

## MATERIAL TEST & INSPECTION CERTIFICATE



**SUNGKWANG BEND CO., LTD.(SKB)**

26, Noksansandan 282-ro, Gangseo-Gu, Busan, Korea  
 TEL : 82-051-3300-450  
 FAX : 82-051-3300-335  
 http://www.skband.com

**CUSTOMER: FORGINGS FLANGES & FITTINGS INC.**  
**PROJECT NAME: N/A**

According to

**DIN 50049 3.1 / EN 10204 3.1 / ISO 10474 3.1**

PURCHASE ORDER NO.	204395	SPEC. FOR MATERIAL	ASTM/ASME A/SA234WPB-S 1313ED	CERTIFICATE NO.	QCLB2015031246
PJT NO.	N/A	SPEC. FOR INSPECTION	ASME B16.9	DATE OF ISSUE	2015.03.09
STARTING MATERIAL	SEAMLESS PIPE	SKB NO.	2014102103	VISUAL & DIMENSION	SATISFACTORY

NO.	SEQ/LINE/ITEM NO	DESCRIPTION	QTY	HEAT NO.	MPG ID NO.	POR/CODE/TAG NO
137		CON REDUCER S80*880 18*10" B.W SMLS Black	11	340090	340090	

**CHEMICAL COMPOSITION(%) (L: LADLE, P: PRODUCT)**

HEAT NO.	STD.	SPEC.	CHEMICAL COMPOSITION(%)																	TENSILE TEST					
			C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	N	Al	B	Zr	Fe	Ti	C.E	SPEC.	Y.S 0.2% offset	T.S	EL.	RA
			MIN	0.10	0.29																	MIN	KSI	KSI	%
340090		MAX	0.30		1.05	0.050	0.008	0.40	0.40	0.15	0.40	0.08								MAX	35.0	60.0	22.0		
	L		0.18	0.22	0.91	0.008	0.003	0.04	0.06	0.01	0.11	<0.01								44.2	67.3	40.0			
	P																								
	L																								

HEAT NO.	TEST TEMP.	SIZE OF SPECIMEN(mm)	ABSORBED ENERGY				LATERAL EXPANSION				PERCENT SHEAR				HARDNESS HB			HEAT TREATMENT	NORMALIZED. 900°C, 3hr, "Air"			
			STD. I		AVE.		STD. I		AVE.		STD. I		AVE.		MIN	197			PMI	N/A	N.D.E	N/A
			VALUE	AVE.	VALUE	AVE.	VALUE	AVE.	MAX	131	128											
340090			B/M												HB	131	128	FLATTENING TEST	N/A	**MEMO		
			H.A.Z															BENDING TEST	N/A			
			W/M															HYDROSTATIC TEST	N/A			
			B/M															CORROSION TEST	N/A			
			H.A.Z															GRAIN SIZE TEST	N/A			
			W/M															HIC TEST	N/A			

MATERIAL MEETS THE REQUIREMENTS OF NACE MR0175-2009 & 0103-2012  
 PED 97/23/EC / MATERIAL ALL MANUFACTURED IN KOREA.  
 FREE OF MURCURY & FREE OF RADIATION

WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION AND THE RESULTS OF ALL EXAMINATION ARE ACCEPTABLE.

REVIEWED BY :  
 WITNESSED BY :

*[Signature]*  
**CHIEF QUALITY OFFICER**

SKE-8903

\* 본 검사증명서에 없기된 규격용의 사용시 안전상 문제가 발생할 수 있으며, 검사증명서 위 변조시 사문서 위조(형법231조)로 불이익을 당하실 수 있습니다.

50861

# MATERIAL TEST & INSPECTION CERTIFICATE


**SUNGKWANG BEND CO., LTD.(SKB)**

26, Noksansandan 262-ro, Gangseo-Gu, Busan, Korea  
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 FAX : 82-051-3300-335  
 http://www.skbend.com

**CUSTOMER:** FORGINGS FLANGES & FITTINGS INC.  
**PROJECT NAME:** N/A

According to

**DIN 50049 3.1 / EN 10204 3.1 / ISO 10474 3.1**

<b>PURCHASE ORDER NO.</b>	173892	<b>SPEC. FOR MATERIAL</b>	ASTM/ASME A/SA234WPB-W 07/07ED	<b>CERTIFICATE NO.</b>	QLH2013012147
<b>PJT NO.</b>	N/A	<b>SPEC. FOR INSPECTION</b>	ASME B16.9	<b>DATE OF ISSUE</b>	2013.01.29
<b>STARTING MATERIAL</b>	SEAMLESS PIPE	<b>SKB NO.</b>	2012121401	<b>VISUAL &amp; DIMENSION</b>	SATISFACTORY

NO.	SEQ/LINE/ITEM NO	DESCRIPTION					QTY	HEAT NO.	MFG ID NO.	POR/CODE/TAG NO
287		STRAIGHT TEE	S80	20'	B.W WELD	Black	4	2-67475	2-67475	

CHEMICAL COMPOSITION(%) (L : LADLE, P : PRODUCT)																	TENSILE TEST(Gauge Length :5D)								
HEAT NO.	STD.	SPEC.	C	SI	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	N	Al	B	Zr	Fe	Ti	CE	SPEC.	Y.S 0.2% offset	T.S	EL.	R.A
	MIN		0.35	0.10	0.29																MIN	KSI	KSI	%	%
	MAX		0.35		1.06	0.050	0.058	0.40	0.40	0.15	0.40	0.08									MAX	35.0	60.0	22.0	
2-67475	L		0.24	0.25	1.17	0.013	0.009	0.01	0.17	<0.01	0.01	0.001										38.6	77.5	38.0	
	P																								
	L																								
	P																								

IMPACT TEST HEAT NO.	TEST TEMP.	SIZE OF SPECIMEN(mm)	ABSORBED ENERGY STD. /		LATERAL EXPANSION STD. /		PERCENT SHEAR STD. /		HARDNESS HB		HEAT TREATMENT	NORMALIZED. 900 °C, 2Hrs., "Air"					
			VALUE	AVE.	VALUE	AVE.	VALUE	AVE.	MIN	197		PMI	N/A	N.D.E	R.T.M.T:GOOD		
			B/M	H.A.Z	W/M	B/M	H.A.Z	W/M	HB	148		FLATTENING TEST	N/A	**MEMO  Mn is Permitted up to 1.35% in A/SA234 Table 1			
2-67475		B/M										FLATTENING TEST	N/A			**MEMO  Mn is Permitted up to 1.35% in A/SA234 Table 1	
		H.A.Z										BENDING TEST	N/A				
		W/M											HYDROSTATIC TEST				
		B/M											CORROSION TEST	N/A			
		H.A.Z											GRAIN SIZE TEST	N/A			
		W/M											HIC TEST	N/A			

MATERIAL MEETS THE REQUIREMENTS OF NACE MR0175 & 0103/ISO15156  
 PED 97/23/EC / MATERIAL ALL MANUFACTURED IN KOREA.  
 FREE OF MERCURY & FREE OF RADIATION

WE CERTIFY THIS MATERIAL HAS BEEN MANUFACTURED AND EXAMINED IN ACCORDANCE WITH ALL  
 REQUIREMENTS OF THE SPECIFICATION AND THE RESULTS OF ALL EXAMINATION ARE ACCEPTABLE.

REVIEWED BY  
 WITNESSED BY : \_\_\_\_\_

*[Signature]*  
 QM DIV. SENIOR MANAGING DIRECTOR