로 1460
1480 Bukbusanup-Ro, Songak-Eup, Dangjin-Si, Chungnam, Korea

: D231009267

: Slab

: ASTM A105-A350LF2

고객사 : 현대아이에프씨㈜
Customer

주문자 : 현대아이에프씨㈜
Contractor

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

발행일자 : 2023-10-24
Date of Issue

제품차수 Dimension	수량 Quantity	중량 Weight (Kg)	제강번호 Heat No.	제품번호 Product No.	화학성분 Chemical Composition(%)														단위 Unit					
					Division	C	Si	Mn	P	S	Cr	NI	B	Ca	Cu	Mo	N	Nb	Ti	V	Sc -Al	CEQ		
						2:x100	3:x1,000	4:x10,000	5:x100,000															
300x2000x5840	1	27,510	S85072	S85072 01	L	1,963	230	1,002	115	25	2	2	4	4	3	2	4	4	3	3	3	3	3	3
300x2000x5830	1	27,460	S85072	S85072 04	L	1,963	230	1,002	115	25	2	2	3	1	15	0	44	0	1	3	46	370	370	
300x2000x5830	1	27,460	S85072	S85072 05	L	1,963	230	1,002	115	25	2	2	3	1	15	0	44	0	1	3	46	370	370	
*** Sub Total(001) ***		3	82,430(Kg)																					
*** Grade Total ***		3	82,430(Kg)	Ceq(CEV). G=C+Mn/6+(N+Cu)/15+(Cr+Mo*F)/5																				
*** Last Item ***																								

606-81-95003

(주)평산엠텍 신진욱

부산광역시 강서구 녹산화전로 93(송정동)

제조, 도매 철강빌딩금속구조재
부품 산 매매, 입대

원본대조필

방화건 식각
010-7300-4410
bhj 3717 @ pat. 69kr.

월본과 같음을 확인함
2024년 9월 10일
SAMBU STAINLESS FORGING CO., LTD.
대표이사 김 정
SAMBU STAINLESS FORGING CO., LTD.
Sang ha, Ju T.+82-51-316-3241

REVIEWED BY
WITNESSED BY
2023. 11. 29
S. M. KIM

PMS
Q.A
WITNESSED BY
REVIEWED BY

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


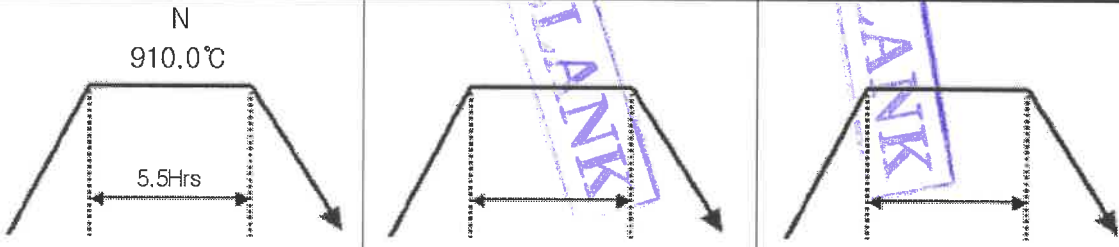



NOTE
* THE SLAB IS FULLY KILLED, FINE-GRAIN PRACTICE. BASIC OXYGEN PROCESS AND VACUUM DEGASSING PROCESS WERE APPLIED.
* ANY WELDING SHALL NOT BE PERFORMED FOR THE ORDERED MATERIAL.
* The Certificate has been issued in compliance with EN 10204 Type 3.1

상기의 제품은 검사의 결과 지정된 규격에 합격한것을 증명합니다.
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 현대제철 고객포털에서 확인하실 수 있습니다.(http://sm.hyundai-steel.com/cs/cm/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/cm/login.jsp) * QRcode scanner App : 'QReal'
* [사용상 주의사항] 본 검사증명서에 형기된 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 Certification

HEAT TREATMENT REPORT

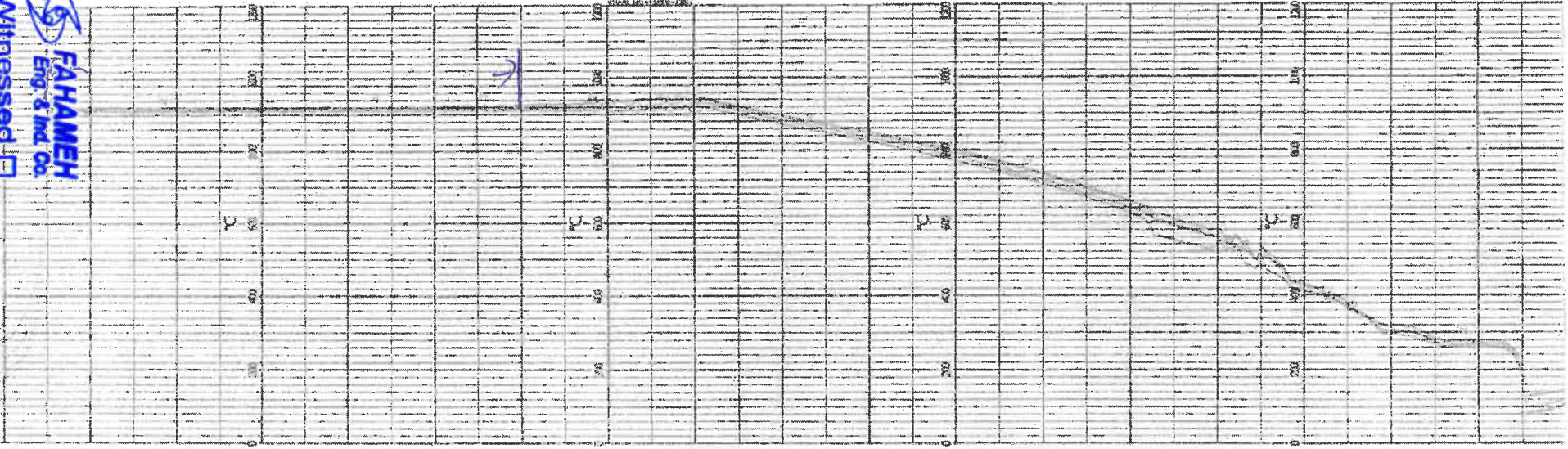
 SAMBU STAINLESS FORGING CO.,LTD 17,Hwajeonsandan 5-ro 14beon-gil, Gangseo-gu, Busan, Korea Tel : 051)316-3241 Fax : 051)316-3242		REPORT NO	HTR202409-128-001	
		ISSUE DATE	2024/09/10	
		CUSTOMER	피엠에스(주)	
MATERIAL	SA350LF2CL1	HEAT ID NO	SEE BELOW	
DATE OF WORK	2024.09.03			
JOB NO	SBQ2024090301			
H/T METHOD	N			
HOLDING TEMP	910.0°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	OD650*T60 OD760*ID600*T90	2EA 2EA	S85072 S85072	A202408-315-001 A202408-315-002
* Remark	<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> REVIEWED BY <input type="checkbox"/> WITNESSED BY 2024.11.23  S. M. KIM </div> <div style="text-align: center;"> <input type="checkbox"/> WITNESSED BY <input checked="" type="checkbox"/> REVIEWED BY PMS Q.A  </div> </div>			
REVIEWED BY <input type="checkbox"/>	_____ Surveyor		 General Manager of QC Dep't	
WITNESSED BY <input type="checkbox"/>				



Witnessed
 Reviewed

No: 960ck fcthrs A5

Witnessed
Reviewed



REVIEWED BY
WITNESSED BY

2024.11.23.

[Signature]
S. M. KIM

PMS WITNESSED BY
Q.A REVIEWED BY

[Signature]



원본대조필

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



INSPECTION CERTIFICATE

(EN 10204 - 3.1)



SAMBU STAINLESS FORGING CO.,LTD
 17,Hwajeonsandan 5-ro 14beon-gil,
 Gangseo-gu, Busan, Korea
 Tel : 051)316-3241 Fax : 051)316-3242

Reviewed
 Witnessed
FAHAMEH
 Eng. Ind. Co.

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

Mat'l Specification : ASME SA266GR2N (2023 ED)
 Customer : 피엠에스(주)
 Project Name : HX-127

Description	Q'ty (EA)	MFG Heat I.D No.	Spec *2	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			%		Size : 10x10x55(mm)					
						250	655		20	33	197	Min.			Avg.	
2) OD760*ID600*T90	2	S98858	T	12.5	50	304	514	36.9	72.1	145 / 141					N/A	
3) OD760*ID600*T65	1														A202408-315-003 A202408-315-004	
***** BLANK *****																

REVIEWED BY
 WITNESSED BY
 2024.11.23
 S. M. KIM

Heat No	Spec	Chemical Composition(%) * 3													Customer's Requirement			
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Nb	V	N	Al				
		Min	0.15	0.40														
S98858	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																	

PMS WITNESSED BY
 REVIEWED BY
 Q.A. *[Signature]*

Heat Treatment *4 N : 910°C X 5.5Hrs A.C	Dimension & Visual GOOD	NDE * 5 UT : N/A (N/A) MT : N/A (N/A) PT : N/A (N/A)
---	----------------------------	---



Rev. _____
 Wit. _____
 Surveyor _____

We hereby certify that the material herein has been manufactured, tested and inspected in accordance with the above specification.

QM General Manager _____

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.T=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

Witnessed
Reviewed



번호 No.
명 Commodity
제품규격 Specification

: D240214584

: Slab

: ASTM A105-A350LF2

고객사 Customer : 현대아이에프씨㈜

주분자 Contractor : 현대아이에프씨㈜



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



증명서 번호 Certificate No. : 20240409-CN-0003-001

발행일자 Date of Issue : 2024-04-09

제품치수 Dimension	수량 Quantity	중량 Weight (Kg)	재강번호 Heat No.	제품번호 Product No.	화학성분 Chemical Composition(%)																단위 Unit		
					Division	C	Si	Mn	P	S	Cr	Ni	B	Ca	Cu	Mo	N	Nb	Ti	V	Sc	Al	CEQ
						4	3	3	4	4	2	2	4	4	3	2	4	3	3	3	3	3	3
300x2000x5810	1	27,370	S98847	S98847 04	L	1,918	235	954	117	32	2	1	3	2	23	0	41	1	1	2	35	357	
300x2000x5830	1	27,460	S98858	S98858 03	L	1,933	238	959	144	18	4	2	3	1	22	0	45	1	1	3	27	365	
300x2000x5850	1	27,550	S98858	S98858 52	L	1,933	238	959	144	18	4	2	3	1	22	0	45	1	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	1	3	27	365	
*** Sub Total(OOI) ***	4	109,840(Kg)																					
*** Grade Total ***	4	109,840(Kg)																					
*** Last Item ***																							

606-81-95003

(주)평산엠텍 신진욱

부산광역시 강서구 녹산화전로 93(송정동)
제조, 도매 철강및금속구조재
부 동 산 메 테, 임 대

원본대조필

원본과 같음을 확인함
2024년 9월 0 일
SAMBU STAINLESS FORGING CO., LTD.
대표이사 김 경
SANG HA, JU T. +82-51-316-3241

REVIEWED BY
WITNESSED BY
2024.11.23
S. M. KIM

방화사 643
010-7300-4410
6673910 @ psnt, co.kr

PMS Q.A
WITNESSED BY
REVIEWED BY


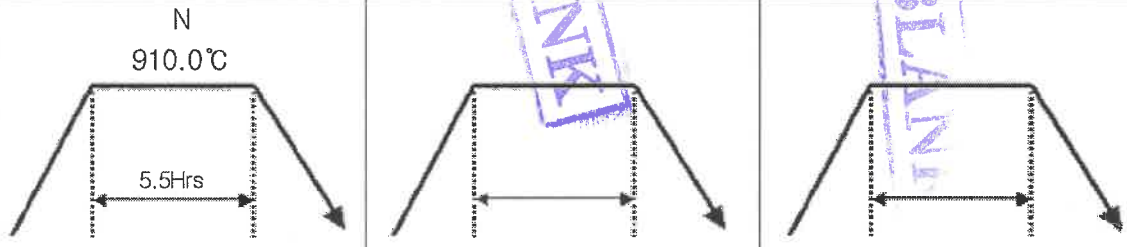


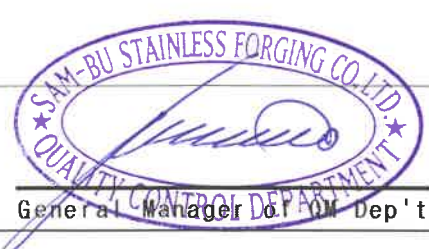
NOTE
* THE SLAB IS FULLY KILLED, FINE-GRAIN PRACTICE, BASIC OXYGEN PROCESS AND VACUUM DEGASSING PROCESS WERE APPLIED.
* ANY WELDING SHALL NOT BE PERFORMED FOR THE ORDERED MATERIAL.
* The Certificate has been issued in compliance with EN 10204 Type 3.1

상기의 제품은 검사의 결과 지정된 규격에 합격한것을 증명합니다.
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 현대제철 고객 포털에서 확인하실 수 있습니다.(http://sm.hyundai-steel.com/cs/cm/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/cm/login.jsp) * QRcode scanner App : 'QReal'
* [사용상 주의사항] 본 검사증명서에 명기된 규격 외 사용시 제품손상 및 안전상 문제가 발생될 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	HTR202409-129-001	
		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℃			
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 OD760*ID600*T65	2EA 1EA	S98858 S98858	A202408-315-003 A202408-315-004
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> REVIEWED BY <input checked="" type="checkbox"/> WITNESSED BY <input type="checkbox"/> 2024.11.23.  S. M. KIM </div>				
* Remark	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PMS <input type="checkbox"/> WITNESSED BY Q.A <input checked="" type="checkbox"/> REVIEWED BY  </div>			
REVIEWED BY <input type="checkbox"/>	_____ Surveyor		 General Manager of QM Dep't	

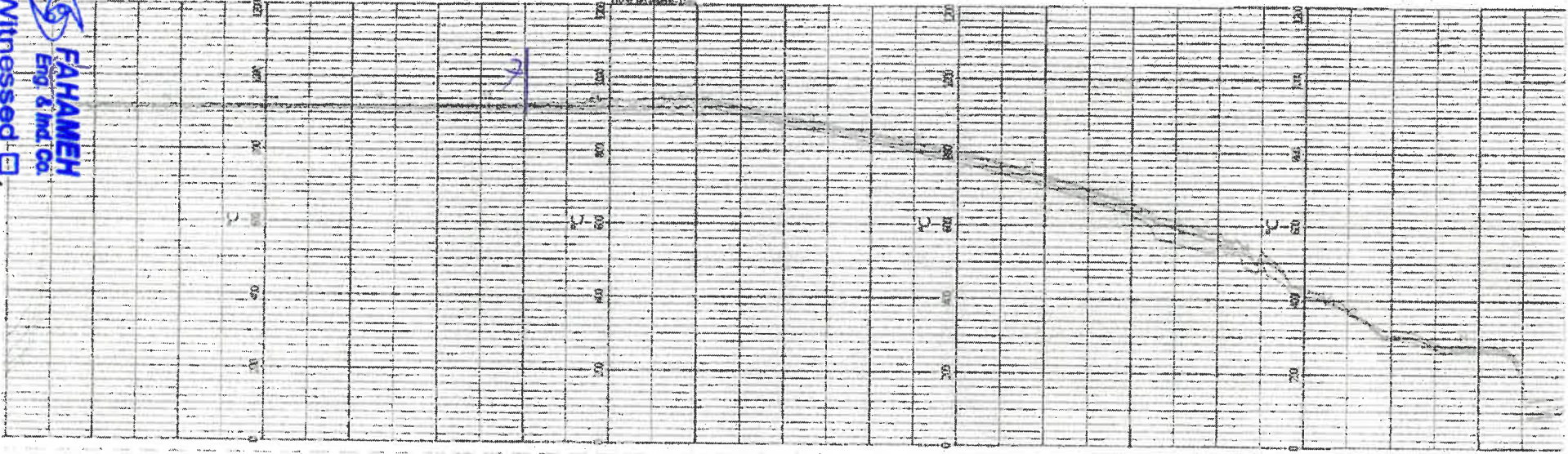


Witnessed
 Reviewed

N: 910° (X5+hrs AC

Witnessed
Reviewed

FAHAMEH
ENG & IND. CO.



REVIEWED BY
 WITNESSED BY
 2024.11.23.
 S. M. KIM

PMS WITNESSED BY
 Q.A REVIEWED BY
[Signature]

SAM-BU STAINLESS FORGING CO., LTD.
 QUALITY CONTROL DEPARTMENT

원본대조필

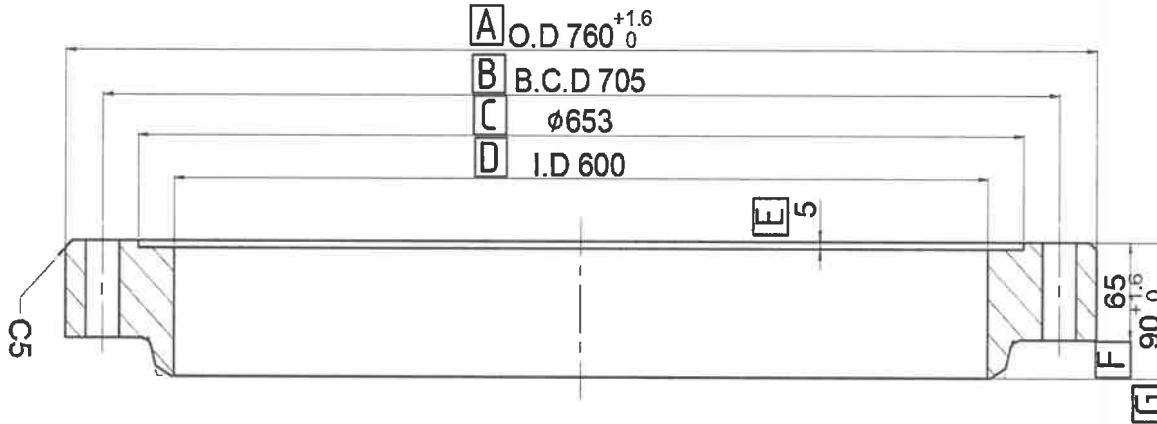


SAMBU STAINLESS FORGING CO., LTD.
 Sang bu, Ju T. 82-51-316-3241

DIMENSION CHECK SHEET

Witnessed
 Reviewed

FAHAMEH
 Eng. & Ind. Co.



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	5.0	65.7	90.1	OK	OK							
	2	760.2	705.0	653.2	600.2	5.1	65.5	90.4	OK	OK							
DESCRIPTION																	
STANDARD																	
MEASUREMENT																	

WITNESSED BY
 WITNESSED BY
 2024.11.23
 S M KIM

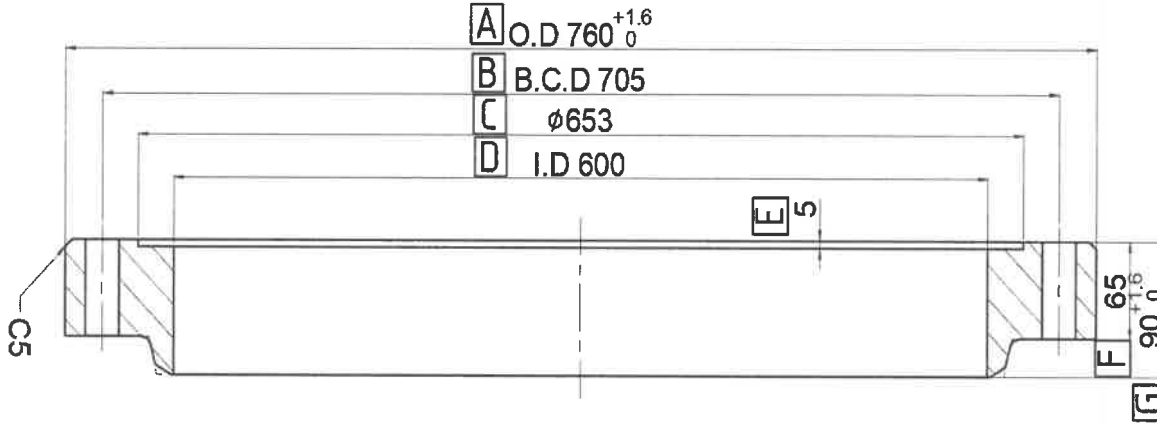
*VISUAL INSPECTION : GOOD RESULT : ACCEPT

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

DIMENSION CHECK SHEET

Witnessed
 Reviewed

FAHAMEH
 Eng. & Ind. Co.



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							
DESCRIPTION																	
STANDARD																	
MEASUREMENT																	

REVIEWED BY
 WITNESSED BY ID
 24.11.23
 S. M. KIM

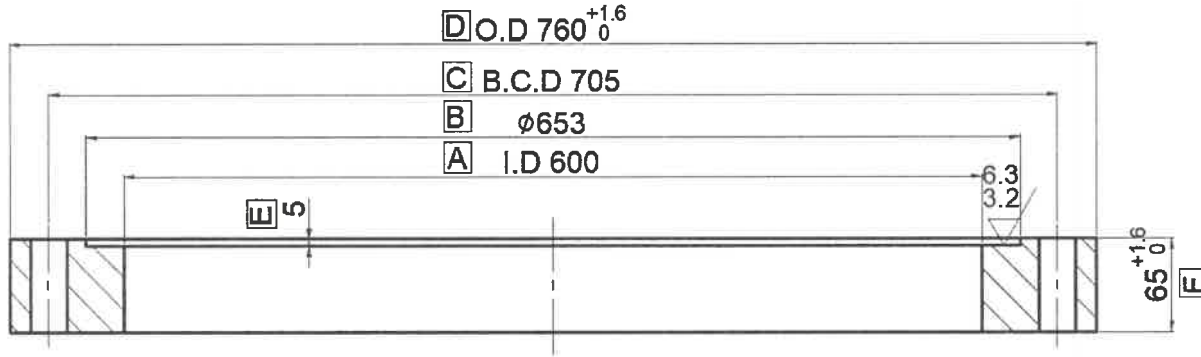
*VISUAL INSPECTION : GOOD RESULT : ACCEPT

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

DIMENSION CHECK SHEET

Witnessed
Reviewed

FAHAMEH
Eng. & Ind. Co.



TITLE	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

DESCRIPTION		4) OD 760 x 65T							UNIT : mm	
CHECK POINT		A	B	C	D	E	F	G		
TOLERANCE		+1.6 0	±0.8	±0.4	±0.4	±0.4	+1.6 0			
STANDARD		760.0	705.0	653.0	600.0	5.0	65.0	20-Ø25		
MEASUREMENT	1	760.3	705.0	653.1	600.1	5.1	65.7	OK		
DESCRIPTION										
STANDARD										
MEASUREMENT										

PREVIEWER BY
WITNESSED BY IV
2024.10.23
S. M. KIM

*VISUAL INSPECTION : GOOD RESULT : ACCEPT

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



초음파탐상검사보고서

Ultrasonic Examination Report

Report No.: BK - PMS - U - 241015 - 01

Page No. : 1 OF 1

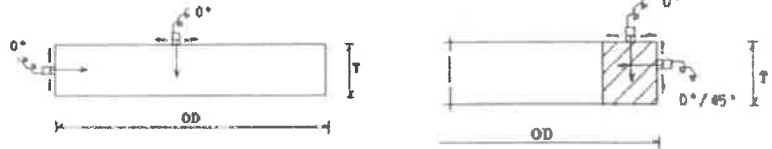
Owner/Customer (주문주/고객) Pioneer Manufacturing & Supply Co., Ltd.	Project Name (공사명) HX127	Project No. (공사번호) T-401
Item Name (제품명) SEE BELOW	Code(규격) : ASME SA388 ASME SEC.VIII DIV.2 PARA. 3.3.4.	Procedure (절차서) NEP(BK)-UT-ASME-001 Rev.1
Item No. (제품번호) SEE BELOW	Drawing No. (도면번호) N / A	Test Time (검사시기) <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 checked="" type="checkbox"/> Angle Beam(사각) Standard Block(표준시험편) <input checked="" type="checkbox"/> IIW-V1(S/No.:B10265) <input type="checkbox"/> STB-A1(SS)	Test Mode (형태) <input checked="" type="checkbox"/> 접촉법(Contact) <input type="checkbox"/> 수침법(Immerse) Reference Block (S/No.) (대비시험편) <input checked="" type="checkbox"/> Back Reference Method <input checked="" type="checkbox"/> 60°V Notch
Equipment Calibration (장비 교정) ASTM E317 FIG1,BLOCK (S/No.:21-1334)	Straight Beam Standard Sensitivity : Back Reference Method (B1: <u>80</u> %)	Straight Beam Scanning Sensitivity Level <u>+6</u> dB Above The Primary Ref' Level
Equipment Linearity (장비 직선성) A.C.L within ±10% / S.H.L within ±5% FSH	Angle Beam Standard Sensitivity : 60° V Notch (DAC: <u>100</u> %)	Angle Beam Scanning Sensitivity Level <u>+6</u> dB Above The DAC Level

Transducer 탐 측 자	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
3) (#16) TEST FLANGE OD760 x ID600 x 65T	1EA	V		"	S98858 / SA266 Gr.2N
				-BLANK-	

SKETCH ON LINE, IF NECESSARY OR ATTACHED 필요시 실선안에 스케치하거나 또는 첨부할 것.

Examined by 시험자	이인섭 I. S. LEE	LEVEL II	Date of Examination 검사일자 2024. 10. 15	Customer QA Manager
Approved by 김두진 김두진 KIM		LEVEL III	Date of Report 보고서 일자 2024. 10. 15	
		<input checked="" type="checkbox"/> Witnessed by 입회자 KIM	<input checked="" type="checkbox"/> Reviewed by 검토자	



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-20241016-001

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(%)														CEQ	UT *5	GOOD	ESU-SM-240926-01				
		C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu	Nb	AL										
		Min	0.10	0.60	-	-	-	-	-	-	-	-	-	-	-					-	-	-	-
	Max	0.35	0.35	1.05	0.035	0.040	0.40	0.30	0.12	0.08	0.40												
S09581	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					
	P																		Dimension Visual	GOOD			

▶ Remark 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

4)

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



- 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

ASME SEC.II PART A SA350 LF2 CL1
(2023ED)

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					
		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							PT *5	N/A		
S09581	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 Visual	GOOD	
	P																				

▶ Remark Heat treatment report No. : SWH-20241016-002
MPS No. : M24-050-13SF 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 (Φ12.5×50L)				Hardness Test (HBW)	Impact Test (10×10×55L)			Bend Test		
				Y.S MPa	T.S MPa	E.L %	R.A %		Test Temp : -46 °C Notch : 2mmV Unit : J			Radius : Angle :		
2.)	ASME B16.5 300# LWN RF 2" L/230	2 EA	Specification	Min	250	485	22	30	-	Minimum : 16			Avg.	
3.)	ASME B16.5 300# WN RF 2" S/160	10 EA	Lot NO	Max	-	655	-	-	197	1	2	3	20	
4.)	ASME B16.5 300# WN RF 3" S/160	2 EA	I12-01	L	340	513	30	67	143,144	68	70	59	65.6	
5.)	ASME B16.5 300# WN RF 4" S/120	2 EA												
6.)	ASME B16.5 300# WN RF 6" S/80	2 EA	SIMULATION	#1										
			P.W.H.T	#2										
				#3										

REVIEWED BY
WITNESSED BY
2024.11.23
S. M. KIM

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Heat Treatment *4	Normalizing	910 °C	5.3 hrs	A.C	Tempering	°C	hrs	Quenching	°C	hrs
	Solution	°C	hrs		Stabilization	°C	hrs	Annealing	°C	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
Q.A
WITNESSED BY
REVIEWED BY



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

Witnessed
Reviewed



Order No. : D211103880

Commodity : Slab

Specification : ASTM A105-A350LF2

Customer : (주)평산엠텍

Contractor : 현대아이에프씨 주식회사



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



Certificate No. : 20211118-CN-0013-002

Date of Issue : 2021-11-18

제품치수 Dimension	수량 Quantity	중량 Weight (Kg)	재강번호 Heat No.	제품번호 Product No.	화합성분 Chemical Composition(%)														단위 Unit			
					Daison	C	Si	Mn	P	S	Cr	Ni	B	Ca	Cu	Mo	N	Nb	Ti	V	Sd -Al	CEQ
307x2000x5830	1	27,460	S09581	S09581 03	L	1,877	257	933	98	30	2	2	3	3	32	0	35	0	1	1	30	351

*** Sub Total(002) *** 1 27,460(Kg)
 *** Grade's Total *** 2 54,970(Kg) Ceq(CEV), G=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
 부 동 산 매 매, 입 대

CERTIFIED TRUE COPY

<input checked="" type="checkbox"/> ACCEPT	<input type="checkbox"/> REJECT
<input checked="" type="checkbox"/> REVIEWED BY	<input type="checkbox"/> WITNESSED BY

REVIEWED BY
 WITNESSED BY
 2021.11.29
 S. M. KIM

원본미조필
 방허권과장 (주) 아-732 44/10

NOT E
 * 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

상기의 제품은 검사의 결과 지정된 규격에 합격한 것을 증명합니다.

Signature: Y. H. Kim
 Chief Of Quality Assurance Team

* 본 검사증명서는 원본인 전자문서(전자서명 정보 포함)로부터 출력된 사본입니다. 전자문서의 내용은 현대제철 고객센터에서 확인하실 수 있습니다.(http://sm.hyundai-steel.com/cs/cm/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/cm/login.jsp) * QRcode scanner App : 'QRReal'
 * [사용상 주의사항] 본 검사증명서에 명기된 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 Certification.



HEAT TREATMENT REPORT

SHIN WOO METAL CO., LTD.

#10, HAMANSANDAN 3-GIL, GUNBUK-MYEON,
HAMAN-GUN, GYENGSANGNAM-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 style="border: 1px solid red; padding: 5px; display: inline-block; color: red; font-weight: bold; font-size: 1.2em;">BLANK</div>	4 EA	<input checked="" type="checkbox"/> Normalizing <input type="checkbox"/> Quenching <input type="checkbox"/> Solution	HOLDING TEMP.	910 °C	Normalizing		
				HOLDING TIME	5.3 hrs			
				COOLING METHOD	A.C			
			<input type="checkbox"/> Tempering <input type="checkbox"/> Annealing <input type="checkbox"/> Stabilization	HOLDING TEMP.	°C			
				HOLDING TIME	hrs			
				COOLING METHOD				
			HARDNESS DATA.					
NO.	x1	x2	x3	x4				
1	143	144						
2								

▶ Remark

REVIEWED BY
 WITNESSED BY

 2024.11.23.
 S. M. KIM

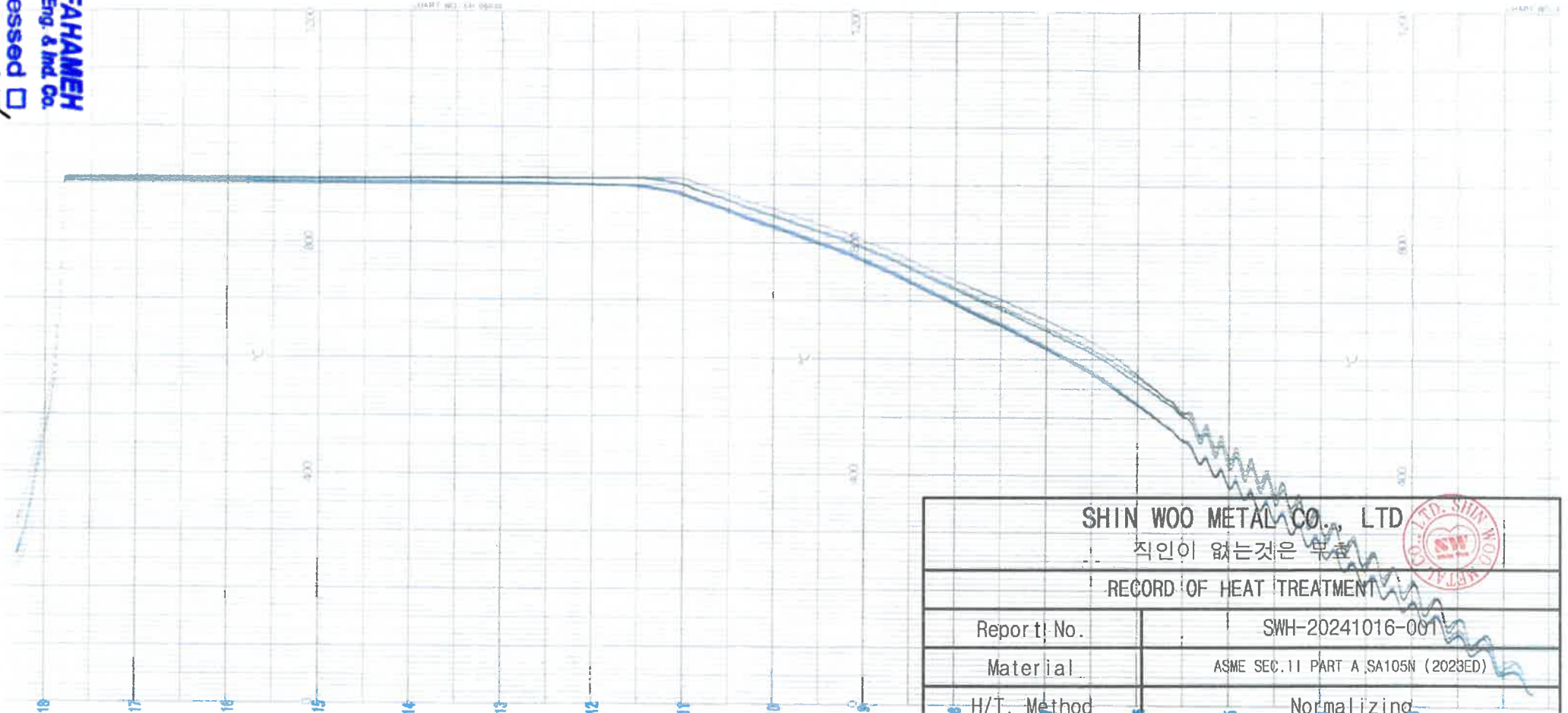
PMS
 WITNESSED BY
 REVIEWED BY
 Q.A. *[Signature]*

J.K. Sang

Manager of Quality Control Dep't

HEAT TREATMENT CHART

Reviewed
 Witnessed
FAHAMEH
 Eng. & Ind. Co.



REVIEWED BY
 WITNESSED BY
 2024.11.29
S. M. KIM

PMS
 WITNESSED BY
 REVIEWED BY
 Q.A. *[Signature]*

SHIN WOO METAL CO., LTD 직인이 없는것은 부호	
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



HEAT TREATMENT REPORT

SHIN WOO METAL CO., LTD.

#10, HAMANSANDAN 3-GIL, GUNBUK-MYEON,
HAMAN-GUN, GYENGSANGNAM-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			
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			
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	x4	
			1	143	144			
			2					

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▶ Remark

REVIEWED BY
 WITNESSED BY
 2024.11.23
S. M. KIM

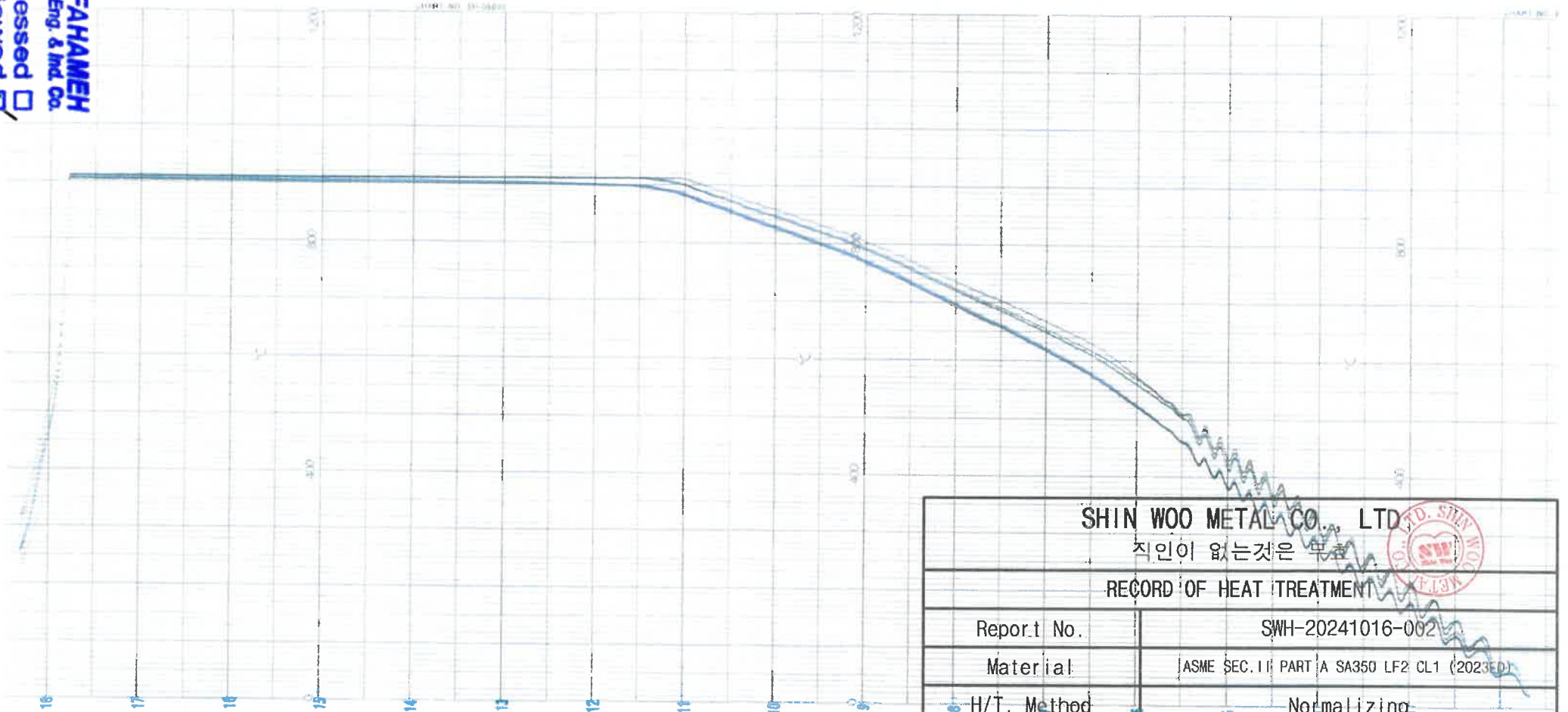
PMS
 WITNESSED BY
 REVIEWED BY
 Q.A. *[Signature]*

J.K. Sang

Manager of Quality Control Dep't

HEAT TREATMENT CHART

FAHAMEH
Eng. & Ind. Co.
Reviewed
Witnessed



REVIEWED BY
 WITNESSED BY
2024.11.29
S. M. KIM

PMS WITNESSED BY
Q.A. REVIEWED BY
[Signature]

SHIN WOO METAL CO., LTD. 직인이 없는것은 부호	
RECORD OF HEAT TREATMENT	
Report No.	SWH-20241016-002
Material	ASME SEC. II 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

ULTRASONIC EXAMINATION REPORT
초음파탐상검사보고서

보고서번호 Report No.

ESU-SM-240926-01

시험일자 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. Rev.No N / A

두께 Thickness mm SEE BELOW inch
재질 / Material 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°	2Z1-007	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	점촉매질 Couplant <input type="checkbox"/> C.M.C <input type="checkbox"/> Glycerine <input checked="" type="checkbox"/> Oil

EXAMINATION AREA : ENTIRE VOLUME

PMS Q.A
 WITNESSED BY
 REVIEWED BY
[Signature]

ShinWoo Metal Q.C Dep't
 Witnessed by
 Reviewed by *[Signature]*

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 2024.09.26
Examined By Level II Date
 주문주/고객 Owner/Customer 검토 Reviewed
 Third Party Inspector 임회 Witnessed
 ANI / AI 공인검사관 검토 Reviewed
 임회 Witnessed

FAHAMEH Eng. & Ind. Co.
Approved By J. B. NAM / 남 정 부 2024.09.26
Level III Date
Witnessed Reviewed

Witnessed
Reviewed

FAHAMEH
Eng. & Ind. Co.

MATERIAL TEST REPORT



Cert. No. : YM2024-1115-K01

Customer : P.M.S CO., LTD

285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea

Issue Date : 2024. 11. 15

Product Name : STUD BOLT+2 HEAVY HEX NUTS

TEL +82-51-314-0757 FAX +82-51-314-0759

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

Project Name : N/A

yujinco@yujincometal.com

Item No. : N/A

Project No. : HX-127

1. BOLT

Specification : ASME SEC. II SA-320/SA-320M Gr.L7

No.	ITEM	Division	Mechanical Properties					Impact Test (-101°C, 2V)		Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)							
			Tensile Strength	Yield Strength*	Elongation	Reduction of Area	Hardness			Quenching	Tempering			C	Si	Mn	P	S	Cr	Mo	
			MPa	MPa	%	%	HRC	J	°C	°C											
			Unit	MPa	MPa	%	HRC	Min. 20	Avg. 27	°C	°C										
			860	725	16	50	-							0.38	0.15	0.75	-	-	0.80	0.15	
			Min											0.48	0.35	1.00	0.035	0.040	1.10	0.25	
			Max				35														
1	STUD BOLT	M22x2.5P x 260L	926.1	799.7	20.4	55.3	28	27.33						0.40	0.242	0.796	0.010	0.0042	0.95	0.212	
								28	27.91	925	710	42	S50430								
								28.41													

2. NUT

Specification : 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. %)									
					Quenching	Tempering	Hardness	Tempering				C	Si	Mn	P	S	Cr	Mo			
					°C	°C	HRB	Temp	Time												
					°C	°C	HRB	(°C)	(hr)												
			365.1	24	-	595	94							0.40	0.15	0.70	-	-	-	0.20	
			Min											0.50	0.35	0.90	0.035	0.040	-	0.30	
			Max																		
-	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

REVIEWED BY
WITNESSED BY
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
Q.A
WITNESSED BY
REVIEWED BY

Approved by : Changhee Lee
Manager of Quality Assurance Team

Witnessed
Reviewed



MATERIAL TEST REPORT



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

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

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

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	Yield Strength*	Elongation	Reduction of Area	Quenching	Tempering			C	Si	Mn	P	S	Ni	Cr
			ksi	ksi	%	%	°C	°C			-	-	-	-	-	8.0	18.0
			Unit	75	30	30	40	-			-	-	-	-	-	0.08	1.00
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

REVIEWED BY
 WITNESSED BY
 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**
 Manager of Quality Assurance Team

Witnessed
Reviewed



MATERIAL TEST REPORT



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

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

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

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	Yield Strength*	Elongation	Reduction of Area	Quenching	Tempering			C	Si	Mn	P	S	Ni	Cr	
			Unit	MPa	MPa	%	%	°C			°C	-	-	-	-	-	8.0	18.0
			Spec	515	205	30	40	-			-	0.08	1.00	2.00	0.045	0.030	10.5	20.0
1	DOWEL PIN	Ø16 x 129L	699.5	622.6	35.2	62.4	CARBIDE SOLUTION TREATMENT		2	6Z051	0.060	0.420	1.840	0.035	0.025	8.10	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
 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
 Q.A
 WITNESSED BY
 REVIEWED BY

Approved by : Changhee Lee
 Manager of Quality Assurance Team

Witnessed
Reviewed

FAHAMEH
Eng. & Ind. Co.

MATERIAL TEST REPORT



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

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

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

1. 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. %)						
		Unit	kN			HRC	Quenching		Hardness	Tempering			C	Si	Mn	P	S	Ni	Cr
				Spec	Min		°C	°C		HRB	Temp (°C)	Time (hr)							
		Size	Max	60.0	24	-	455	89					0.40	-	-	-	-	-	-
				-	35	-	-	-					-	0.40	1.00	0.040	0.050	-	-
-	HEX NUT	M10x1.5P	Accept	31	880	490	99	540	24	24	SA63109	0.4431	0.261	0.743	0.0144	0.006	-	-	-

Remark :

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

REVIEWED BY
WITNESSED BY

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
Q.A

WITNESSED BY
REVIEWED BY

Changhee Lee

Approved by : Changhee Lee
 Manager of Quality Assurance Team

Witnessed
Reviewed



MATERIAL TEST REPORT



Cert. No. : YM2024-1115-K05

Customer : P.M.S CO., LTD

285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea

Issue Date : 2024. 11. 15

Product Name : PLUG

TEL +82-51-314-0757 FAX +82-51-314-0759

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

Project Name : N/A

yujinco@yujincometal.com

Item No. : N/A

Project No. : HX-127

1. PRODUCT

Specification : ASME SEC. II SA-276 Type304

No.	ITEM	Division	Mechanical Properties				Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)							
			Tensile Strength	Yield Strength*	Elongation	Reduction of Area	Quenching	Tempering			C	Si	Mn	P	S	Ni	Cr	
			Unit	ksi	ksi	%	%	°C			°C	-	-	-	-	-	8.0	18.0
			Spec: Min	75	30	30	40	-	-			0.08	1.00	2.00	0.045	0.030	11.0	20.0
			Size Max	-	-	-	-	-	-			0.060	0.440	1.820	0.033	0.026	8.05	18.19
1	PLUG	1"		103.2	91.9	34.9	62.5	CARBIDE SOLUTION TREATMENT		4	6W385							

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
 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
 Q.A
 WITNESSED BY
 REVIEWED BY

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

Witnessed
Reviewed



MATERIAL TEST REPORT



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

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

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

1. BOLT

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

No.	ITEM	Division	Mechanical Properties					Heat Treatment		Quantity (EA)	Heat No.	Chemical Composition (wt. %)								
			Tensile Strength	Yield Strength*	Elongation	Reduction of Area	Hardness	Quenching	Tempering			C	Si	Mn	P	S	Ni	Cr	Mo	
			MPa	MPa	%	%	HRC	°C	°C											
			860	720	16	50	-	-	593											
		Unit																		
		Spec	Min	Max																
		Size																		
1	SETTING BOLT	M20x2.5P x 150L	925.1	856.5	19.0	55.7	28	905	725	16	S55467	0.411	0.261	0.839	0.0104	0.0025	-	0.987	0.173	

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. %)								
					Quenching	Tempering	Hardness	Tempering			C	Si	Mn	P	S	Ni	Cr	Mo	
					°C	°C	HRB	Temp			Time								
					-	455	89	(°C)			(hr)								
		Unit	kN	HRC															
		Spec	Min	Max															
		Size																	
-	HEAVY HEX NUT	M20x2.5P	Accept	29	870	510	102	540	24	48	22313176	0.45	0.23	0.62	0.022	0.003	-	-	-

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

REVIEWED BY
 WITNESSED BY
 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
 Q.A
 WITNESSED BY
 REVIEWED BY

Approved by : Changhee Lee
 Manager of Quality Assurance Team

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 requirements of the Customer's procurement.

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

WITNESSED BY
 REVIEWED BY
 PMS
 Q.A. *Changhee Lee*

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



285, Noksansaneopjung-ro, Gangseo-gu, Busan, Korea
 TEL 051-314-0757 FAX 051-314-0759

QSP-091-03 Rev.0

FAHAMEH
 Eng. & Ind. Co.
 Witnessed
 Reviewed

Witnessed
Reviewed

FAHAMEH
Eng. & Ind. Co.



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

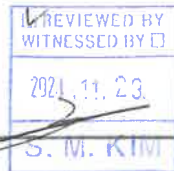
In the following Nondestructive Testing Methods:

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

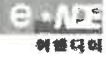
Certificate Number



[Signature]
Certification Management Committee
Chair

[Signature]
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.



e-NDE CO., LTD.

Nondestructive Test Certificate

nde II - 5722R1

Certificate No.

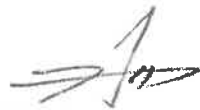
This is to certify that

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

Reviewed
 Witnessed
FAHAMEH
 Eng. & Ind. Co.



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 D
 2021.11.23
 S. M. KIM

206623

Certificate Number

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.

Witnessed
Reviewed

FAHAMEH
Eng. & Ind. Co.

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

REVIEWED BY
WITNESSED BY
2021.11.23
S. M. KIM

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

Calibration Certificate

Q & Q Corporation

Certificate No : Q2403326-106-001



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

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 ± 0.1) °C

Humidity : (48 ± 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 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

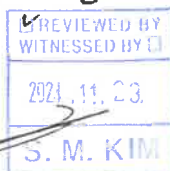
Description	Manufacturer and Model	Serial Number	The due date of next calibration	Calibration laboratory
Caliper Checker	Mitutoyo, 660 mm	559	18. Sep. 2026.	Q & Q Corp.
Surface Plate	Kumsung, (1 000 × 750) mm	260919	21. Jan. 2025.	Q & Q Corp.
Surface Thermometer	TES, 1300	990407368	29. Jun. 2024.	Q &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

Certificate No : Q2403326-106-001



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

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.

REVIEWED BY
WITNESSED BY □
2021.11.23
S. M. KIM

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

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



Witnessed
Reviewed

(210 × 297) mm



Calibration Certificate

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

Page : (1) of (2)

1. Client

Name : DAHAN METAL CO.,LTD.
Address : 32, Saenggokсандan 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

REVIEWED BY
 WITNESSED BY
2024. 04. 13.
S. M. KIM

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 the calibration, it 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



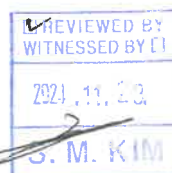
- * Description : Calipers,inside/outside
- * Manufacturer : Mitutoyo
- * Serial Number : 0027937

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 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).

FAHAMEH
Eng. & Ind. Co.

Witnessed
Reviewed



(210 × 297) mm

#17

Calibration Certificate

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

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

Page (1) of (2)

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



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.

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

16. Jul. 2024

Accredited by KOLAS , Republic of KOREA

Sam Jeong industry Co., Ltd. Represent *[Signature]*



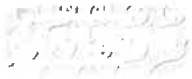
(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity, etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

Confirmation of the authenticity of the Calibration Certificate(Quality Manager, 055-384-1611)



Witnessed
Reviewed

Sam Jeong industry Co., Ltd.



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>D.J. SHIN</i>
<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	-	$\sqrt{30^2 + 0.0061^2} \times l^2 \mu\text{m}$ (A unit of <i>l</i> is mm)
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

456

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)



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.JSHAN

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

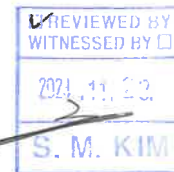
Calibration method and/or brief description

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



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)
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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

Korea Cal-Tech Center CO., LTD

16. Jul. 2024



(NOTE) If any significant instability or other adverse factor(overload, temperature, humidity, etc.)

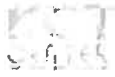
manifests itself during or after calibration, and is likely to affect the validity of the calibration.

Contact the manufacturer of the authenticity of the Calibration Certificate(Quality Manager, 055-238-9941)

KCT Witnessed
Reviewed

KCT CO., LTD.

A4(210 × 297) mm



Calibration Result

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 (2) of (2)



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

ShinWoo Metal Q.C Dept.
 Witnessed by
 Reviewed by P.J.S.H.W.

1. Calibration Value of bevel protractors

Scale Value	Correction Value(°)	Uncertainty of measurement (CL ≙ 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.

REVIEWED BY
 WITNESSED BY
 2024. 11. 23.

 S. M. KIM



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

KCT CO., LTD.
Witnessed
Reviewed

KCT CO., LTD.

A4(210 × 297) mm