



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. 12. 02
Ref. No. :
P/O. No. : PMS-24-050

- DESCRIPTION : GASKET SPACER, PIPE, TIE-ROD, FITTING

APPLICATION NO. : T-406

*** ENCLOSED CERTIFICATE**

		PAGE	Ref. No.
Inspection Item List (T-406)	-----	(1)	()
1. SPIRAL WOUND GASKET			
1) Inspection Certificate	-----	(2 ~ 6)	()
2. SPACER			
1) Inspection Certificate	-----	(7)	()
3. SMLS PIPE			
1) Marterial Test Certificate	-----	(8~23)	()
4. TIE-ROD & ROUND BAR			
1) Marterial Test Certificate	-----	(24~25)	()
5. FITTING			
1) Marterial Test Certificate	-----	(22~29)	()
2) Dimension Check Sheet	-----	(30~32)	()
3) Calibration Cert	-----	(33~34)	()

*** REMARKS**

결	담당	팀장	이사	전무	사장
재					

Inspection Item List

Project : HX-127

T-406

No.	Equip.	Item	Material	Description	Q'ty	Heat No.	Remark
1	HX-127	SPIRAL WOUND GASKET	SS304 + Graphite	OD 650 x ID 608 x 4.5T	2	SD59293/SE34170	
2	HX-127	SPIRAL WOUND GASKET	SS304 + Graphite	OD 650 x ID 608 x 4.5T	2	SD59293/SE34170	
3	HX-127	SPIRAL WOUND GASKET	SS304 + Graphite	OD 650 x ID 624 x 4.5T	4	SD59293/SE34170	
4	HX-127	SPACER	SA334 Gr.6	OD19.05 x 1.65T x 558L	12	B1-2313351	
5	HX-127	SPACER	SA334 Gr.6	OD19.05 x 1.65T x 538L	36	B1-2313351	
6	HX-127	SMLS PIPE	SA333 Gr.6	3" x S/160 x 500L	1	126239	
7	HX-127	SMLS PIPE	SA333 Gr.6	4" x S/120 x 500L	1	2-55913	
8	HX-127	SMLS PIPE	SA333 Gr.6	6" x S/80 x 500L	1	J8K4534	
9	HX-127	SMLS PIPE	SA333 Gr.6	2" x S/160 x 6,000L	1	585163	
10	HX-127	SMLS PIPE	STPG370	8A x S/80 x 6,000L	1	13B03470-1	
11	HX-127	TIE-ROD	SS400	OD 10(M10) x 2262L	12	SF80353	
12	HX-127	ROUND BAR	SS400	OD 13 x 1,694L	44	SF80323	
13	HX-127	90D ELBOW (L.R)	SA234 WPB	3" x S/80	4	EW740	
14	HX-127	90D ELBOW (L.R)	SA420 WPL6	2" x S/160	10	HD697	
15	HX-127	90D ELBOW (L.R)	SA420 WPL6	4" x S/120	2	HA584	
16	HX-127	HALF COUPLING	SA105	1/4"NPT, #3000	10	S45589	
TOTAL					143		



☒ EN10204 3.1 ☐ EN10204 3.2

KUKIL INNTOT CO.,LTD

REFERENCE STANDARD : ASME B 16.20

STYLE	INNER RING	HOOP	OUTER RING	FILLER
K/# SIB-EEG I-R : SUS 304 H : SUS 304 F : GRAFLEX				

REVIEWED BY
WITNESSED BY
2021.02.22
S. M. KIM

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

☐ EN10204 3.1 ☐ EN10204 3.2

KUKIL INTOT CO.,LTD

CERTIFICATE NO. 20241018034
LOT NO. : 20240923032
ORDER NO. : PMS-24-050-16
REFERENCE STANDARD : ASME B 16.20

STYLE	INNER RING	HOOP	OUTER RING	FILLER
K/# SB-EG H : SUS 304 F : GRAFLEX				

REVIEWED BY
WITNESSED BY
2021.12.01
S. M. KIM

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

QUALITY CONTROL MANAGER :

posco

Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 220913-RC01PN-0029A1-0001
Date of Issue/발행일자 : Sep., 15, 2022

Surface Finish : NO.2B
/표면마무리

Order No./계약번호 : 01S5667214

PO No./주문번호 : 22D0620070403

Supplier : DK CORPORATION
/주문자

Commodity : STAINLESS COLD ROLLED COIL
/품명

Customer : DK CORPORATION
/고객사

Spec & Type : POSCO304(ASTM-A240M-304(2019ED)/ASME-SA240M-304(2019ED))
/규격

Chemical Composition/화합성분										
C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	N (ppm)			
0.0498	0.386	1.062	0.0313	0.0061	18.145	8.055	354			

Division	L
----------	---

Tensile Test /인장시험		Hardness /경도	
YS 0.2% (MPa)	TS (MPa)	EL (%)	HRB
253	630	56	84.6
253	631	55	84.1

==== Last Item =====

REVIEWED BY
WITNESSED BY D

2021.12.03

S. M. KIM

Size/치수 (mm)	Product No. /제품번호	Quantity /수량	Weight /중량 (kg)	Heat No. /재간번호	Position	Tensile Test /인장시험		Hardness /경도
3x1524xC	Q8G0958	1	20,673	SD59283	T	YS 0.2% (MPa)	TS (MPa)	EL (%)
*** Sub Total (Q40) ***		1	20,673 (kg)		B	253	630	56
** Heat Treatment ** Solution Treatment Min 1040°C Quenching.		1	20,673 (kg)			253	631	55
*** Grade Total ***		1	20,673 (kg)					
*** Grand Total ***		1	20,673 (kg)					

REVIEWED BY
WITNESSED BY

2021.12.03

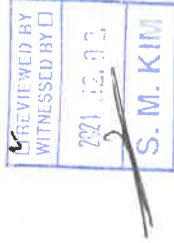
S. M. KIM

WITNESSED BY

REVIEWED BY

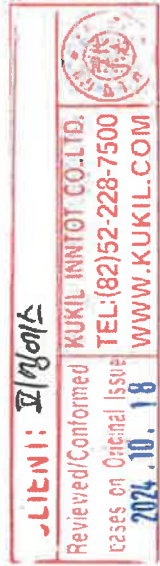
Q.A.

=== Last Item ===



* Position - T : Top, M : Middle, B : Bottom
* Tensile Test Direction : Transversal, Gauge Length : 50 mm(Rectangular),
Yp Method : 0.2 % off-set
* Division - L : Ladle Analysis

We hereby certify that the material herein has been made in accordance with the order and above specification.
No repair welding was performed to the products.
Test Certificate is issued according to ISO 10474/EN 10204 3.1.



본 검사증명서 위변조시 사문서 위조증명법 제231조28호 불이익을 당할 수 있으며, 본 증서는 KOLAS와 관련이 없습니다.



T.C.BAE

Surveyor To :

posco

Pohang Works, 6262, Donghaean-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, 37877, Korea

Chief of material testing section

< PAGE : 1 >

Bae, Tae Chul

Mill Test Certificate/검사증명서



Steel Total Solution

Young - Jin Metal Co., Ltd.

328-16, Geumsong-ro, Jicheon-myeon, Chilgok-gun,
Gyeongangbuk-do, Korea

Tel:054-977-0363 / Fax:054-977-0362

Customer : (주)인코일 INNTOT

Spec. & Type : ASTM-A240M-304/304L

Certificate No/증명서번호 : YJM-23-0207

Surface Finish/표면마무리: BA

Date of issue/발행일자 : Feb. 07, 2023

Case No	Size (mm)	Product No.	Quantity (EA)	Weight (kg)	Heat No.	Tensile Test			Hardness (HV)	Chemical Composition(%)						
						YS (N/mm ²)	TS (N/mm ²)	EL (%)		C	Si	Mn	P	S	Cr	Ni
										Max	1.00	2.00	0.045	0.030	20.00	10.50
									Min						18.00	8.00
1	0.2 x 5.2	QGD1511	87	643	SE34170	294	652	50	167	0.0186	0.4340	1.4640	0.0328	0.0017	18.1620	8.0960
2	0.2 x 5.2	QGD1511	87	636	SE34170	294	652	50	167	0.0186	0.4340	1.4640	0.0328	0.0017	18.1620	8.0960
3	0.2 x 5.2	QGD1511	58	453	SE34170	294	652	50	167	0.0186	0.4340	1.4640	0.0328	0.0017	18.1620	8.0960
4	0.2 x 5.2	QGD1511	87	648	SE34170	294	652	50	167	0.0186	0.4340	1.4640	0.0328	0.0017	18.1620	8.0960
5	0.2 x 5.2	QGD1511	87	661	SE34170	294	652	50	167	0.0186	0.4340	1.4640	0.0328	0.0017	18.1620	8.0960
Total																
EN10204 3. 1.																
SOLUTION HEAT TREATMENT TEMPERATURE 300 series 1,050℃~1,200℃																

REVIEWED BY
WITNESSED BY
2024. 02. 02
S. M. KIM



504-86-03556

(주)영진금속 이도경

경북 칠곡군 자전면 금송로 328-16

제조:도매 유통:금속

상기 제품은 제조 규격과 이상이 없음을 증명함.

Young Jin Metal Co., LTD.

WE HEREBY CERTIFY THAT THE MATERIAL HEREIN HAS BEEN MADE
IN ACCORDANCE WITH THE ORDER AND SPECIFICATION.

CHIEF OF QUALITY ASSURANCE DEPARTMENT

Do Kyoung, Lee

CLIENT: (주)인코일

Reviewed/Conformed KUKIL INNTOT CO., LTD.

cases on Original Issue TEL:(82)52-228-7500

2024. 10. 18 WWW.KUKIL.COM

WITNESSED BY

PMS

Q.A



SGL CARBON GmbH - Postfach 1193 - 86400 Mering

JIN SAN COMMERCIAL CO., LTD.
76 LS-ro, Dongan-gu, Anyang-si
14117 Gyeonggi-do
South Korea

Test Report 2.2 | No. 8839/23

acc. to EN 10204

Signed: Wolfgang Mayr
Department: Quality management
Telephone: +49 8271 63-1287
E-Mail: Wolfgang.Mayr@sglcarbon.com

Date: December 1, 2023

Your purchase order: 23-SG26 + 23-SG27
Delivery Note / Item: 31234193 / 7
Order / Item: 17237398 / 7

Delivery:

Item 7 1000 M Foil SIGRAFLEX®
F05010C
1000 mm x 0,5 mm
1 roll = 50 m

pile no: 2308060901 2308061001 2308061101 2308061201 2308061301 2308061401
2308061501 2308061601 2308061701 2308061801 2308061901 2308062001
2308062101 2308062201 2308062301 2308062401 2308062501 2308062601
2308062701 2308062801

Test result/properties:

Carbon content [%]	Halogen content [ppm]	Thickness [mm]	Chloride content [ppm]	Tensile strength [N/mm²]
≥ 98.0	≤ 100.0	ca. 0.5	≤ 25.0	≥ 4.0
Area weight [g/m²]	Ash content [%]	Fluoride content [ppm]	Iron content [ppm]	Density [g/cm³]
ca. 500.0	≤ 2.0	≤ 25.0	≤ 5000.0	ca. 1.0
Oxidation TGA 670°C [%/h]	Sulphur content [ppm]			
≤ 5.0	< 300.0			

Values are valid for the graphite foil only, not for the final product.

The requirements agreed upon the order are fulfilled.



This certificate has been generated automatically and is valid without signature.

CERTIFICATE NO: 20241016-03PAGE: 1DATE: 2024-10-16

CUSTOMER: PMS

P/O NO.(W/O NO.): PMS-24-050-01

COMMODITY: SEAMLESS COLD-DRAWN CARBON STEEL TUBE FOR LOW-TEMPERATURE SERVICE

SPECIFICATION: ASME SA334 GR.6/SA1016(2023ED.)

INSPECTION CERTIFICATE
According to EN10204 3.1

YCP CO.,LTD

1519-2, DADAE-DONG, SAHA-GU, BUSAN, KOREA

TEL : (051)264-9300 FAX : (051)264-9200

NO	LOT NO	I . D	O . D	W . T	LENGTH(M)	Q'TY(PCS)	T.LENGTH(mm)	WEIGHT(kg)	REMARK	NOTE
1	YC241010-01	--	19.05	1.650 (AVG)	5.569	388	2,160,772	1,529.8	900℃ FINAL TEMP.	G: GOOD

REVIEWED BY
WITNESSED BY
2024.12.02
S.M.KIM

HEAT NO
B1-2313351

LOT NO	CHEMICAL COMPOSITION				TENSILE TEST			
	C	Si	Mn	P	S	T.S (#2) MIN	Y.P (#2) MIN	EL (#3) MIN
MAX	30	--	106	25	25	415	240	30
MIN	--	10	29	--	--	512.3	349.8	37.0
#1	2		3					
H	16	29	123	15	8	508.9	348.7	38.0
P	16	30	122	14	9			

DIAMETER
VARIATION
& LONG

FLATNESS

STRAIGHT

STRESS

FLATNESS

TESTING

IMPACT

TEMP

EDDY

CURRENT

HYDRO

STATIC

HAZARD

ANES

*1: CHEMICAL COMPOSITION
2: * 100
3: * 1000

*2:
T.S: TENSILE STRENGTH (Mpa)
Y.P: YIELD POINT
STRENGTH (Mpa)

*3: EL: ELONGATION (%)

WE HEREBY CERTIFY THAT THE MATERIALS HEREIN HAS BEEN MADE AND TESTED
IN ACCORDANCE WITH ABOVE SPECIFICATIONS AND THE RESULT OF ALL TEST ARE ACCEPTABLE

MANAGER OF Q.A DEPT
H. S. KIM

FMS
WITNESSED BY
2024.12.02
S.M.KIM

4).5)

YCP-YH-015-01

YCP CO.,LTD

A4(210mmX297mm)



TUBOS REUNIDOS INDUSTRIAL, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD MILL TEST CERTIFICATE

QUALITY
MANAGEMENT
SYSTEM
certified by
LRQA

THE BILLETS AND THE MATERIAL COVERED BY THIS CERTIFICATE ARE MANUFACTURED AT OUR STEEL PLANT IN AMURRIO, SPAIN.

PAG. 1 / 3

Nº 0000354092/2 Rev. 000

CLIENTE: KEONWOO METALS CO., LTD. PEDIDO / PARTIDA: KTC-20-99974
CUSTOMER P. ORDER / ITEM 006.

PRODUCTO: TUBERÍA SIN SOLDADURA LAMINADA EN REF. FABRICA: 300021013
ARTICLE CALIENTE WORK ORDER 000060
HOT FINISHED SEAMLESS TUBES

EXTREMOS: BISELADOS PROTECCIÓN SUPERF: LACA EXTERIOR
ENDS BEVELLED ENDS EXT. COATING EXTERNALLY DRY LACQUERED

NORMA / GRADO: ASTM A333/A333M-18 / ASME II PROCESO FUSION: HORNO ELECTRICO
API STANDARD AND GRADE SA-333/SA-333M-19 / API 5L 2018 46TH ED MELTING PROCESS DESGASIFICADO EN VACIO
PSL2 ELECTRIC FURNACE FULLY KILLED VACUUM
L360N/X52N16/1 DEGAASSED FINE GRAIN PRACTICE

ESPEC. ADICIONALES: NACE MR0175/ISO 15156 ED. 2015 FAB. DE PALANQUILLA: COLADA CONTINUA
ADDITIONAL SPECS. NACE MR0103/ISO 17945 ED. 2015 BILLET MANUFACTURE CONTINUOUS CASTING

6) DIMENSIONES: 88.9 X 11.13 MM. X (3" X 5/16")
DIMENSIONS 6 M.

MARCAS: ESTAMPADO: TRI API SPEC 5L 5L-8011 (SELLO API) (MM/AA) 88.9 11.1 L360N/X52N PSL2
MARKING DIE STAMPING SMLS HN (HEAT) 20.5 MPA 6,000 M ASTM/ASME A/SA333 6/1 HFS LT -45 C

PINTADO: CODIGO COLOR:

EST. SUMINISTRO: NORMALIZADO. ENFRIADO AL AIRE / NORMALIZED. AIR COOLED
SUPPLYING COND 960 °C 23 MIN

DESCRIPCION SUMINISTRO / DESCRIPTION OF DELIVERY

ITEM FAB. T.R. ITEM	ITEM CLI. CLIENTS ITEM	LONG. INDIV (M) INDIVIDUAL LENGTH	COLADA CAST NR.	Nº TUBOS QUANTITY	LONG. TOTAL (M) LENGTH	PESO (KG) WEIGHT
000060		6,000	126239	41	246,000	5,212
TOTAL				41	246,000	5,212

Lista de Bultos / Packing 707043
List

606-85-26047

건우메탈(주) 우태구

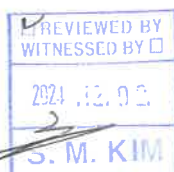
부산시 강서구 가라새2로 139길32

제조: 도매 파이프, 철강, 무역
부동산 임



TUBOS REUNIDOS INDUSTRIAL GARANTIZA QUE TODOS LOS TUBOS CUBIERTOS POR ESTE CERTIFICADO CUMPLEN LOS REQUISITOS DEL PEDIDO Y CON LAS ESPECIFICACIONES ARRIBA MENCIONADAS.
TUBOS REUNIDOS INDUSTRIAL CERTIFY THAT ALL THE TUBES COVERED BY THIS CERTIFICATE COMPLY WITH ORDER REQUIREMENTS AND ABOVE MENTIONED SPECIFICATIONS.

AMURRIO 18.03.2021



조정배 / 051-941-6078
CONTROL DE CALIDAD DE TUBOS REUNIDOS INDUSTRIAL
TUBOS REUNIDOS INDUSTRIAL (QUALITY CONTROL)

Borja Egizabal



TUBOS REUNIDOS INDUSTRIAL, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD MILL TEST CERTIFICATE

QUALITY
MANAGEMENT
SYSTEM
certified by
LRQA

PAG. 2 / 3

Nº 0000354092/2 Rev. 000

ENSAYOS NO DESTRUCTIVOS / NON DESTRUCTIVE TESTS

ENSAYO / TEST	%CONTROL / TEST RATE (%)	REQUISITOS / REQUIREMENTS	RESULTADO / RESULT
VISUAL Y DIMENSIONAL/ VISUAL & DIMENSIONAL INSP.	100%		O.K.
P.HIDROSTATICA/ HYDROTEST	100%	2.970.0 PSI 5 SEC.	O.K.
CORRIENTES INDUCIDAS/ EDDY CURRENTS	100%	ASTM E 309, N12.5/HS 3.2 MM	O.K.
U.S. (LONGITUDINAL): ULTRASONIC TEST (LONG)	100%	ASTM E 213 12.5% W.T. NOTCH	O.K.
MAGNETISMO RESIDUAL/ RESIDUAL MAGNETISM		MAX 30.0 GAUSS	



ENSAYOS TECNOLÓGICOS Y METALÚRGICOS / TECHNOLOGICAL AND METALLURGICAL TEST

AFLASTADO
FLATTENING

AC/ A/SA333/5L2018, PSL2 -OK

ANÁLISIS DE COLADA / CAST ANALYSIS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Ti	Nb	B	C.E.
MIN.		0.29	0.10											
MAX.	0.24	1.35	0.45	0.025	0.0100	0.300	0.3000	0.1200	0.4000	0.0800	0.0400	0.0200	0.0010	0.43
126239	0.1380	1.30	0.22	0.009	0.0045	0.069	0.0721	0.0999	0.1274	0.0680	0.0033	0.0050	0.0001	0.42

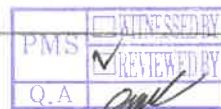
ANÁLISIS DE PRODUCTO / PRODUCT ANALYSIS

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	V	Ti	Nb	B	C.E.
MIN.		0.29	0.10											
MAX.	0.24	1.35	0.45	0.025	0.0100	0.300	0.3000	0.1200	0.4000	0.0800	0.0400	0.0200	0.0010	0.43
126239	0.1420	1.30	0.22	0.009	0.0052	0.070	0.0700	0.1000	0.1200	0.0690	0.0030	0.0050	0.0001	0.42
126239	0.1380	1.30	0.22	0.009	0.0057	0.070	0.0700	0.1000	0.1280	0.0690	0.0030	0.0050	0.0001	0.42

FORMULAS

	(01)	(02)
MIN.		
MAX.	0.150	0.230
126239	0.077	0.230
126239	0.077	0.230

(01) Nb + Ti + V
(02) Pcm: C + Si/30 + (Cr + Mn + Cu/20 + Ni/60 + Mo/15 + V/10 + S)*B



조정배 /051-941-6078

AMURRIO 18.03.2021

606-85-26047

건우메탈(주) 우태구

부산시 강서구 가리새2로 13번길32

제조 도매 판매처
부품 산 입 파이프, 철강, 무역 대



CONTROL DE CALIDAD DE TUBOS REUNIDOS
INDUSTRIAL

TUBOS REUNIDOS INDUSTRIAL QUALITY CONTROL

Borja Aguilera



TUBOS REUNIDOS INDUSTRIAL, S.L.U

Barrio Sagarribai, 2 - 01470 AMURRIO (Spain)

EN 10204:2004 / 3.1

CERTIFICADO DE CALIDAD MILL TEST CERTIFICATE

QUALITY
MANAGEMENT
SYSTEM
certified by
LRQA

PAG. 3 / 3

Nº 0000354092/2 Rev. 000

ENSAYOS DE TRACCIÓN / TENSILE TEST

COLADA CAST	Nº	L/T (1)	TP (2)	DIMENSION (mm)	L.ELAST. YIELD POINT (Mpa) (3)	R.TRACC. T.STRENGTH (Mpa)	ALARG. ELONG. (%) (4)	Estricción Reduction of Area (%)	DUREZA HARDNESS (HRB)
MIN.					360	460			
MAX.					330	760			99
126239	1	L	P	19,50 x 10,800	382	528	40		82
126239	202/67	L	P	19,60 x 11,100	375	532	38		83

- (1) : L = LONGITUDINAL // T = TRANSVERSAL
 (2) : T = Full size tube // P = Strip specimen // C = Cylindrical // F = Flat specimen
 (3) : yield point (0,5%)
 (4) : Lo = 2" (50 mm)

ENSAYOS DE IMPACTO - CHARPY V / IMPACT TEST

COLADA CAST	Nº	L/T (1)	DIMENS (mm)	Tª (°C)	RESILIENCIA IMPACT TEST (J)	AVG (J)
			10 10,00	-45	14 / 18	
126239	1	L	10 10,00	-45	200	188 197 195
126239	202/67	L	10 10,00	-30	198	183 169 183

- (1) : L = LONGITUDINAL // T = TRANSVERSAL

ANEXOS / ANNEX

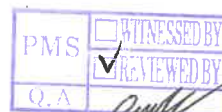
FULLY KILLED
RADIATION FREE
MERCURY FREE
NO WELD REPAIR

606-85-26047

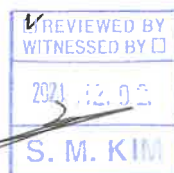
건우메탈(주) 우태구

부산시 강서구 가리새2로 13번길32

제조 도면 파이프, 철강, 무역
부 동 산 임 대



조정배 / 051-941-6078



AMURRIO 18.03.2021

CONTROL DE CALIDAD DE TUBOS REUNIDOS
INDUSTRIAL
TUBOS REUNIDOS INDUSTRIAL QUALITY CONTROL
Borja Eguizabal

INSPECTION CERTIFICATE



JFE Steel Corporation

CHITA WORKS
1, Kawasumi-cho 1-chome, Hondo-City, Aichi Pref. 476-0811
Japan

Date: MARCH 16, 2022 Page 1 / 1

Certificate No.	#230301772-000	Invoice No.	51-1127	JFE Code	SB22
Order No.	2N8T516-005	Shipper's Reference No.	228092 55021051		
Shipper	HANWA CO., LTD.				
Customer	KEONWOOD METALS CO., LTD.				
Commodity	HOT FINISHED SEAMLESS CARBON STEEL PIPE				
Specification	ASTM A333M GRADE 6/ASME SA-333M GRADE 6 (2018/2021 ED)				
Size	114.30 X 11.13 X 6000 (4" X S120)				
Project Name					
Construction No.	Ship No.				
Reference No.					
Customer's Control No. 1					
Customer's Control No. 3	KTC-22-99949				

Quantity	40	Mass	6,800 kg	Total Length	
----------	----	------	----------	--------------	--

MFG. No.	Heat No.	Products
S2050-01	2-55913	40

Chemical Composition (%)

MFG. No.		C	Si	Mn	P #1	S #1	Cu	Ni	Cr	Mo	
S2060-01	*a Max L	24		135	25	25	40	40	30	12	*a: Standard Spec. (ASTMA333M-6) Sampling Position : Base Metal
	Min L		10	29							
	Max P	24		135	25	25	40	40	30	12	
	Min P		10	29							
S2060-01	*b Max L	24		135	25	25	40	40	30	12	*b: Standard Spec. (ASME SA333M-6) Sampling Position : Base Metal
	Min L		10	29							
	Max P	24		135	25	25	40	40	30	12	
	Min P		10	29							
S2060-01	*c Max L										*c: Customer Spec. Sampling Position : Base Metal
	Min L										
	Max P										
	Min P										
S2060-01	L	13	22	86	12	4	1	1	2	<1	L : Ladle Analysis P : Product Analysis CEQ1 (8C2) : C + (Mn+Si) / 6 + (Cr+Mo+V) / 5 + (Ni+Cu) / 15 #1 : ×1000 Others : ×100
	P	13	23	85	13	5	1	<1	1	<1	
	P	13	23	85	12	5	1	<1	1	<1	
S2050-01	*a Max L	8	2								
	Min L										
	Max P	8	2								
	Min P										
S2050-01	*b Max L	8	2								
	Min L										
	Max P	8	2								
	Min P										
S2050-01	*c Max L			43							
	Min L										
	Max P			43							
	Min P										
S2050-01	L	<1	<1	32							
	P	<1	<1	32							
	P	<1	<1	32							

✓ REVIEWED BY
WITNESSED BY

2021.12.02

S. M. KIM



전우메탈(주) 우태구

부산시 강서구 가리새2로 13번길32

제조 도매 판매처
부품 산 입 파이프, 철강, 무역

조정배 / 051-941-6078



WE HEREBY CERTIFY THAT THE MATERIALS DESCRIBED HEREIN HAVE BEEN MANUFACTURED, SAMPLED, INSPECTED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION (S), AND THAT THEY SATISFY THE REQUIREMENTS.

105-01-750 Form 1 Rev. 1

Manager, Q.A.

This Inspection Certificate is printed with special forgery proof technology.

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INSPECTION CERTIFICATE



JFE Steel Corporation

CHUO KOREA
1, Asanbiki-cho 1-chome, Nador-City, Aichi Pref. 475-8811
Japan

Date: MARCH 16, 2023 Page 2 / 8

Certificate No. : N280301772-000
Order No. : 2N3T516-005

Tensile Test

MFG. No.	YS	Variation	TS	EL (%)	
*a Max	240		415	30	
*a Min					
*b Max	240		415	30	
*b Min					
S2050-01	308 303		448 441	47 47	

*a: Standard Spec. (ASTMA333M-6)
Sampling Position : Base Metal
Direction : Longitudinal
Type of Specimen : Strip 25.4 mm
G. L. : 50 mm
Unit : MPa
Kind of YS : 0.2 % offset method

*b: Standard Spec. (ASMESA333M-6)
Sampling Position : Base Metal
Direction : Longitudinal
Type of Specimen : Strip 25.4 mm
G. L. : 50 mm
Unit : MPa
Kind of YS : 0.2 % offset method

Impact Test

MFG. No.	Absorbed Energy				
	Each	2 pcs	Ave.		
*a Min	11	14	14		
*b Min	11	14	14		
S2050-01	199 222 191	204			

*a: Standard Spec. (ASTMA333M-6)
Sampling Position : Base Metal
Direction : Longitudinal
Type of Specimen : 2V
10X7.5
Test Temperature : -48°C
Unit : J

*b: Standard Spec. (ASMESA333M-6)
Sampling Position : Base Metal
Direction : Longitudinal
Type of Specimen : 2V
10X7.5
Test Temperature : -48°C
Unit : J

Hardness Test

*a Each	Max	248			
	Min				
	Variation				
MFG. No.	Outer	Mid	Inner		
	(1) (2) (3) Ave.	(1) (2) (3) Ave.	(1) (2) (3) Ave.		V. Ave.
S2050-01	I	126			

*a: Customer Spec.
Sampling Position : Base Metal
Method : HV

Flattening Test

Heat Treatment
N.D.B.

GOOD

Normalizing 925°C x 5H

Standard Spec. (ASTMA333M-6) : ET

Standard Spec. (ASMESA333M-6) : ET

Customer Spec. : UT

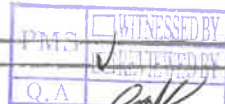
ET: GOOD

UT: GOOD

GOOD

Visual & Dimension

GOOD



조창배 / 051-941-6078

WE HEREBY CERTIFY THAT THE MATERIALS DESCRIBED HEREIN HAVE BEEN MANUFACTURED, SAMPLED, INSPECTED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION(S), AND THAT THEY SATISFY THE REQUIREMENTS.

606-85-26047

전우메탈(주) 우태구

부산시 강서구 가리새로 139길22

부동산



INSPECTION CERTIFICATE



JFE Steel Corporation

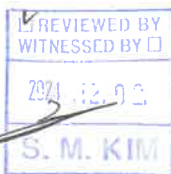
CHITA WORKS
1, Kawasaki-cho 1-chome, Nanda-City, Aichi Pref. 476-8411
Japan

Date : MARCH 16, 2022 Page 3 / 3

Certificate No. : N280301772-000
Order No. : 2N3T518-005

Remarks

EN10204 3.1
NO WELD REPAIR
FULLY KILLED
NACE MR0175/ISO15156, NACE MR0103/ISO17945 (HARDNESS ONLY)
FINE GRAIN PRACTICE



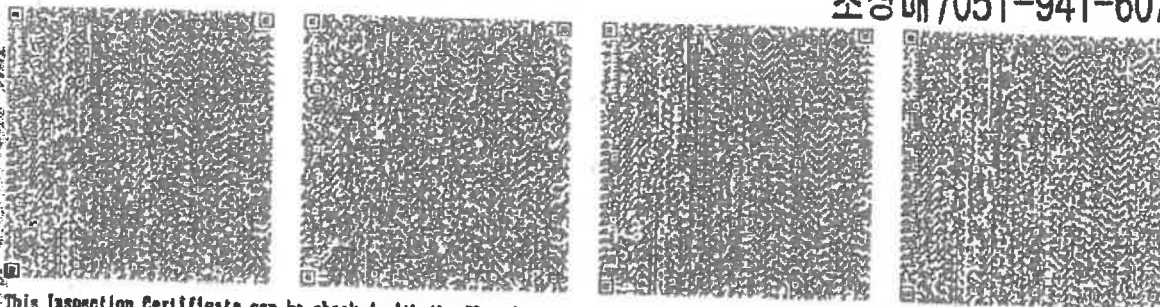
606-85-26047

건우메탈(주) 우태구

부산서 강서구 가리새2로 13원길32
제조 도면 파이프, 철강, 무역
부 품 산 입



조정배 / 051-941-6078



This Inspection Certificate can be checked with the QR code. <http://www.jfe-steel.co.jp/en/millsteel.htm>

WE HEREBY CERTIFY THAT THE MATERIALS DESCRIBED HEREIN HAVE BEEN MANUFACTURED, SAMPLED, INSPECTED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION(S), AND THAT THEY SATISFY THE REQUIREMENTS.

705-01-750 Form18 Rev.2



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NIPPON STEEL & SUMITOMO METAL CORPORATION
WAKAYAMA WORKS [KATNAN AREA]
260-100, FUJIOO, KATNAN, JAPAN

INSPECTION CERTIFICATE

CERTIFICATE NO. :BYVF2629-01

PAGE : 1/2 DATE : 2019-02-12

CUSTOMER : KEONWOO METALS CO., LTD.
ORDER NO. :
SHIPPER : NIPPON STEEL & SUMITOMO METAL CORP. 111 5252 AYK8348B 8-848-N3-5-Y-A038-01
COMMODITY : SEAMLESS HOT FINISHED CARBON STEEL PIPE
STANDARD : ASTM A333H-16 / ASME 2017 EDITION SA-333H GR. 6
SPECIFICATION : TSG-2300R5
MILL WORK NO. : BYVF2629

O.D. : 168.3mm W.T. : 10.97mm LENGTH: 6000mm QUANTITY: 63pcs. MASS: 16065kg

HEAT NO. : J8K4534
PRODUCTS PCS. : 63

(6" x 5/8")

HEAT TREATMENT : NORMALIZED(900 C X 5min. A.C.)

CHEMICAL COMPOSITION(%)

		*1	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Co	*CEQ
						#2	#2							
SPEC. MIN.		R	-	10	29	-	-	-	-	-	-	-	-	-
MAX.		R	30	-	195	25	25	40	30	40	12	8	2	43
HEAT NO.														
J8K4534		L	11	31	126	11	2	26	12	36	2	0	2	39
		P	11	30	126	10	2	23	13	37	3	0	2	39
		P	11	30	126	10	2	23	13	37	3	0	2	39

*1 R: LADLE & PRODUCT ANALYSIS L: LADLE ANALYSIS P: PRODUCT ANALYSIS *2: X1000 OTHER: X100
*CEQ: $C + Mn/6 + (Cr + Mo + V)/5 + (Cu + Ni)/15$

"FOR EACH REDUCTION OF 0.01% CARBON BELOW 0.30%, AN INCREASE OF 0.05% MANGANESE ABOVE 1.06% IS PERMITTED TO A MAXIMUM OF 1.35% MANGANESE."

TENSILE TEST

		*1 *2	YS #3	TS #3	EL. %
SPEC. MIN.		L B	M 240	M 415	30
MAX.		L B	M -	M -	-
HEAT NO.					
J8K4534		L B	M 360	M 504	40
		L B	M 358	M 503	41
		L B	M 364	M 506	40
		L B	M 361	M 504	40

606-85-26047

권우메탈(주) 우태구

부산시 강서구 가리새2로 13번길32

제조 도매
부품 산

파이프, 철강, 무역
임대

606 85 26047

권우메탈(주) 우태구

부산시 강서구 가리산로 13번길32

제조도매 파이프, 철강, 무역
부품 산 입

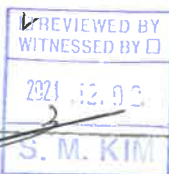
TYPE OF SPECIMEN: STRIP 25mm WIDTH *1 SAMPLING DIRECTION L: LONGITUDINAL *2 SAMPLING POSITION B: BASE METAL
*3 UNIT N/MPa GAUGE LENGTH: 60.0mm KIND OF YS: 0.5% EXTENSION UNDER LOAD

IMPACT TEST(-45.0 C 2mm V-Notch 10X7.50)

		*1 *2	*3 *4	AVG
SPEC. MIN.		L B	E J	*5 11/14 14
MAX.		L B	E J	-/- -
				[1] [2] [3]
HEAT NO.				
J8K4534		L B	E J	171 207 161 180



WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE IN ACCORDANCE WITH THE RULES OF THE CONTRACT.



조정배 / 051-941-6078

Y. Itoh

YUJIN ITO

HEAD OF DEPARTMENT
QUALITY ASSURANCE DEPARTMENT

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Fax. No. : +81-3-6867-4926 E-mail: pipe-ipp@jp.nssc.com

NO. 057306K19

This certificate is a printed copy of the original electric document as of 2019-02-18



NIPPON STEEL &
SUMITOMO METAL
CORPORATION

NIPPON STEEL & SUMITOMO METAL CORPORATION
WAKAYAMA WORKS [KAINAN AREA]
260-100, FUNDO, KAINAN, JAPAN

INSPECTION CERTIFICATE

CERTIFICATE NO. :BYVF2629-01

PAGE : 2/2 DATE : 2019-02-12

[1] [2] [3]: SPECIMEN NO.
ABSORBED ENERGY *5:VALUE OF ONE PIECE/EACH VALUE OF TWO PIECES AVG: AVERAGE VALUE OF ONE SET (3 PIECES)
*1 SAMPLING DIRECTION L: LONGITUDINAL *2 SAMPLING POSITION B: BASE METAL *3 E: ABSORBED ENERGY *4 UNIT J: Joule

FLATTENING TEST: ACCEPTABLE
VISUAL & DIMENSIONS: ACCEPTABLE
HYDROSTATIC TEST 19.0MPa: GUARANTEED BUT NOT CONDUCTED
ULTRASONIC EXAMINATION: ACCEPTABLE
POSITIVE MATERIAL IDENTIFICATION TEST (SPARK TEST): ACCEPTABLE
NO WELD REPAIR
CERTIFIED ACCORDING TO PED2014/68/EU, ANNEX 1, PAR. 4.3 BY TÜV RHEINLAND INDUSTRIE SERVICE GmbH
(NOTIFIED BODY, ID-No. 0035/CERTIFICATE No. 01 202 J/Q-02 0017)
NACE MR0175/ISO 15156-2, NACE MR0103/ISO 17945 HARDNESS (HRC 22 MAX.): GUARANTEED
VACUUM DEGASSED
STEEL HAS BEEN FULLY KILLED
FINE GRAIN PRACTICE
EN 10204 3.1

606-85-26047

건우메탈(주) 우태구

부산시 강서구 가리새2로 13번길32

제조: 도매 파이프, 철강, 무역
부: 총 산 입 대



조정배 / 051-941-6078



WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN MADE IN ACCORDANCE WITH THE RULES OF THE CONTRACT.

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Fax. No. : +81-3-6867-4926 E-mail: pipe-ipp@jp.nssc.com

NO. 057306K19



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ABNAHMEPRÜFZEUGNIS EN 10204-3.1
INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1

65-817888/001/P

Prüf-Nr.:
Inspection No.:
No. du certificat:

Blatt: 2 / 7
Page:
Page:

Pos.	Stück	Maße	Item	Number	Dimensions	Poste	Nombre	Dimensions	mm	Länge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfachlängen
										Longueur	Poids	Heat No.	Test pressure	Tube number group	Multiple lengths
										m	kg	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueurs multiples
0020	162	3" NPS * Sched. 160	6000,00	972,00	20961	585528									
0030	42	4" NPS * Sched. 80	6000,00	252,00	5715	585163									
0040	52	4" NPS * Sched. 120	6000,00	312,00	8874	585528									
0050	42	4" NPS * Sched. 160	6000,00	252,00	8529	585900									

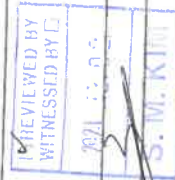
Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	AL	V	NB
Item	Heat No.												
Poste	No. de coulée												
0010	585163	0,120	0,190	0,73	0,006	0,005	0,12	0,02	0,08	0,16	0,033	0,001	0,001
0020	585528	0,130	0,320	1,23	0,008	0,002	0,14	0,06	0,25	0,18	0,043	0,063	0,012
0030	585163	0,120	0,190	0,73	0,006	0,005	0,12	0,02	0,08	0,16	0,033	0,001	0,001
0040	585528	0,130	0,320	1,23	0,008	0,002	0,14	0,06	0,25	0,18	0,043	0,063	0,012
0050	585900	0,130	0,310	1,24	0,006	0,003	0,12	0,06	0,25	0,18	0,041	0,069	0,014

1. Formel: $CEV = C + (Mn/6) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15) < = 0,43 \%$

Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr	1. Formel
Item	Heat No.	1. Formula
Poste	No. de coulée	1. Formule
0010	585163	0,286
0020	585528	0,416
0030	585163	0,286
0040	585528	0,416
0050	585900	0,415



Pos.	Schmelzen-Nr.	C	SI	MIN	P	S	CR	MO	NI	CU	AL	V	NB
Item	Heat No.												
Poste	No. de coulée												
0010	585163	0,110	0,180	0,74	0,005	0,005	0,12	0,02	0,08	0,16	0,034	0,001	0,001
0010	585163	0,120	0,180	0,74	0,006	0,005	0,12	0,03	0,08	0,15	0,034	0,001	0,001
0020	585528	0,120	0,300	1,24	0,008	0,002	0,13	0,06	0,25	0,17	0,041	0,064	0,014
0020	585528	0,120	0,290	1,24	0,008	0,002	0,14	0,05	0,24	0,18	0,042	0,065	0,015
0030	585163	0,130	0,200	0,78	0,005	0,004	0,12	0,02	0,08	0,16	0,031	0,001	0,001
0030	585163	0,110	0,180	0,73	0,006	0,005	0,12	0,02	0,08	0,16	0,033	0,001	0,001
0030	585163	0,130	0,200	0,76	0,005	0,004	0,12	0,03	0,08	0,16	0,030	0,001	0,001
0030	585163	0,110	0,190	0,73	0,005	0,005	0,12	0,02	0,08	0,16	0,032	0,001	0,001
0040	585528	0,130	0,300	1,23	0,008	0,002	0,13	0,06	0,25	0,17	0,042	0,063	0,014
0040	585528	0,120	0,310	1,23	0,008	0,002	0,14	0,05	0,26	0,16	0,043	0,064	0,014
0050	585900	0,130	0,290	1,26	0,005	0,003	0,12	0,05	0,23	0,17	0,041	0,071	0,017
0050	585900	0,130	0,280	1,27	0,005	0,003	0,11	0,06	0,24	0,16	0,041	0,071	0,016

1. Formel: $CEV = C + (Mn/5) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15) < 0,43 \%$

Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr.	1. Formel
Item	Heat No.	1. Formula
Poste	No. de coulée	1. Formule
0010	585163	0,277
0010	585163	0,288
0020	585528	0,405
0020	585528	0,405
0030	585163	0,304
0030	585163	0,275
0030	585163	0,302
0030	585163	0,275

REVIEWED BY
2024.12.02
S. M. Kiliç

WITNESSED BY
PMS
Q.A.
J. Kiliç

65-817888/001/P

Dokument-Nr.:
Document No.:
No. du document:

ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1

Prüf-Nr.:
Inspection No.:
No. du certificat:

Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr	1. Formel
Item	Heat No.	1. Formula
Poste	No. de coulée	1. Formule
0040	585528	0,413
0040	585528	0,403
0050	585900	0,414
0050	585900	0,416



Prüfsergebnisse / Test results / Résultats des essais

Die Röhre wurden zerstörungsfrei geprüft:

The tubes are non destructive tested:

Les tubes ont passé un essai non destructif:

Augensichtkontrolle:

Visual inspection:

Examen visuel:

PASSED

Maßkontrolle:

Dimensions examination:

Vérification des dimensions:

PASSED

Ringfaltversuch:

Flattening test:

Essai d'aplatissement:

PASSED

ET-test: acc. to ASME SA-999, ASTM-A 999; ET - Test method: acc. to ASTM-E 309; for imperfections

Ergebnisse der mechanischen Prüfung / Results of mechanical testing / Résultats des essais mécaniques

Die Probennahme erfolgte an Vielfachlängen.

The sampling was carried out on multiple lengths.

L'échantillonnage était réalisé aux longueurs multiples.

Zugversuch längs Streifenprobe / Tensile test longitudinal Strip test specimen / Essai de traction longitudinale Bande découpée sur tube

Pos.	Proben-Nr.	Schmelzen-Nr.	Probenabmessung	Streckgrenze	Zugfestigkeit	Dehnung	Einschnürung
Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation	Area reduction
Poste	No. de l'éprouvette	No. de coulée	Dimensions de l'éprouv.	Limite élastique	Résistance à la traction	Allongement	Coefficient de striction
Anforderungen			mm	ReH	Rm	A2"	1. Formel
Requirements				PSI	PSI	%	1. Formula
Exigences				MIN 34809	60191-114580	MIN 35	1. Formule
0010	000001	585163	19,00 X	8,80	41046	61496	46,00
0010	000002	585163	19,00 X	8,60	42641	62221	44,00
0010	000003	585163	19,00 X	8,80	41916	62076	46,00
0010	000004	585163	19,00 X	8,50	41481	61351	42,00



ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1

CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-817888/001/P

Document No.: No. du document:

Prüf-Nr.: Inspection No.:
No. du certificat:

Blatt: 5 / 7
Page: Page:

Zugversuch längs Streifenprobe / Tensile test longitudinal Strip test specimen / Essai de traction longitudinale Bande decoupee sur tube

Pos.	Proben-Nr.	Schmelzen-Nr.	Probenabmessung	Streckgrenze	Zugfestigkeit	Dehnung	Einschnürung
Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation	Area reduction
Poste	No. de l'éprouvette	No. de coulée	Dimensions de l'éprouv.	Limite élastique	Résistance à la traction	Allongement	Coefficient de striction
Anforderungen				ReH	Rm	A2"	1. Formel
Requisiments			mm	PSI	PSI	%	1. Formula
Exigences				MIN 34809	60191-114580	MIN 35	1. Formule
0010	000005	585163	19,00 X 8,90	41771	61641	44,00	
0010	000006	585163	19,00 X 8,60	41626	62076	44,00	
0010	000007	585163	19,00 X 8,70	40901	60771	44,00	
0010	000008	585163	19,00 X 8,50	41191	61351	44,00	
0010	000009	585163	19,00 X 8,70	42496	62946	42,00	
0010	000010	585163	19,00 X 8,80	41336	61786	44,00	
0010	000011	585163	19,00 X 9,00	41191	61061	46,00	
0020	000001	585528	25,40 X 11,30	58740	77160	46,00	
0020	000002	585528	25,40 X 10,90	57870	76145	46,00	
0020	000003	585528	25,40 X 10,90	58305	76725	44,00	
0020	000004	585528	25,40 X 10,90	59756	77885	44,00	
0020	000005	585528	25,40 X 11,10	58885	77595	44,00	
0020	000006	585528	25,40 X 11,10	58595	77885	44,00	
0020	000007	585528	25,40 X 11,40	58885	77013	42,00	
0020	000008	585528	25,40 X 11,60	58450	76725	46,00	
0020	000009	585528	25,40 X 11,20	58015	76580	46,00	
0030	000001	585163	25,40 X 8,60	46122	65847	40,00	
0030	000001	585163	25,40 X 9,00	40756	60336	44,00	
0030	000002	585163	25,40 X 8,50	45542	66572	44,00	
0030	000002	585163	25,40 X 8,70	40901	61931	42,00	
0030	000003	585163	25,40 X 8,60	46557	66572	44,00	
0040	000001	585528	25,40 X 11,20	56710	77305	42,00	
0040	000002	585528	25,40 X 11,20	56855	76870	42,00	



Zugversuch längs Streifenprobe / Tensile test longitudinal Strip test specimen / Essai de traction longitudinale Bande decoupee sur tube

Pos. Item Poste	Proben-Nr. Specimen No.	Schmelzen-Nr. Heat No.	Probenabmessung Specimen dimensions	Streckgrenze Yield strength	Zugfestigkeit Tensile strength	Dehnung Elongation	Einschnürung Area reduction
	No. de l'éprouvette	No. de coulée	Dimensions de l'éprouv.	Limite élastique	Résistance à la traction	Allongement	Coefficient de striction
Anforderungen Requisiments Exigences	mm		ReH PSI MIN 34809	Rm PSI 60191-114580	A2" % MIN 35	1. Formel 1. Formula 1. Formule	
0040 000003	585528		25,40 X 11,20	57870	75275	44,00	
0050 000001	585900		25,40 X 13,30	59901	78030	44,00	
0050 000002	585900		25,40 X 13,80	60191	77885	43,00	
0050 000003	585900		25,40 X 13,70	58450	77015	44,00	

Kerbschlagbiegeversuch Notched bar impact test / Essai de flexion par choc (résilience) [1 CHARPY_V]

Pos. Item Poste	Proben-Nr. Specimen No.	Schmelzen-Nr. Heat No.	Probenabmessung Specimen dimensions	Probenlage Specimen position	Prüftemperatur Test temperature	Kerbschlagarbeit Absorbed energy	Kerbschlagzähigkeit Impact strength	Verf.-Bruchanteil Shear fracture
	No. de l'éprouv.	No. de coulée	Dimensions de l'éprouvette	Position de l'éprouvette	Température d'essai	Energie absorbée	Résistance au choc	Rupture ductile
Anforderungen Requisiments Exigences	Länge Longueur	Breite Largeur	Höhe Hauteur	längs (L) longitudinal (L) longitudinal (L)	GRAD °C -45	einzel single individuelle	mittel average moyenne	einzel single individuelle
	mm 65	mm 7,50	mm 10,00	quer (Q) transversal (Q) transversal (Q)	J MIN 011	J MIN 014	J/cm² J/cm²	% %
0010 000001	585163		55	L	118			
					55			
					116	96		
0030 000001	585163		55	L	194			
					196			
					125	172		
0030 000001	585163		55	L	169			
					145			
					177	164		

REVIEWED BY
WITNESSED BY
2024.12.02
S. M. KING

PMS
WITNESSED BY
WITNESSED BY
G.A. *gault*

ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1

Kerbschlagbiegeversuch Notched bar impact test / Essai de flexion par choc (résilience) [1 CHARPY_V]

Dokument-Nr.: 65-817888/001/P

Document No.:
No. du document:

Prüf-Nr.:
Inspection No.:
No. du certificat:

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Pos. Proben-Nr.	Schmelzen-Nr.	Probenabmessung			Probenlage	Prüftemperatur	Kerbschlagarbeit		Kerbschlagzähigkeit		Verf.-Bruchanteil
Item	Specimen No.	Specimen dimensions			Specimen position	Test temperature	Absorbed energy		Impact strength		Shear fracture
Poste	No. de l'éprouv.	Dimensions de l'éprouvette			Position de l'éprouvette	Température d'essai	Energie absorbée		Résistance au choc		Rupture ductile
Anforderungen	Requirements	Länge	Breite	Höhe	längs (L)	GRAD	einzel	mittel	einzel	mittel	einzel
		Length	Width	Height	longitudinal (L)		single	average	single	average	single
Exigences		Longueur	Largeur	Hauteur	longitudinal (L)	°C	individuelle	moyenne	individuelle	moyenne	individuelle
		mm	mm	mm	quers (Q)		J	J	J/cm²	J/cm²	%
		55	10,00	10,00	transversal (Q)	-45	MIN 014	MIN 018			%
0020 000001	585528	55	10,00	10,00	L	-45	137				
			10,00	10,00			166				
			10,00	10,00			144	149			
0040 000001	585528	55	10,00	10,00	L	-45	181				
			10,00	10,00			200				
			10,00	10,00			186	189			
0050 000001	585900	55	10,00	10,00	L	-45	154				
			10,00	10,00			158				
			10,00	10,00			168	160			
<div>VERIFIED BY WITNESSED BY <input type="checkbox"/></div> <div>2024.12.02 3</div>											
Wärmebehandlung / Heat treatment / Traitement thermique											
Normalized: 900 °C											

WITNESSED BY
WITNESSED BY D
2021.12.02
S. M. KIM

Vermerk / Remark / Remarque

NACE Standard: Hardness acc. to ANSI/NACE MR0175/ISO 15156: HRC max 22., Hardness acc. to Standard MR0103 HRC max. 22.;
Certificate remarks: fully killed fine grained steel, No weld repair has been carried out; Certificate-Remark: Tubes are suitable for a hydrostatic test acc. to A/SA 999.

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

Verkäufer(in) / Sales personnel / Personne chargée : Mrs Schöneweis, Tel.: 05254 81-204234, Fax: 204289

Dinslaken, 23.06.2014, TEL.: 02064.623-5360 FAX: 02064.623-5390

Abnahmebeauftragter
Inspection representative

Contrôleur

DR. BASEL KEITA / SEMIZ

Es wird bestätigt, daß die gelieferten Erzeugnisse den techn. Lieferbedingungen des Auftrages entsprechen. Dieses Dokument wurde mittels EDV erstellt und ist ohne Unterschrift rechtsgültig.
We certify that the supplied products comply with the order specification. This document was prepared by means of electronic data processing and is valid without signature.
Nous attestons que les produits livrés sont conformes aux stipulations de la commande. Ce document a été établi par traitement électronique de l'information et est valide sans signature.

HANEDA

INSPECTION CERTIFICATE

DALIAN HANEDA STEEL TUBE CO.,LTD.

Guangfanchun Longwangtang Lushunkou District
Dalian, China

Date 2023-6-7

Cert.No. DH23005-1

Control No. DH23005

P.O.No. CNSPO-230200

Ship No.

Job. No.

Supplier: CNS TRADING

Marks

Works No.

Commodity: Seamless Cold Drawn Finished Carbon Steel Pipes Acc.to

Specification: STPG/STS/STPT 370 NO.1-2 S-O

Mfg.No.	Size		Length in mm	Quantity		Visual & Dimensions	Hydrostatic Test MPa	Bend	Flattening	Flaring	Hardness HRB	Eddy Current Test	Impact Test	Remarks	
	O.D.	W.T.		No.of Piece	Mass kg										
2300501	8A	Sch80	6000	309	1481	Good			Good		71.1/70.2	Good		Fine Heat Treatment Condition Annealed 680°C x 12min.	
Total															
Mfg. No.	Test Pieces Type	Yield Point in N/mm ² min.215	Tensile Strength in N/mm ² min.370	Elongation in % G.L.50mm min.30	Heat. No. Spec. max. 13803470-1	Standard					Chemical Composition %				Remarks
						C x100	Si x100	Mn x100	P x1000	S x1000					
2300501	No.11	328/335	435/437	41/42		25	10-35	30-90	35	35				EN10204-3.1/ISO10474-3.1 NACE MR0175/ISO15156-2(2015) NACE MR0103/ISO17945(2015) HARDNESS(HRC2 MAX):GUARANTEED	

VIEWED BY
WITNESSED BY

2021.12.03

S. M. KHA

WITNESSED BY

REVIEWED BY

Q.A.

PMS

Q.A.

VIEWED BY
WITNESSED BY
2021.12.01
S. M. KHA

PMS
Q.A.
WITNESSED BY
REVIEWED BY
J. J. J.

We hereby certify that the material described herein has been manufactured, examined and tested in accordance with the above specification and the customer's purchase specification.
Note: Yield Strength 0.2% offset method.
Note: Steel made by Basic Oxygen process.

Sub Chief of Quality Control Section

Sub Chief of Quality Control Section

CUSTOMER		신한스틸(주)		MILL TEST CERTIFICATE										DONGIL STEEL				
CERT No.		B-240718-0005		경 사 중 명 서										TEL : 82-51-322-1177~9				
LOT No.		BA2406002												FAX : 82-51-326-5555				
COMMODITY		Cold Drawn Steel												ADDR. : 46, Gaya-daero,				
		Round Bar												Sasang-Ku, Busan, Korea				
ST'L GRADE		SS400		KIND / SPEC		Chemical Composition										Mechanical properties		
SPECIFICATION				Unit		C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Y.S	T.S	E.L	R.A
SIZE		LENGTH		Q'TY		x100		x100	x1000	x1000	x100	x100	x100	x100	N/mm ²	N/mm ²	%	%
MM		M		B/D		Min		50		50								
11) 10mm		4.00		2		Max		17		22		75		14		8		

서평 등
사점

Inspection Certificate

* Jeonpyeong Works
151, Daesong-ro, Nam-gu, Pohang-si,
Gyeongsangbuk-do, 37866, Korea
Phone : 82-54-289-3554

* Jeungpyeong Works
902, Noam-ri, Doan-myeon, Jeungpyeong-gun
Chungcheongbuk-do, 368-11, Korea
Phone : 82-54-289-3554

고객명 / Customer : 신한스틸(주)
포장 / Packing : 피피마대
피막 / Coating : NONE
총량 / Total Weight : 1,974 kg



증명서 번호 / Certificate No. : 24785587	
송장 번호 / Invoice No. : D20240701-33	
발행연월일 / Date of Issue : JUL.01.2024	
계약 번호 / Order No. : 46M517	
품명 / Commodity : Cold Drawn Bars	
수량 / Quantity : 55400 CD	원형 13.000
규격 / Specification : JIS G 3101	

No.	Product No.	Diameter		Roundness mm	Length	Weight kg	Physical Properties										Remarks		
		Min.	Max.				TS kgf/mm ²	YS	EL %	RA	Hardness HRB	Spheroidized %	DM-F mm	DM-T	Macro Structure	Straightness mm/m			Appearance (MT)
			13.000		6,040.0										0.50		Max.		
		12.957			6,000.0														
1	46M5170100	12.970	12.980	0.010	6,030.0	1,974					86.4				0.30	good	Min.		

No.	Heat No.	Lot No.	Chemical Composition(%)																			Remarks
			C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Sol-Al	Ti	Nb	Pb	Bi	B	O	N ₂	V		
				X 100		X 1,000					X 100						X 10,000		X 100			
							50	50														
							50															

상기 강제는 규정의 시험을 행하여 합격하였음을 증명합니다.
This is to certify that the commodity mentioned hereunder has been duly inspected by
our inspection department and up to the purchasers requirements.

K. H. Jang

Manager of Quality Assurance Team

HYUNDAI SPECIAL STEEL COMPANY

25

Customer	(주)센텀 머티리얼				Certificate No.	20241102319		Date	2024/11/19
P.O No.	240903-020 (240829-004)				Project Name				
Job No.									
Specification for Material	ASME SA234 WPB (SECT. II2023 Ed.)				Starting Material	SEAMLESS PIPE			
Specification for Inspection	ASME B16.9-2018				Dimension and Visual Inspection			GOOD	
Heat Code No [HCN]	No.	Descriptions				Q'ty (Pcs)	Heat Treatment		
EW740	0001	90° ELBOW LONG	SCH80	B.W	3"	4	HOT FORMED 621℃~945℃, AC		

CHEMICAL COMPOSITION(%)

Heat Code No [HCN]	Spec.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Raw Heat No/Raw Maker
	Max.	0.30	-	1.06	0.050	0.058	0.40	0.40	0.15	0.40	0.08	
	Min.	-	0.10	0.29	-	-	-	-	-	-	-	
EW740	L	0.18	0.18	0.71	0.016	0.007	0.02	0.05	0.01	0.02	0.000	J1KA370/NIPPON STEEL

MECHANICAL PROPERTIES

Heat Code No [HCN]	Spec	Y.S	T.S	E.L	Hardness Test		
		ksi		(%)	HBW		
	Max.	-	-	-	197		
	Min.	35	60	29.4	-		
EW740	P	45.1	67.2	49.7	127	129	131



We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order. Any forgery or falsification of this certificate will be subjected to the full extent of the criminal prosecution. Please contact us by the below Fax or E-mail if you have any inquiries on this certificate.

Fax: +82 831 6886 / E-mail: tkqac@tkbend.co.kr

Remark:



Legend:
HB: Brinell
ST: Solution Treatment
SR: Stress Relieving

N: Normalized
T: Tempered
A: Annealed
Q: Quenched
YS: 0.2% Offset Method
(G): Hot-Dip Galvanized Coating
(P): Polyethylene Coating

AC: Air Cool
OC: Oil Cool
WQ: Water Quenched
WC: Water Cool
B: Base
W: Weld
H: Haz
L: Ladle
P: Product

Reviewed by:

Witnessed by:

Approved by:

W. S. Kim
Head of Quality Control Dept

Customer	(주)센텀 머티리얼					Certificate No.	20241102320	Date	2024/11/19
P.O No.	240903-020 (240829-004)					Project Name			
Job No.									
Specification for Material	ASME SA420 WPL6 (SECT. II2023 Ed.)					Starting Material	SEAMLESS PIPE		
Specification for Inspection	ASME B16.9-2018					Dimension and Visual Inspection		GOOD	
Heat Code No [HCN]	No.	Descriptions				Q'ty (Pcs)	Heat Treatment		
HD697	0002	90° ELBOW LONG	SCH160	B.W	2"	10	N: 910℃		
HA584	0003	90° ELBOW LONG	SCH120	B.W	4"	2	N: 910℃		

CHEMICAL COMPOSITION(%)

Heat Code No [HCN]	Spec.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	Raw Heat No/Raw Maker
	Max.	0.30	0.40	1.35	0.035	0.040	0.40	0.30	0.12	0.40	0.08	0.02	
	Min.	-	0.15	0.50	-	-	-	-	-	-	-	-	
HD697	L	0.11	0.27	1.23	0.009	0.001	0.02	0.13	0.01	0.02	0.00	0.000	J3L4226/NIPPON STEEL
HA584	L	0.11	0.29	1.30	0.010	0.001	0.02	0.12	0.02	0.02	0.00	0.000	J2LA417/NIPPON STEEL

MECHANICAL PROPERTIES

Heat Code No [HCN]	Spec	Y.S	T.S	E.L	* Impact Test(J)			
		ksi		(%)	Temp.(℃)	Size(2mm-v)		
		Max.	95	-	-46			
	Min.	35	60	30	Act.	Ave.		
HD697	P	42.1	66.7	41.6	267.3	279.4	286.2	277.6
HA584	P	44.6	66.3	47.2	353.9	232.9	347.6	311.5

REVIEWED BY
WITNESSED BY
2024.11.02
S. M. Kim

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order. Any forgery or falsification of this certificate will be subjected to the full extent of the criminal prosecution. Please contact us by the below Fax or E-mail if you have any inquiries on this certificate.

Fax: +82 831 6886 / E-mail: tkqaqc@tkbend.co.kr

Remark:

	Size	Min	Ave
HA584	10X10X55mm	14.0	18.0
HD697	10X7.5X55mm	11.0	14.0

Legend:
HB: Brinell
ST: Solution Treatment
SR: Stress Relieving

N: Normalized
T: Tempered
A: Annealed
Q: Quenched
YS: 0.2% Offset Method
(G): Hot-Dip Galvanized Coating
(P): Poly Ethylene Coating

AC: Air Cool
OC: Oil Cool
WQ: Water Quenched
WC: Water Cool
B: Base
W: Weld
H: Haz
L: Ladle
P: Product



Reviewed by:
Witnessed by:

Approved by:

W. S. Kim
Head of Quality Control Dept

INSPECTION CERTIFICATE

(EN 10204 3.1 / ISO 10474 3.1)

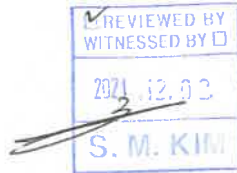
Customer	(주)샘담머티리얼		Certificate No.	20241000134	Date	2024/10/22
P.O No.	241021-002		Project Name			
Job No.			Starting Material	FORGED STEEL		
Specification for Material	ASME SA105 (SECT. II 2017 Ed.)		Dimension and Visual Inspection	GOOD		
Heat Code No [HCN]	No.	Descriptions			Q'ty (Pcs)	Heat Treatment
S45589	0001	H/COUPLING 3000# NPT 1/4"			10	N: 900℃ 2.5Hrs
						Specification for Inspection
						ASME B16.11

CHEMICAL COMPOSITION (%)

Heat Code No [HCN]	Spec.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	C.E	Raw Maker
S45589	Max.	.35	.35	1.05	.035	.04	.4	.3	.12	.4	.08	.47	
	Min.	-	.1	.6	-	-	-	-	-	-	-	-	
	L	.178	.212	.935	.0083	.0053	.064	.128	.018	.067	.001	.37	SeAH css

MECHANICAL PROPERTIES

Heat Code No [HCN]	Spec	Y.S		T.S	E.L	RA	Hardness Test		* Impact Test(J)		
		Ksi			(%)	(%)	HBW		Temp	Notch	
		Max.	Min.				187		Min	Avg	
S45589	P	41.3	71.8	33	69	139	139		Act	Ave	



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

Remark:

Legend:
HB: Brinell
ST: Solution Treatment
SR: Stress Relieving
N: Normalized
T: Tempered
A: Annealed
Q: Quenched
Y: S: 0.2% Offset Method
(G): Hot-Dip Galvanized Coating
AC: Air Cool
OC: Oil Cool
WQ: Water Quenched
WC: Water Cool
B: Base
W: Weld
H: Haz
L: Ladle
P: Product

☐ Reviewed by:

☐ Witnessed by:

Approved by:

G. M. Park

S&AH CSS

S&AH Changwon Integrated Special Steel
147 Jeokhyeon-ro, Seongsan, Changwon, Gyeongnam, Korea

INSPECTION CERTIFICATE

Date : 2021-09-29
Cert. No. : 210929-2133
Made in Korea
Method used passed in the Republic of Korea

Steel Grade : A105

Heat No. : S45589

Size : DIAMETER 27 MM

Commodity : ROUND BARS

Specification(Ed/Add) : ASTM A105 (09)

Melting Process : E.A.F. - L.F. & V.D. - STRAND CASTING

Delivery Condition : NORMALIZING

BLACK SURFACE

Customer : ACE METAL CO., LTD

Supplier : S&AH Changwon Integrated Special Steel

Purchase order No. :

Chemical Composition (wt. %)

Inspection Items	Chemical Composition (wt. %)											Nonmetallic Inclusion (ASTM E45)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	O	22	04	14	(Method A)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Tensile Test (N/mm²)

Inspection Items	Tensile Test (N/mm ²)		Hardness (HB)		Impact Test		Decarburized Layer		Grain Size		Micro Structure		Ultrasonic Test	
	YS 0.2%	TS	EL (%)	RA (%)	Type		DM-T	DM-F						
Spec.	Min. 285.0	495.0	33.0	69.0										
	Max. 9900-1													
9900-2														

GOOD

<<Remark>> EN 10204 Type 3.1 / NO REPAIR WELDING. FREE FROM MERCURY CONTAMINATION.

04: N+P+CR+MO+V+CU, 14: CR+MO, 22: CE-(C+H+NM+O)+((CR+MO+V)+S+H+(CU+NI+V)+S)

NORMALIZED: 900°C X 2.5HRS X FAN COOL

FULLY KILLED STEEL, FINE GRAIN

NACE MR-0103, MR-0175/ISO15156

CERT TO : ASME SA105/CHEMICAL COMPOSITION ONLY

609-86-10503

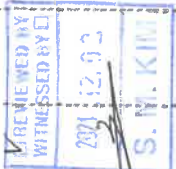
(주)에이스메탈 조운채

경남 창원시 진해구 남영로50번길 6(남영동)

제조업 외 철강 외

부적격률 99.93

원본대조필



TOTAL 65 1,750 3,858

We hereby certify that the material described herein has been made in accordance with the rules of the contract.

Our quality system is certified in accordance with ISO 9001:2015 by DNV.

※ 본 품질보증서에 명기된 규격용도의 사용시 안전성 문제가 발생될 수 있으며, 품질보증서 위, 변조시 시문서 위조(제법 231조)로 불이익을 당할 수 있습니다.

※ 세아강철 특수강 홈페이지 (www.seahss.co.kr)에서 품질보증서 원본을 확인할 수 있습니다.

중량: 1,750 kg
일자: 2021-09-30

Certified by

S. H. K

Manager of Quality Assurance Team

INSPECTION CERTIFICATE (DIMENSION)

EDTK corporation

117-12, Noksansaneop-daero, Gangseo-gu, Busan, 46752 Korea

Tel : 82-51-970-6672 Fax : 82-51-831-6886

DATE : 2024/11/19

P.O. No : 240903-020 (240829-004)

CUSTOMER : (주)센텀 머티리얼

PROJECT :

SPEC : ASME B16.9-2018

MAT'L : SA234 WPB

Q'TY : 4 EA

PRODUCT/SIZE :

0001 90° ELBOW LONG

S80

B.W

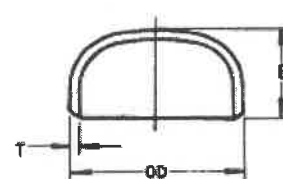
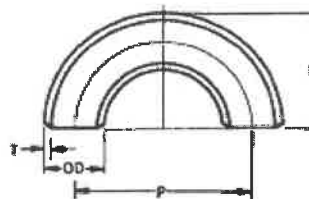
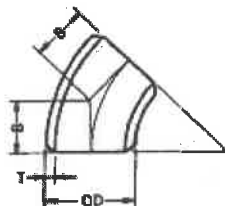
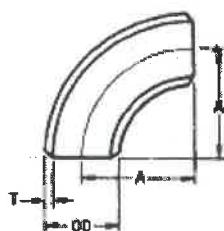
3"

☒ 90° ELBOW

☐ 45° ELBOW

☐ 180° ELBOW

☐ CAP

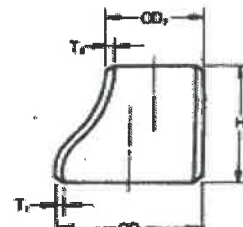
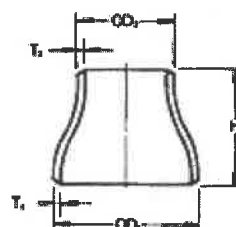
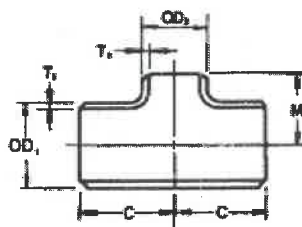
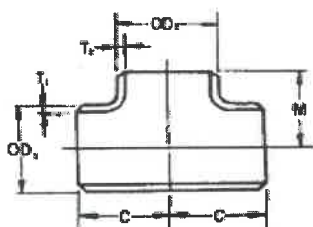


☐ STR. TEE

☐ RED. TEE

☐ CON. REDUCER

☐ ECC. REDUCER



CHECK POINT		OD	T	A				
DIMENSION STD.		88.9	7.62	114.0				
TOLER- ANCES	Max	+1.6	-	+2.0	<div>VIEWED BY WITNESSED BY 2024.12.02 S. M. KIM</div>			
	Min	-1.6	-12.5%	-2.0				
1	89.3	7.9	114.3					
2	88.6	8.1	113.8					
3	89.9	7.9	114.6					
4	89.1	8.2	114.1					
===== BLANK =====								

REMARKS :

(UNIT:mm)

APPROVED :

C. B. Lim

WITNESSED :

INSPECTED :

J. M. Ahn

INSPECTION CERTIFICATE (DIMENSION)

EDTK corporation

117-12, Noksansaneop-daero, Gangseo-gu, Busan, 46752 Korea

Tel : 82-51-970-6672 Fax : 82-51-831-6886

DATE : 2024/11/19

P.O. No : 240903-020 (240829-004)

CUSTOMER : (주)센텀 머티리얼

PROJECT :

SPEC : ASME B16.9-2018

MAT'L : SA420 WPL6

Q'TY : 10 EA

PRODUCT/SIZE :

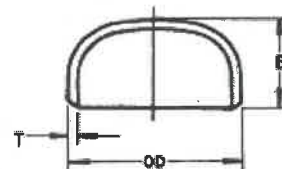
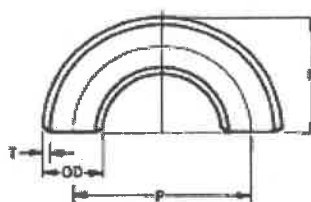
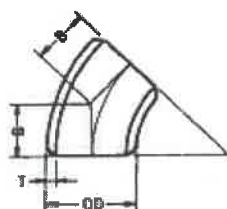
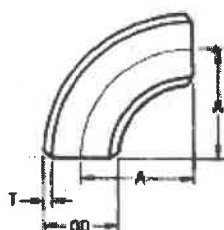
0002 90° ELBOW LONG S160 B.W 2"

☒ 90° ELBOW

☐ 45° ELBOW

☐ 180° ELBOW

☐ CAP

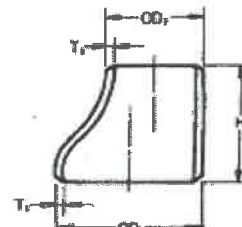
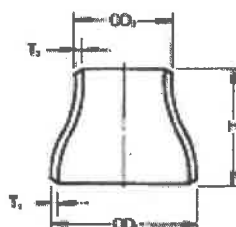
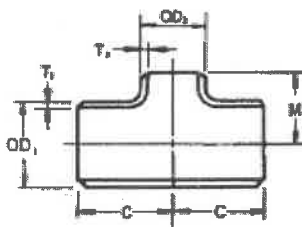
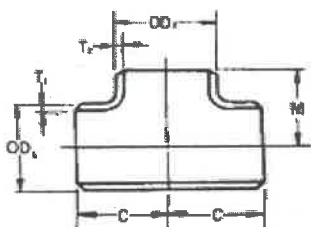


☐ STR. TEE

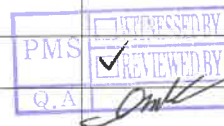
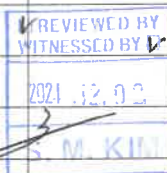
☐ RED. TEE

☐ CON. REDUCER

☐ ECC. REDUCER



CHECK POINT		OD	T	A				
DIMENSION STD.		60.3	8.74	76.0				
TOLERANCES	Max	+1.6	-	+2.0				
	Min	-0.8	-12.5%	-2.0				
1		60.6	9.1	76.4				
2		60.1	9.3	76.1				
3		59.8	9.1	75.8				
4		60.3	9.4	76.2				
5 - 10		APPLIED IN THE TOLERANCE OF STD. DIMENSIONS.						



REMARKS :

(UNIT:mm)

APPROVED :

C. B. Lim

WITNESSED :

INSPECTED :

I. M. Ahn

INSPECTION CERTIFICATE (DIMENSION)

EDTK corporation

117-12, Noksansaneop-daero, Gangseo-gu, Busan, 46752 Korea
Tel : 82-51-970-6672 Fax : 82-51-831-6886

DATE : 2024/11/19
P.O. No : 240903-020 (240829-004)
CUSTOMER : (주)센텀 머티리얼
PROJECT :

SPEC : ASME B16.9-2018

MAT'L : SA420 WPL6

Q'TY : 2 EA

PRODUCT/SIZE :

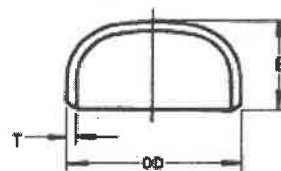
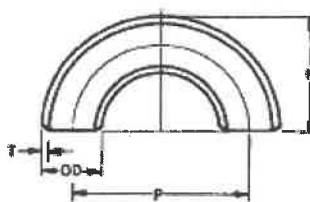
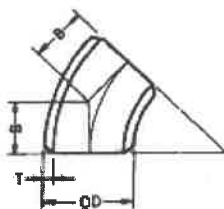
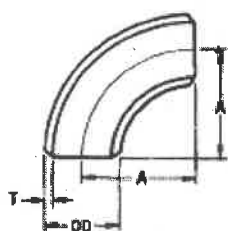
0003 90° ELBOW LONG S120 B.W 4"

☒ 90° ELBOW

☐ 45° ELBOW

☐ 180° ELBOW

☐ CAP

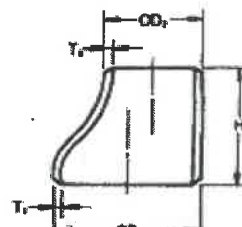
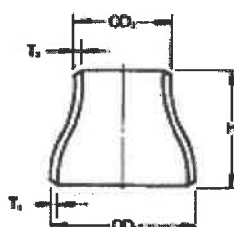
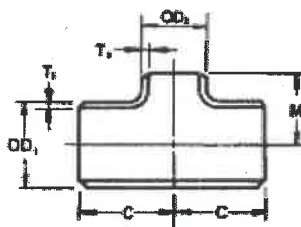
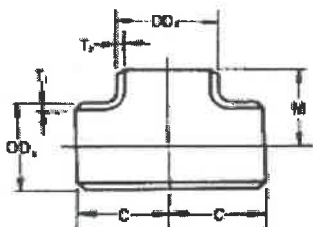


☐ STR. TEE

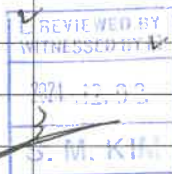
☐ RED. TEE

☐ CON. REDUCER

☐ ECC. REDUCER



CHECK POINT		OD	T	A				
DIMENSION STD.		114.3	11.13	152.0				
TOLERANCES	Max	+1.6	-	+2.0				
	Min	-1.6	-12.5%	-2.0				
1		114.7	11.3	152.6				
2		114.1	11.5	152.2				
3		===== BLANK =====						
4								



REMARKS :

(UNIT:mm)

APPROVED :

C. B. Lim

WITNESSED :

INSPECTED :

J. M. Ahn

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 ± 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 (QECl - 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

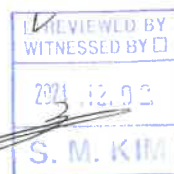
■ Inside/Outside Caliper(Digital type) Calibration

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