

Travel Sheet

Authorized Inspector to be given travel sheet prior to construction so that he can indicate hold points and Inspection Points.

"A"-Hold Point, "I"- Inspection Point, "R"-Revision, "W"- Witness Point

Hold Points established - Sign & Date _____

(Authorized Inspector)

Vessel Serial # 12052 to 12074

Vessel Serial # 12055		DWG # V85-05	(A) #
Vessel Title: 8" Fuel Gas Scrubber		CRN # F6388.231	
ITEM	COMMENTS	AUTH Insp., Hold Rev., Witness POINTS	DATE FUNCTION COMPLETE & INSPECTORS INITIALS
			QC INSPECTOR
APPROVED DRAWING			March 7, 2011 <i>Q</i>
CALCULATIONS ON FILE			March 7, 2011 <i>Q</i>
MATERIAL CHECKED AGAINST DRAWING, MATERIAL LIST			March 7, 2011 <i>Q</i>
MTR'S CHECKED			March 7, 2011 <i>Q</i>
VESSEL LAYOUT			March 8, 2011 <i>Q</i>
NOZZLES	ORIENTATION		March 8, 2011 <i>Q</i>
& FITTINGS	RATINGS		March 8, 2011 <i>Q</i>
FIT	NOZZLES & FITTINGS		March 9, 2011 <i>Q</i>
UP	SHELL & HEAD		March 14, 2011 <i>Q</i>
INTERNALS (tray, baffles, etc)			March 10, 2011 <i>Q</i>
INTERNAL INSPECTION			March 10, 2011 <i>Q</i>
WELD SIZES			March 15, 2011 <i>Q</i>
WELDERS I.D.			March 15, 2011 <i>Q</i>
EXTERNAL AFTER COMPLETION OF ALL WELDING			March 16, 2011 <i>Q</i>
RADIOGRAPHS			
OTHER N.D.E.			
IMPACT TESTS			
POST WELD HEAT TREATMENT	YES: <i>Q</i> NO: <i>Q</i>		
EXTERNAL BEFORE PWHT			
PWHT CHART CHECKED			
NAMEPLATE			March 17, 2011 <i>Q</i>
HYDROSTATIC TEST			APR 02 2011 <i>Q</i>
DATA REPORT			APR 02 2011 <i>Q</i>
NONCONFORMANCES			

		SPECIFICATIONS	HEAT NUMBER	VERIFIED THICKNESS
SHELL	C1	SA-106-B	08204768	8.1mm
	C2			
HEADS	1	SA-234-WPB	09K30112	7.16mm
	2	SA-516-70	SB96741 - PB46803303	19.05mm
	3			
REPADS	1			
	2			
	3			
	4			
		SPECIFICATIONS	SIZE	SCHEDULE
NOZZLES				
FITTINGS		SA-105	1", 2"	#3000 cplg.
TUBES				

Purchaser: NATIONAL OILWELL VARCO

INSPECTION CERTIFICATE

TO EN10204 3.1



Thai Benkan Co., Ltd.
58 Soi Watkrutai, Bangken, Prapadung,
Samutprakan, 10130 Thailand

D M Y Certificate No.

23/12/2008 T-2009140813

E-No. MB-779 Purchase Order No. Job No.

EO6288NO/BKT

No.	MFG. No. (Heat Identification No.)	Specification for Material Made from Seamless Pipe ASTM A334-07/ASME SA334-07 Gr. WPB CSA Z345.11-05 Gr.241 CAT 1SS NACE MR0175ISO 15182-2:2003		Specification for Inspection 810 9-2007		Visual Examination Good	Dimensional Inspection									
		Product & Size (11/1)		Quantity	Heat Treatment (Note 1)											
1	09M30109	C WPB 8 S40		32/75	N	HB : 120 - 150	Good									
2	09K30118	C WPB 4 S40		100	N	HB : 128 - 135										
3	09D30010	C WPB 8 S40		13/75	*N	HB : 120 - 150										
4	09H30002	C WPB 8 S40		19/75	*N	HB : 120 - 150										
5	09K30112	C WPB 8 S40		11/75	N	HB : 120 - 150										
Specification		Chemical Composition %										Tension Test %		HARDNESS MAX 197 HB : GOOD Raw Material Supplier		
		C	Si	Mn	P	S	Cr	Ni	Mo	V	Nb	C.E.	YS		TS	E
Min.		x 100	x 100	x 100	x 1000	x 1000	x 100	x 100	x 100	x 1000	x 1000	x 100	MPa		%	
Max.			10	29									240	415	30	
Material Heat No.																
1	J8KA080	18	19	77	13	6	2	2	7	3	0	0	339	481	47	Sumitomo Metal Industries Ltd. Siderca S.A.I.C. Dongkies Steel Mill Co. Ltd. PFI Plate Mill Public Co. Ltd. Sumitomo Metal Industries Ltd.
2	58016	20	17	62	10	1	5	3	4	2	1	32	332	495	38	
3	H3073328	26	32	109	16	6	1	1	2	0.2	17	39	300	498	41	
4	07	13	30	101	18	5	3	1	2	3.8	1	0	298	481	39	
5	J9K1208	19	22	84	18	6	1	2	4	1	0	34	313	488	44	

(Note 1) A: Has formed with final temperature between 620 °C-980°C. Air Cooling N: Normalizing 910°Cx0.5 HR. Air Cooling *N: Normalizing 910°Cx0.5 HR. Air Cooling (Specification for material made from plate) S: Stress Relieving 675°Cx0.5 HR. Air Cooling

The fittings were manufactured, sampled, tested and inspected in accordance with the specification and was found to meet the requirements.

C.E. = C+Mn/6+(C+Mn+V)/5+(Ni+Cu)/15

MAGNETIC PARTICLE EXAMINATION FOR THE ONLY:

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned

and also with the purchaser's requirements and that the test results shown herein are correct.

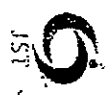
* 1: "T" symbolized wall thickness in mm. * 2: YS Yield strength TS = Tensile strength E = Elongation

109639 Quality Assurance Manager
Thai Benkan Co., Ltd.

RECEIVED
DEC 11 2008

8" STD Pipe.

D08-2-8014
08204768



江阴市无缝钢管总厂
JIANGYIN CITY SEAMLESS STEEL TUBE FACTORY

产品质量证明书 (EN10204.3.1)
MILL TEST CERTIFICATE

江苏省江阴市夏港镇建设路375号
No. 375, Zhencheng Rd, Jiangyin Town, Jiangyin City
Jiangsu Province, China (214442) <http://www.jysteel.com>
Tel: 86-510-86180723 Fax: 86-510-86180732

总件数 Total Pieces		111	总重量 Total Weight		55.1071	日期 Date		2008年10月23日	合同编号 Contract No.		许可证号 License No.		0503
产品名称 Product		CARBON STEEL SEAMLESS PIPE		技术标准 Spec		ASTM A106-03B/ASME SA106-03A/EN 10216-2		交货状态 Delivery Status		HOT-ROLLING			
规格 Size (D, W, T, L, mm)		NPS 8" x 0.3226 (10)		钢级 Grade		B		牌号 Steel Type					
序号 NO.	Heat No	批号 Batch No	件数 Pcs	支数 PCS	重量 (t) WT	尺寸 Dimension (mm)	拉伸长度 Gauge Length (mm)	屈服强度 Y.S. (PSI)	伸长率 E.L. (%)	抗拉强度 T.S. (PSI)	冲击试验 Impact Test		硬度试验 Hardness Value
											纵向冲击 AK	横向冲击 AK	
1	08204768	Y20808-716	37	185	50.357	*1-A2	50	46910/45685	36.55	71790/71065			20.5
2	D08-2-8012	Y10808-192	36	180	48.996	*1-A2	50	47135/44235	39.31	73965/69615			19
3	D08-2-8014	Y10808-188	38	190	51.718	*1-A2	50	47135/46410	33.31	73965/73240			19.5
4													
化学成分 Chemical Composition													
序号 NO.	类别 Type	Si	Mn	P	S	Cr	Ni	Cu	Mo	V	CE	Mn/C	Cr+Cu+Mo+Ni+V
1	R	0.20	0.21	0.009	0.032	0.14	0.07	0.01	0.04	0.28	5.11		0.06
2	R	0.20	0.24	0.013	0.008	0.020	0.10	0.020	0.01	0.04	0.30	2.90	0.06
3	R	0.180	0.230	0.014	0.010	0.020	0.10	0.020	0.01	0.04	0.28	3.06	0.06
4	R												
物理性能 Physical Properties													
屈服强度 Yielding		抗拉强度 Tearing		冲击功 U.T.		夏比冲击 E.T.		洛氏硬度 M.H.R.		维氏硬度 L.M.T.		延伸率 N.D.	
OK		OK		OK		OK		OK		OK		OK	
金相分析 Metallogical Analysis													
序号 NO.		类别 Type		晶粒度 Grain size		夹杂物 Inclusion		带状组织 Banding		显微组织 Microstructure		硬度试验 Hardness Value	
1		R		A		B		C		D		B.S	
2		R		A		B		C		D		B.S	
3		R		A		B		C		D		B.S	
4		R		A		B		C		D		B.S	
备注 Remark													
1. NO WELD REPAIRS WERE PERFORMED. 2. PIPES ARE FREE OF DEFECTS AND SLUDGE. 3. CTE-Cu+Mo+Ni+V+5%Ni+Cu/15. 4. API 5L, Gr. B - 3rd Edition ASTM A574-04 ASME SA533B 2004 Edition ASTM A106-03B ASME SA106 2004 Edition NACE MR0175-2002. 5. CAN THEORETICAL WEIGHT BASIS.													

质量管理部门负责人:
Quality Manager:

审核人:
Auditor:

制证人:
Certification-maker:



edmonton exchanger
& manufacturing ltd.



CERTIFICATE OF COMPLIANCE

5545-89 Street Edmonton, Alberta Canada T6E 5W9

www.edmontonexchanger.com

tel 780.468.6722 • QC fax 780.466.4668 • sales fax 780.466.5155

Customer RJV GASFIELD LTD.

PO 2660

Work Order C87535 Date 2010/12/17 CofC# 21303

Page 1 of 1

Item#	Description	Qty	Heat#	Tag Code
P87535-1	DISC(S) - 0.7500" NOM X 12" OD (Material Spec: SA 516-70 Normalized)	8	SB56276-PB25630503	A
		6	292924-99513	B
		6	SB78542-PB90712703	C
		8	78902-16760	D
		22	SB96741-PB46803303	E

Material being supplied conforms to the latest ASME Code Section II, Part A, 2007 Edition, Addenda July 1, 2009. All welders and procedures are qualified to ASME Code Section IX.

Supplementary Examination - Items

JAN 04 2011



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		A09 Advice of dispatch No./ Date of dispatch 214210-28.05.06	A08 Manufacturer's order/ A03 Certificate No. 306374-004	Sheet 1/...
A05 Established inspecting body DH		A01 Product HOT ROLLED PLATES		
A06 Purchaser Final receiver		A07.1 No. 60115 A07.2 No. E10372-J1010-LG SA20-S5		
B02/ Steel grade SA516-70				
B03 Specifications ASME-2A:04 DIL-HUE2:REV.19-03.10.05				



12880

B01-B99 Product description

B09 Item No.	B10 Quantity	B11 Thickness	B12 Width	B13 Length	B14 Mass theoretical KG	B04 Delivery condition	B08 Heat No.	B07 Rolled plate No./ Test No.	B16 Customer reference
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78902	16750-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78902	16760-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78902	16761-01	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78902	16761-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78902	16761-03	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000 x	5580	N	78903	16744-02	ITEM 1
**	6				33480				
02	1	1,0000 x	96,50000 x	480,00000 x	5959	N	78901	16769-02	ITEM 2
02	1	1,0000 x	96,50000 x	480,00000 x	5959	N	78901	16775-01	ITEM 2
**	2				11918				
***	8				45398				

B04 Delivery condition / Heat treatment of plates

ITEM NO.: 01-02

N: HT: 1670 GR.F +36 -27 GR.F

SOAKING TIME TO ACHIEVE THE TARGET TEMPERATURE OVER THE WHOLE SECTION: 1-1,75 MIN/MM (25-45 MIN/INCH)
COOLING IN STILL AIR

B06 Marking

ITEM NO.: 01-02

STEEL GRADE SA516 70 MTLFV SA516 60 MTLFV

HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

A04



QM-System: Certification as per ISO 9001

Z01/202 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

3. Müller



AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

Trademark

B. MUELLER
Test House Manager

Inspector's stamp

Date 29.05.06

PP 1



DILLINGER HÜTTE

Erklärungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004		A09 Advice of dispatch No./ Date of dispatch	A03/ Manufacturer's order/ A03 Certificate No.	Sheet
INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		214210-28.05.06	306374-004	2/...
MATERIAL TEST REPORT (MTR)			B01 Product	
A05 Established inspecting body		HOT ROLLED PLATES		
DH	A06 Purchaser			
	Final receiver			
B02/ Steel grade	ARCELOR CANADA, BURLI			
B03 Specifications	EDMONTON STEEL, EDMON			
	SA20-S5			
	SA516-70			
	ASME-2A:04			
	DIL-HUE2:REV.19-03.10.05			

C10-C29 Tensile test

B09 Item No.	B08 Heat No.	B07 Roll plate/ Test No.	B05 Reference condition	C01	C02/ C01	C03 Temp. GR.F	C04	C10	C11	KSI RP02	C12	C13	A % L0=6IN	C14-C15
01	78902	16750		K1 Q		RT	HBW	10/3000			74,1		29,9	
01	78902	16760		K1 Q		RT	HBW	10/3000			74,4		29,4	
01	78902	16761		K1 Q		RT	HBW	10/3000			74,2		29,4	
01	78903	16744		K1 Q		RT	HBW	10/3000			73,4		30,9	
02	78901	16769		K1 Q		RT	HBW	10/3000			74,5		29,9	
02	78901	16775		K1 Q		RT	HBW	10/3000			74,8		30,9	

C30-C39 Hardness test

B09 Item No.	B08 Heat No.	B07 Roll plate/ Test No.	B05 Reference condition	C01	C02/ C01	C03 Temp. GR.F	C33 Testing method	C35 Individual values	C32 Average value
01	78902	16750		K1	O	RT	HBW 10/3000	HB 142	143
01	78902	16760		K1	O	RT	HBW 10/3000	HB 144	144
01	78902	16761		K1	O	RT	HBW 10/3000	HB 142	142
01	78903	16744		K1	O	RT	HBW 10/3000	HB 143	143
02	78901	16769		K1	O	RT	HBW 10/3000	HB 144	144
02	78901	16775		K1	O	RT	HBW 10/3000	HB 144	146

C40-C49 Impact test

B09 Item No.	B08 Heat No.	B07 Roll plate/ Test No.	B05 Reference condition	C01	C02/ C01	C03 Temp. GR.F	C41 Specimen width	C40 Type of specimen	C44 Testing method	C46 Energy	C45 Individual values	C43 Average value
01	78902	16750		K1	LV	-51	51	CHP-V		AV 111	136	151
01	78902	16760		K1	LV	-51	51	CHP-V		AV 107	125	126
01	78902	16761		K1	LV	-51	51	CHP-V		AV 83	140	122
01	78903	16744		K1	LV	-51	51	CHP-V		AV 161	144	156

A04

Trademark

2017/202 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

QM-System: Certification as per ISO 9001

A01

AG der Dillinger Hüttenwerke

Postfach 1580, D-66748 Dillingen/Saar

Inspection department

Inspector's stamp

Date 29.05.06

PP



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004		A09 Advice of dispatch No./ Date of dispatch		A08/ Manufacturer's order/ A03 Certificate No.		Sheet	
INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		214210-28.05.06		306374-004		3/...	
MATERIAL TEST REPORT (MTR)				B01 Product			
A05 Established inspecting body DIL		A06 Purchaser Final receiver		A07.1 No. 60115 A07.2 No. E10372-J1010-LG		HOT ROLLED PLATES	
B02 Steel grade SA516-70		ARCELOR CANADA, BURLI					
B03 Specifications ASME-2A:04 DIL-HUE2:REV.19-03.10.05		EDMONTON STEEL, EDMON					
				SA20-S5			

C40-C49 Impact test

B09 Item No.	B08 Heat No.	B07 Roll-plate/ Test No.	B05 Reference condition	C01	C02/ C01	C03 Temp. GR.F	C41 Specimen width	C40 Type of specimen	C44 Testing method	C46 Energy	C45 Individual values AV=FT, LBF	C43 Average value
02	78901	16769		K1 LV	LV	-51		CHP-V				
02	78901	16775		K1 LV	LV	-51		CHP-V				

C70-C99 Chemical composition % - Heat analysis

B08 Heat	C70	C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NE	SN
78901	Y	0,186	0,339	1,18	0,012	0,0008	0,0047	0,035	0,012	0,005	0,019	0,054	0,000	0,000	0,000
78902	Y	0,179	0,373	1,20	0,010	0,0007	0,0060	0,035	0,015	0,004	0,021	0,038	0,000	0,000	0,000
78903	Y	0,169	0,360	1,18	0,012	0,0009	0,0053	0,048	0,016	0,005	0,070	0,035	0,001	0,000	0,001

C94 Heat analysis Carbon equivalent / Alloying restrictions

B08 Heat	FO-02=	FO-55=	FO-78=	FO-91=
78901		0,40	0,09	6,3
78902		0,39	0,08	6,7
78903		0,38	0,13	7,0

C95 Ladle treatment

ITEM NO.: 01-02
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL

A04		A01	
Z01/Z02 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.		AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	
QM-System: Certification as per ISO 9001		Date 29.05.06	
Trademark		Inspector's stamp B. MOELLER Test House Manager	
		PP 1	



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004		A09 Advice of dispatch No./ Date of dispatch		A08/ Manufacturer's order/ A03 Certificate No.		Sheet	
INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		214210-28.05.06		306374-004		4/...	
MATERIAL TEST REPORT (MTR)				B01 Product			
A05 Established inspecting body		A06 Purchaser		A07.1 No.		A07.2 No.	
DH		ARCELOR CANADA, BURLI		60115		EDMONTON STEEL, EDMON	
		Final receiver		SA20-S5		HOT ROLLED PLATES	
B02/ Steel grade		SA516-70					
B03 Specifications		ASME-2A: 04					
		DIL-HUE2:REV.19-03.10.05					

C70-C99 Chemical composition % - Product analysis

B08 Heat	B07 Test No.	C01	C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NE	SN
78901	16769	K1	0.176	0.317	1.16	0.010	0.0008	0.0040	0.036	0.012	0.004	0.018	0.051	0.000	0.000	0.000
78902	16767	K1	0.181	0.339	1.16	0.009	0.0010	0.0053	0.030	0.013	0.004	0.020	0.044	0.001	0.000	0.000
78902	16768	K1	0.185	0.321	1.16	0.010	0.0011	0.0040	0.034	0.013	0.005	0.018	0.050	0.000	0.000	0.000
78903	16749	K1	0.172	0.364	1.20	0.009	0.0003	0.0055	0.037	0.014	0.003	0.020	0.035	0.000	0.000	0.000
B08 Heat	B07 Test No.	C01	Ti	B												
78901	16769	K1	0.001	0.0002												
78902	16767	K1	0.001	0.0001												
78902	16768	K1	0.001	0.0000												
78903	16749	K1	0.001	0.0000												

C94 Product analysis Carbon equivalent / Alloying restrictions

B08 Heat	B07 Test No.	C01	FO-02=	FO-55=
78901	16769	K1	FO-02= 0.38	FO-55= 0.09
78902	16767	K1	FO-02= 0.39	FO-55= 0.08
78902	16768	K1	FO-02= 0.39	FO-55= 0.09
78903	16749	K1	FO-02= 0.38	FO-55= 0.07

C94 Carbon equivalent formula / Alloying restrictions

FO-02 = C + (MN/6) + (CR+MO+V) / 5 + (NI+CU) / 15
 FO-55 = CU+MO+NI+CR
 FO-78 = CR+MO
 FO-91 = MN/C

A04			ZG1022 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order. QM-System: Certification as per ISO 9001	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
Trademark			B. MOELLER Test House Manager	ADB Inspector's stamp	Date 29.05.06 PP 1



DILLINGER HÜTTE

Erklärungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991 MATERIAL TEST REPORT (MTR)		A09 Advice of dispatch No./ Date of dispatch 214210-28.05.06	A03 Manufacturer's order/ A03 Certificate No. 306374-004	Sheet 5
A05 Established inspecting body DH	A06 Purchaser Final receiver ARCELOR CANADA, BURLI A07.1 No. 60115 EDMONTON STEEL, EDMON A07.2 No. E10372-J1010-LG SA20-S5			
B02 Steel grade SA516-70				
B03 Specification ASME-2A:04 DIL-HUE2:REV.19-03.10.05				

D01 Checking of marking, surface, shape and dimensions

ITEM NO.: 01-02

RESULT OF MARKING, SURFACE, SHAPE AND DIMENSIONS: NO REMARKS
SURFACE AS PER ASME-SA20
THICKNESS AS PER ASME-SA20
LENGTH AND WIDTH AS PER ASME-SA20
FLATNESS AS PER 1/2-ASME-SA20



A04		Z01Z02 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar inspection department	A01
QM-System: Certification as per ISO 9001			ADB	
Trademark		B. MUELLER Test House Manager	Inspector's stamp Date 29.05.06	PP 1

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 061110-PPSA-002-015
Date of Issue/발행일자: Nov. 17, 2006



Order No./계약번호: 0002574516
Supplier/주조사: DAE WOO INTERNATIONAL CORP.
Customer/고객사: EDMONTON EXCHANGER
PO No./주문번호: E10568 (ASME2004 EDITION)
Commodity/품명: HR STEEL PLATE (ISO10474/3.1B)
Spec & Type/규격: ASTM SA516-70 (VACUUM DEGASSED)

Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile/인장시험			Impact/충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	POSITION	Chemical Composition/화학 성분 (%)																
					YP (KSI)	TS (KSI)	EL (%)			C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Tr	Al	V	As			
0.75"x86.5"x480"	PC21414101-4102	2	8,934 19,696	SB56276	51.9	78.0	28	A:112 1:89 2:89 3:96 A:91 1:114 2:122 3:117 A:118 147,719 (LBS)		L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28			
0.75"x86.5"x480"	PC21414201-4202	2	8,934 19,696	SB56276	52.2	78.3	28			L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28			
*** Sub Total (330) *** *** HEAT TREATMENT *** Normalized : 890°C 30min. *** 0.75"x120.5"x480"	PB25630001-0003	3	16,737 36,897	SB56272	50.9	76.1	27	1:110 2:117 3:117 A:115 1:115 2:95 3:116 A:108		L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30			
0.75"x120.5"x480"	PB25630101-0103	3	16,737 36,897	SB56272	51.9	77.0	28			L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30			

Customer/고객: LG Chem, Ltd.
Product/제품명: PC21414101-4102
Revision/개정: 1.0
Date/일자: 2006.07.01
Page/페이지: 1 of 1
Drawing/도면명: PC21414101-4102
Drawing/도면번호: 1000

Position - T: Top, M: Middle, B: Bottom
Tensile Test. Direction: Transversal, Gauge Length: 200mm (Rectangular).
YP Method: 0.2% offset
Impact Test. Direction: Longitudinal, T.L.R. (Trans Longitudinal Ratio)
Division - L: Ladle Analysis
Chemical Composition Unit: -2x1/100, -3x1/100, -4x1/100, -5x1/100,000
Tr: It is within the standard range (<0.008%) and include trace element.
Supply Condition: As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and (or) KEPCO MNA/ SNA4300.
B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material
- 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.
* This Mill Test Certificate cannot be copied for any purpose.



Surveyor To:

Na, Chaibong

Chief of material testing section Na, C.B

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호: 061110-PPSA-002-016
Date of issue/발행일자: Nov., 17, 2006

Order No./계약번호: 0002574516

PO No./주문번호: E10568
(ASME2004 EDITION)

Supplier/주문자: DAE WOO INTERNATIONAL CORP.

Commodity/품명: HR STEEL PLATE (ISO10474/3.1B)

Customer/고객사: EDMONTON EXCHANGER

Spec & Type/규격: ASTM SA516-70 (VACUUM DEGASSED)

Size/지수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P O S I T I O N	Tensile/인장시험		Impact/충격시험		Chemical Composition/화합성분(%)													
						Y.P. (KSI)	T.S. (%)	EL (%)	V notch -50°F Energy SF (FT-LBS) (%)		C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V	Se-Al
0.75"x120.5"x480"	PB25630201-0203	3	16,737 36,897	S856272	T	52.6	77.3	28	135 2:108 3:111 A:102	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30
0.75"x120.5"x480"	PB25630701-0703	3	16,737 36,897	S856272	T	53.2	77.5	28	173 2:122 3:99 A:98	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30
0.75"x120.5"x480"	PB25642801-2803	3	16,737 36,897	S856272	T	52.4	77.9	33	138 2:116 3:106 A:107	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30
0.75"x120.5"x480"	PB25660601-0603	3	16,737 36,897	S856272	T	52.5	77.9	30	133 2:97 3:77 A:86	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30
0.75"x120.5"x480"	PB25660701-0703	3	16,737 36,897	S856272	T	53.1	77.7	28	1103 2:115 3:131	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test Direction : Transversal Gauge Length : 200mm (Rectangular)
Y.P Method : 0.2% off-set

* Impact Test Direction : Longitudinal,
T.L.R (Trans Longitude Ratio)

* Division - L: Ladle Analysis
* Chemical Composition Unit: -2x1/100, -3x1/1000, -4x1/10000, -5x1/100000
* Tr : It is within the standard range (<0.009%) and include trace element.
* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL 01, 2005 and PQG01 Rev.0 dated JUL 01, 2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3600 and/or KEPIC MNA/ SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material.

- 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.

* This Mill Test Certificate cannot be copied for any purpose.



Surveyor To:

Na, Cha; Bong

KT-001, 10 MAR 01 2005

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section

Na, C.B

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호: 061110-PPSA-002-017
Date of Issue/발행일자: Nov., 17, 2006

Order No./계약번호: 0002574516

Supplier/주문자: DAE WOO INTERNATIONAL CORP.

Customer/고객사: EDMONTON EXCHANGER

PO No./주문번호: E10568

(ASME2004 EDITION)

Commodity/품명: HR STEEL PLATE (ISO10474/3.1B)

Spec & Type/규격: ASTM SA516-70 (VACUUM DEGAISED)

Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	POSITION	Tensile/인장시험			Impact/ 충격시험		DIVISION	Chemical Composition/화합성분(%)												
						YP (KSI)	TS (KSI)	EL (%)	V Notch -50°F Energy (FT-LBS)	SF (%)		C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V Sol-Al	
0.75"x120.5"x480"	PB25629901-9902	2	11,158 24,598	SB56276	T	51.9	77.2	27	A-117 1:128 2:100 3:96		L	1878	353	1142	102	16	3	22	141	Tr	1	1	17	28
0.75"x120.5"x480"	PB25630301-0303	3	16,737 36,897	SB56276	T	52.1	76.9	27	A-107 1:121 2:101 3:98		L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	PB25630401-0403	3	16,737 36,897	SB56276	T	51.3	77.3	28	A-107 1:195 2:214 3:193		L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	PB25630501-0503	3	16,737 36,897	SB56276	T	52.2	77.7	30	A-201 1:207 2:207 3:196		L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	PB25630601-0603	3	16,737	SB56276	T	52.4	77.6	28	A-204 1:129		L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28

* Position - T : Top, M : Middle, B : Bottom.

* Tensile Test Direction : Transversal, Gauge Length : 200mm (Rectangular).

YP Method : 0.2% off-set

* Impact Test Direction : Longitudinal,

T.L.R (Trans Longitud Ratio)

* Division - L: Ledge Analysis

* Chemical Composition Unit: -2x1/100, -3x1/1000, -4x1/10000, -5x1/100000

* Tr: It is within the standard range (<0.008%) and include trace element

* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2005 and PQG01 Rev.0 dated JUL.01.2005 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and/or KEPIC MNA/ SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material

- 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.

* This Mill Test Certificate cannot be copied for any purpose.



Surveyor To:

Na, Chei Bong

KT-001, 10.04.2004

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Na, C.B

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호: 061110-PPSA-002-018
Date of issue/발행일자: Nov., 17, 2006

Order No./계약번호: 0002574516

Supplier/주문자: DAE WOO INTERNATIONAL CORP.

Customer/고객사: EDMONTON EXCHANGER

PO No./주문번호: E10568
(ASME2004 EDITION)

Commodity/품명: HR STEEL PLATE (ISO10474/3.1B)

Spec & Type/규격: ASTM SA516-70 (VACUUM DEGAUSED)

Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재간번호	P O S I T I O N	Tensile/인장시험		Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	D I V I S I O N	Chemical Composition/화학 성분(%)															
						YP (KSI)	TS (KSI)			EL (%)	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V	Sol-Al		
0.75"x120.5"x480"	PB25642701-2703	3	16,737 36,897	SB56276	T	51.3	76.7	27	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28			
																							2.94		
																								3.131	
																									A-118
0.75"x120.5"x480"	PB25675301-5303	3	16,737 36,897	SB56276	T	50.8	76.9	28	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28			
																							1.92		
																								2.72	
																									3.100
0.75"x120.5"x480"	PB25685301-5303	3	16,737 36,897	SB56276	T	51.2	76.9	30	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28			
																							1.128		
																								2.142	
																									3.120
0.75"x120.5"x480"	PB26020201-0203	3	16,737 36,897	SB56919	T	51.8	77.8	28	L	1842	339	1168	81	20	2	24	105	Tr	1	1	18	34			
																							1.97		
																								2.117	
																									3.129

* Position: T: Top, M: Middle, B: Bottom

* Tensile Test: Direction: Transversal, Gauge Length: 200mm (Rectangular).

YP Method: 0.2% off-set

* Impact Test: Direction: Longitudinal

T: L.R (Trans Longitude Ratio)

* Division: L-Ladle Analysis

* Chemical Composition Unit: -2x1/100, -3x1/100, -4x1/100, -5x1/100,000

* Tr: It is within the standard range (<0.008%) and include trace element.

* Supply Condition: As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and (or) KEPIC MNAI SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material - 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.

* This Mill Test Certificate cannot be copied for any purpose.



KT-101, 10 MAR 2005

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Surveyor To:

Na, Chai Bong

Chief of material testing section Na, C.B

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 0611110-PPSA-002-019
Date of Issue/발행일자 : Nov. 17, 2006

Order No./계약번호 : 0002574516

Supplier/주원자 : DAE WOO INTERNATIONAL CORP.

Customer/고객사 : EDMONTON EXCHANGER

PO No./주문번호 : E10568
(ASME2004 EDITION)

Commodity/품명 : HR STEEL PLATE (ISO10474/3.1B)

Spec & Type/규격 : ASTM SA516-70 (VACUUM DEGASSED)

Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재간번호	Tensile/인장시험 YP TS EL (KSI) (%)	Impact/ 충격시험 V Notch Energy SF (FT-LBS) (%)	Chemical Composition/화합 성분(%)												
0.75"x120.5"x480"	PB26020301-0303	3	16,737 36,897	SB566919	51.5 77.3 30	1.90 2.83 3.78 A-83 614,970 (LBS)	L 1842 339 1168 81 20 2 24 105 Tr 1 18 34												
*** Sub Total : (940) ***			50		278,950 (kg)														
*** HEAT TREATMENT : 890°C 35min.																			
1"x96.5"x480"	PB25641401-1403	3	17,874 39,405	SB56272	51.3 77.7 32	1.94 2.89 3.74 A-86 614,970 (LBS)	L 1922 368 1131 91 19 2 21 93 Tr 1 17 30												
1"x96.5"x480"	PB25685101-5103	3	17,874 39,405	SB56276	50.3 75.9 28	1.90 2.83 3.78 A-83 614,970 (LBS)	L 1878 353 1142 102 16 3 22 111 Tr 1 17 28												
1"x96.5"x480"	PB25687101-7103	3	17,874 39,405	SB56276	50.3 75.9 31	1.94 2.89 3.74 A-86 614,970 (LBS)	L 1878 353 1142 102 16 3 22 111 Tr 1 17 28												
1"x96.5"x480"	PC21563801	1	5,958	SB56919	52.2 76.7 31	1.89 A-112	L 1842 339 1168 81 20 2 24 105 Tr 1 18 34												

Position : T : Top, M : Middle, B : Bottom
Tensile Test : Direction : Transversal, Gauge Length : 200mm (Rectangular).

YP Method : 0.2% off-set

Impact Test : Direction : Longitudinal,

T.L.R (Trans Longitudinal Ratio)

Division - L : Lade Analysis

Chemical Composition Unit : -2x1/100, -3x1/1000, -4x1/10000, -5x1/100000

Tr : It is within the standard range (<0.008%) and include trace element

Supply Condition : As-Rolled unless otherwise Heat Treated.



A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQ001 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and/or KEPIC MNAV SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material - 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.

* This Mill Test Certificate cannot be copied for any purpose.



Surveyor To:

Na. Choi Berg

MADE IN KOREA

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Na. C.B



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004		A10 Advice of dispatch No./ Date of dispatch	A08/ Manufacturer's order/ A03 Certificate No.	Sheet
INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		252001-05.04.07	318453-002	1/...
MATERIAL TEST REPORT (MTR)				
A05 Established inspecting body	A06 Purchaser			
DH	Final receiver			
	ARCELOR CANADA, BURLI			
	EDMONTON STEEL, EDMON			
B02/ Steel design.	SA516-70			
B03 Any suppl. requirements	ASME-2A: 04+A05			
	DIL-HUB-2: R21-2006-04-27			



13292

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	B11 Length	B12 Theoretical mass KG	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
02	1	0,7500 x	172,00000 x	344,00000 x	5708 N		292924	99513-01	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000 x	5708 N		292924	99513-02	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000 x	5708 N		292924	99513-03	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000 x	5708 N		292924	99513-04	ITEM 2
**	4				22832				
***	4				22832				

B04 Product delivery condition

ITEM NO.: 01-02
 N: HT: 1670 GR.F +36 -27 GR.F
 SOAKING TIME TO ATTAIN THE TARGET TEMPERATURE OVER THE WHOLE SECTION: 1-1,75 MIN/MM (25-45 MIN/INCH)
 COOLING IN STILL AIR

B06 Marking of the product

ITEM NO.: 01-02
 STEEL DESIGNATION SA516 70 MTLV SA516 60 MTLV
 HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

C10-C29 Tensile test

B14 Item No.	B07.2 Heat No.	B05 Rol.plate/ Reference (heat) treatment	C01 C02/ C03 C01	C10 C11	C12 C13	C14-C15
02	292924	99513	K1 Q RT	52,2	76,3	
			GR.F	KSI	RM	A %
				RP02		LO=8IN
						28,0

A04 201020203 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

QM-System: Certification as per ISO 9001

B. Mueller

B. MUELLER

ADB

AG der Dillinger Hüttenwerke
 Postfach 1580, D-66748 Dillingen/Saar
 Inspection department

Inspector's stamp

Date 05.04.07

KW

1



Manufacturer's mark



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004		A10 Advice of dispatch No./ Date of dispatch	A08 Manufacturer's order/ A03 Certificate No.	Sheet
INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991		252001-05.04.07	318453-002	2/...
MATERIAL TEST REPORT (MTR)				
A05 Established inspecting body	A06 Purchaser	A01 Product		
DH	ARCELOR CANADA, BURLI	HOT ROLLED PLATES		
	EDMONTON STEEL, EDMON			
B02/ Steel design.	SA516-70			
B03 Any suppl. requirements	ASME-2A: 04+A05			
	DIL-HUE-2: R21-2006-04-27			

C30-C39 Hardness test

B14 Item No.	B07.2 Heat No.	B07.1 Roll plate/ Test No.	B05 Reference (heat) treatment	C01	C02/C01	C03 Temp. GR.F	C33 Testing method	C35 Individual values	C32 Average value
02	292924	99513		KL	O	RT	HBW 10/3000	HB 146 146 146	146

C40-C49 Impact test

B14 Item No.	B07.2 Heat No.	B07.1 Roll plate/ Test No.	B05 Reference (heat) treatment	C01	C02/C01	C03 Temp. GR.F	C41 Width of test piece	C44 Type of test piece	C45 Energy	C46 Individual values	C43 Average value
02	292924	99513		KL	LV	-51		CHP-V	AV 164	153	148

C70-C99 Chemical composition % - Heat analysis

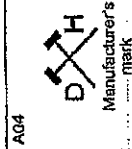
B07.2 Heat No.	C70	C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NB	SN
292924	Y	0,183	0,371	1,19	0,008	0,0006	0,0067	0,036	0,028	0,027	0,056	0,032	0,000	0,000	0,001

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat No.	C94	FO-02=	0,40	FO-55=	0,14	FO-78=	0,06	FO-91=	6,5
292924									

C95 Ladle treatment

ITEM NO.: 01-02
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL



A04	2012/02/203 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	A01
QM-System: Certification as per ISO 9001		
AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department		
Inspector's stamp		Date 05.04.07
B. MUELLER Test House Manager		KN 1



DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991 MATERIAL TEST REPORT (MTR)		A10 Advice of dispatch No./ Date of dispatch 252001-05.04.07	A08/ Manufacturer's order/ A03 Certificate No. 318453-002	Sheet 3
A05 Established inspecting body DH		A06 Purchaser ARCELOR CANADA, BURLI A07.1 No. 61216		
B02/ Steel design. SA516-70		Final receiver EDMONTON STEEL, EDMON A07.2 No. E10421-J1010-IG		
B03 Any suppl. requirements		ASM E-2A: 04+A05 DIL-HUE-2: R21-2006-04-27		

C70-C99 Chemical composition % - Product analysis

Heat	Test No.	C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NB	SN
B07.2 292924	B07.1 99514	0,176	0,361	1,16	0,008	0,0010	0,0062	0,033	0,024	0,022	0,049	0,033	0,000	0,000	0,001
Heat	Test No.	Ti	B												
B07.2 292924	B07.1 99514	0,002	0,0001												

C94 Product analysis Carbon equivalent / Alloying restrictions

Heat	Test No.	FO-02 =	FO-02 =	FO-55 =	FO-55 =
B07.2 292924	B07.1 99514	C + (MN/6) + (CR+MO+V) / 5 + (NI+CU) / 15	0,39	0,13	0,13

C94 Carbon equivalent formula / Alloying restrictions

FO-02 =	C + (MN/6) + (CR+MO+V) / 5 + (NI+CU) / 15
FO-55 =	CU+MO+NI+CR
FO-78 =	CR+MO
FO-91 =	MN/C

D01 Marking and identification, surface appearance, shape and dimensional properties

ITEM NO.:	01-02
RESULT OF MARKING, SURFACE, SHAPE AND DIMENSIONS:	NO REMARKS
SURFACE	AS PER ASME-SA20
THICKNESS	AS PER ASME-SA20
LENGTH AND WIDTH	AS PER ASME-SA20
FLATNESS	AS PER 1/2-ASME-SA20



Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

QM-System: Certification as per ISO 9001

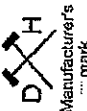
AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection departmentB. MUELLER
Test House Manager

Inspector's stamp

Date 05.04.07

KW

1

Manufacturer's
mark

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 :080222-PPSA-006-005
Date of Issue/발행일자:Feb., 27, 2008



Order No./계약번호:0003114506

Supplier/주문자:DAE WOO INTERNATIONAL CORP.

Customer/고객사:EDMONTON EXCHANGER

PO No./주문번호:E 10634-1
(ASME2004EDITION)

Commodity/품명:HR STEEL PLATE (EN10204 3.1B)

Spec & Type/규격:ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/지수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재질번호	POSITION	Tensile/인장시험		Impact/충격시험 V.Nuch -50°F Energy SF (FT-LBS) (%)	D T Y L S I O N	Chemical Composition/화학성분(%)																	
						YP (KSI)	TS (KSI)			EL (%)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al			
0.625"x120.50"x480"	PB47919902	1	4,650 10,251	SB98670	T	53.7	76.6	28		L	1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25			
0.625"x120.50"x480"	PB47919904	1	4,650 10,251	SB98670	T	53.7	76.6	29		L	1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25			
0.625"x120.50"x480"	PB47919801-9804	4	18,800 41,004	SB98670	T	55.7	80.4	27		L	1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25			
*** Sub Total (050) ***			40			188,000 (kg)		410,054 (LBS)																			
*** HEAT TREATMENT *** Normalized : 890 C 30min.																											
0.750"x96.50"x480"	PB46803301-3304	4	17,868 39,392	SB98741	T	50.3	76.4	26		L	1912	343	1151	120	9	2	22	1	100	Tr	Tr	1	19	23			

Position : T : Top, M : Middle, B : Bottom
Tensile Test. Direction : Transversal. Gauge Length : 200mm(Rectangular).
YP Method : 0.2% off-set
Impact Test. Direction : Longitudinal,
T.L.R.(Trans Longitude Ratio)
Division : Ladle Analysis
Chemical Composition Unit : 2x1/100, 3x1/1000, 4x1/10000, 5x1/100000
Tr : It is within the standard range(<0.008%) and include trace element.
Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL 01, 2006 and PQG01 Rev.0 dated JUL 01 2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and/or) KEPIC MNA/ SNA-4300.
B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material
- 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.
This material is fine grained steel.
* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Jo, Won Gook



POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 :080222-PPSA-006-006
Date of Issue/발행일자:Feb., 27, 2008

Order No./계약번호:0003114506

PO No./주문번호:E 10634-1
(ASME2004EDITION)

Supplier/주문자:DAE WOO INTERNATIONAL CORP.

Commodity/품명:HR STEEL PLATE (EN10204 3.1B)

Customer/고객사:EDMONTON EXCHANGER

Spec & Type/규격:ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/치수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P O S T T O N	Tensile/인장시험 YP TS EL (KSI) (%)	Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화합성분(%) C Si Mn P S Cr Ni B Cu Mo Nb Ti V Sol-Al
0.750"x96.50"x480"	PB46805701-5704	4	17,868 39,392	SB95741	T	51.9 76.7 29	3-134 A-139	L 1912 343 115 120 9 2 22 1 100 Tr 1 19 23
0.750"x96.50"x480"	PB46866501-6504	4	17,868 39,392	SB95743	T	52.1 77.5 29	3-121 A-139	L 1941 334 1183 88 20 2 20 1 93 Tr 1 15 34
0.750"x96.50"x480"	PB46830102-0104	3	13,401 29,544	SB95749	T	50.9 76.1 30	3-135 A-136	L 1950 330 1144 78 14 2 23 Tr 94 Tr 1 18 38
*** Sub Total (060) ***			15			67,005 (kg)	147.719 (LBS)	
*** HEAT TREATMENT *** T ===> Normalized : 890°C 30min								
0.750"x120.50"x480"	PC37142301	1	5,579 12,299	SA81498	T	49.9 78.6 30	1-94 2-104 3-91	L 1901 381 1170 93 15 3 24 Tr 108 Tr 2 19 36

* Position - T : Top, M : Middle, B : Bottom.

* Tensile Test. Direction : Transversal. Gauge Length : 200mm (Rectangular).

YP Method : 0.2% off-set

* Impact Test. Direction : Longitudinal,

T.L.R (Trans Longitude Ratio).

* Division - L: Ladle Analysis

* Chemical Composition Unit: -2x1/100, -3x1/100, -4x1/10000, -5x1/100000

* Tr : It is within the standard range(<0.008%) and include trace element.

* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2005 and POG01 Rev.0 dated JUL.01.2005 audited and approved by customer as conforming to the requirements of ASME Sec. III

NCA-3600 and/or) KEPIC MNA/ SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material

* 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.

This material is fine grained steel.

* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section

Jo, Won Gook

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 :080222-PPSA-006-007
Date of Issue/발행일자:Feb., 27, 2008

Order No./계약번호:0003114506

PO No./주문번호:E 10634-1
(ASME2004EDITION)

Supplier/주문자:DAE WOO INTERNATIONAL CORP.

Commodity/품명:HR STEEL PLATE (EN10204 3.1B)

Customer/고객사:EDMONTON EXCHANGER

Spec & Type/규격:ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/지수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P O S I T I O N	Tensile/인장시험		Impact/충격시험 V-Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화학성분(%)	P C M N	S I M N	P S C r N i	B -2	Cu -3	Mo -2	Nb -3	Ti -3	V Sol-AI -3
						YP (KSI)	TS EL (%)											
0.750"x120.50"x480"	PB46845701-5703	3	16,737 36,897	SB96741	T	53.7 80.1	30	A-97 1:135 2:145 3:139	L 1912 343 1151 120 9 2 22 1 100 Tr 1 19 23									
0.750"x120.50"x480"	PB46808401-8403	3	16,737 36,897	SB96741	T	50.3 76.3	29	A-139 1:125 2:137 3:150	L 1912 343 1151 120 9 2 22 1 100 Tr 1 19 23									
0.750"x120.50"x480"	PB46808301-8302	2	11,158 24,598	SB96741	T	50.2 75.0	30	A-138 1:136 2:116 3:116	L 1912 343 1151 120 9 2 22 1 100 Tr 1 19 23									
0.750"x120.50"x480"	PB46881801-1803	3	16,737 36,897	SB96743	T	53.1 77.5	29	A-122 1:128 2:153 3:142	L 1941 334 1183 88 20 2 20 1 93 Tr 1 16 34									
0.750"x120.50"x480"	PB46808001-8003	3	16,737 36,897	SB96743	T	50.5 76.4	28	A-141 1:114 2:124	L 1941 334 1183 88 20 2 20 1 93 Tr 1 16 34									

Position - T : Top, M : Middle, B : Bottom
Tensile Test. Direction : Transversal, Gauge Length : 200mm(Rectangular),
YP Method : 0.2% off-set

Impact Test. Direction : Longitudinal,
T.L.R(Trans Longitude Rail)

Division - L:Ladle Analysis
Chemical Composition Unit: -2x1/1000, -3x1/1000, -4x1/10000, -5x1/100000
Tr : It is within the standard range (<0.008%) and include trace element
Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL 01,2006 and PQG01 Rev.0 dated JUL 01,2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and/or KEPC MNAI SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material specification and also with the requirements called for by the above order.
We hereby certify that the material herein has been made and tested in accordance with the above This material is fine grained steel.

* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Jo, Won Gook



POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 :080222-PPSA-006-008
Date of Issue/발행일자:Feb., 27, 2008

Order No./계약번호:0003114506

Supplier/주문자:DAE WOO INTERNATIONAL CORP.

Customer/고객사:EDMONTON EXCHANGER

PO No./주문번호:E 10634-1
(ASME2004EDITION)

Commodity/품명:HR STEEL PLATE (EN10204 3.1B)

Spec & Type/규격:ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/지수	Product No. 제품번호	COIL Que- rality 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P S T O N	Tensile/인장시험 YP TS EL (KSI) (%)	Impact/충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화학성분(%) C Si Mn P S Cr Ni Cu Mo Nb Ti V Sol-Al
0.750"x120.50"x480"	PB46808601-8603	3	16,737 36,897	S896743	T	50.8 76.1 29	3.114 A:137	L 1941 334 1183 88 20 2 20 1 93 Tr 1 16 34
0.750"x120.50"x480"	PB47395401-5403	3	16,737 36,897	S896743	T	52.5 77.7 25	1.133 2.141	L 1941 334 1183 88 20 2 20 1 93 Tr 1 16 34
0.750"x120.50"x480"	PB46808601-8603	3	16,737 36,897	S896746	T	51.3 77.3 28	3.128 A:153	L 1948 334 1135 88 14 2 20 1 94 Tr 1 16 27
0.750"x120.50"x480"	PB47920401-0402	2	11,158 24,598	S896670	T	54.4 79.2 29	2.102 3.100 A:101	L 1817 342 1151 68 15 2 23 Tr 89 Tr 1 19 25
*** Sub Total (070) ***			26			145,054 (kg)	319,785 (LBS)	

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 200mm(Reclangular).
* YP Method : 0.2% off-set

* Impact Test. Direction : Longitudinal,
T.L.R.(Trans Longitude Ratio)

* Division - L:Ladle Analysis

* Chemical Composition Unit: -2:x1/100, -3:x1/1000, -4:x1/10000, -5:x1/100000.
* Tr : It is within the standard range(<0.008%) and include trace element.

* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQ001 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and(or) KEPIC MNA/ SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material
- 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.
This material is fine grained steel.

* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Jo, Won Gook

posco Mill Test Certificate/검사증명서

Certificate No./증명서번호 :080222-PPSA-006-009
Date of Issue/발행일자:Feb., 27, 2008

Order No./계약번호:0003114506

Supplier/주문자:DAE WOO INTERNATIONAL CORP.

Customer/고객사:EDMONTON EXCHANGER

PO No./주문번호:E 10634-1
(ASME2004EDITION)

Commodity/품명:HR STEEL PLATE (EN10204 3.1B)

Spec & Type/규격:ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/치수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재강번호	POSITION	Tensile/인장시험		Impact/충격시험 V Notch -50°F Energy (FT-LBS) (%)	P I S I O N	Chemical Composition/화합성분(%)																
						YP (KSI)	TS (KSI)			EL (%)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al		
0.875"x96.50"x480"	PB46803601-3603	3	15,642 34,485	SB96741	T	50.3	75.6	29		L	1912	343	1151	120	9	2	22	1	100	Tr	Tr	1	19	23		
0.875"x96.50"x480"	PB46830301	1	5,214 11,495	SB96741	T	51.1	76.0	29	1:134 2:133 3:117 A:128	L	1912	343	1151	120	9	2	22	1	100	Tr	Tr	1	19	23		
0.875"x96.50"x480"	PB46830201-0203	3	15,642 34,485	SB96741	T	51.9	76.4	32	2:82 3:68 A:96 1:130 2:119 3:84 A:111	L	1912	343	1151	120	9	2	22	1	100	Tr	Tr	1	19	23		
0.875"x96.50"x480"	PB46808901-8903	3	15,642 34,485	SB96741	T	51.1	75.9	28	1:125 2:117 3:131 A:125	L	1912	343	1151	120	9	2	22	1	100	Tr	Tr	1	19	23		

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test. Direction : Transversal, Gauge Length : 200mm(Rectangular).
* YP Method : 0.2% off-set

* Impact Test. Direction : Longitudinal.

* T.L.R.(Trans Longitude Ratio)

* Division - L:Ladle Analysis.

* Chemical Composition Unit : -2x1/100, -3x1/1000, -4x1/10000, -5x1/100000

* Tr : It is within the standard range(<0.008%) and include trace element.

* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. II NCA-3800 and(or) KEPIC MNA/ SNA4300.

B) No repair welding was performed to the products.

C) The product numbers listed on this test report identifies the material

- Via 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.

This material is fine grained steel.

* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Jo, Won Gook



POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 080225-PPSA-004-001
Date of Issue/발행일자 : Feb., 27, 2008

Order No./계약번호 : 0003114508

PO No./주문번호 : E 10634-1
(ASME2004EDITION)

Supplier/추문자 : DAE WOO INTERNATIONAL CORP.

Commodity/품명 : HR STEEL PLATE (EN10204 3.1B)

Customer/고객사 : EDMONTON EXCHANGER

Spec & Type/규격 : ASME SA516-70 AND SA 20(ASME2004EDITION)

Size/치수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile/인장시험 YP TS EL (KSI) (%)	Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화합성분(%)												
0.875"X120.50"X480"	PC37834801	1	6,512 14,356	SB98670	53.4 77.3 28	1:119 2:142 3:133 A:131 14,356 (LBS)	C 4 -4 -3 -3 -4 -4 -2 -2 -2 -4 -3 -2 -2 -3 -3 -3	Si 342	Mn 1151	P 68	S 15	Cr 2	Ni 23	Tr 89	Mo 1	Ti 19	25		
*** Sub Total (090) ***			1		6,512 (kg)														
*** HEAT TREATMENT ***			Normalized : 890°C 48min. ***																
*** Lot Total ***			238		1,488,417 (kg)	3,281,349 (LBS)													
*** Grade Total ***			238		1,488,417 (kg)	3,281,349 (LBS)													
*** Grand Total ***			238		1,488,417 (kg)	3,281,349 (LBS)													

*** Last Item ***

* LOT NO ==> VACUUM DEGASSED

* LOT NO ==> VACUUM DEGASSED



- Position - T : Top, M : Middle, B : Bottom
- Tensile Test. Direction : Transversal, Gauge Length : 200mm (Rectangular).
- YP Method : 0.2% off-set
- Impact Test. Direction : Longitudinal, T.L.R (Trans Longitude Ratio)
- Division - L : Ladle Analysis
- Chemical Composition Unit : 2x1/100, 3x1/100, 4x1/100, 5x1/100, 6x1/100, 7x1/100, 8x1/100, 9x1/100, 10x1/100, 11x1/100, 12x1/100, 13x1/100, 14x1/100, 15x1/100, 16x1/100, 17x1/100, 18x1/100, 19x1/100, 20x1/100, 21x1/100, 22x1/100, 23x1/100, 24x1/100, 25x1/100, 26x1/100, 27x1/100, 28x1/100, 29x1/100, 30x1/100, 31x1/100, 32x1/100, 33x1/100, 34x1/100, 35x1/100, 36x1/100, 37x1/100, 38x1/100, 39x1/100, 40x1/100, 41x1/100, 42x1/100, 43x1/100, 44x1/100, 45x1/100, 46x1/100, 47x1/100, 48x1/100, 49x1/100, 50x1/100, 51x1/100, 52x1/100, 53x1/100, 54x1/100, 55x1/100, 56x1/100, 57x1/100, 58x1/100, 59x1/100, 60x1/100, 61x1/100, 62x1/100, 63x1/100, 64x1/100, 65x1/100, 66x1/100, 67x1/100, 68x1/100, 69x1/100, 70x1/100, 71x1/100, 72x1/100, 73x1/100, 74x1/100, 75x1/100, 76x1/100, 77x1/100, 78x1/100, 79x1/100, 80x1/100, 81x1/100, 82x1/100, 83x1/100, 84x1/100, 85x1/100, 86x1/100, 87x1/100, 88x1/100, 89x1/100, 90x1/100, 91x1/100, 92x1/100, 93x1/100, 94x1/100, 95x1/100, 96x1/100, 97x1/100, 98x1/100, 99x1/100, 100x1/100
- Tr : It is within the standard range (<0.008%) and include trace element.
- Supply Condition : As-Rolled unless otherwise Heat Treated.

- A) This material was produced under a quality system manual Rev.5 dated JUL 01, 2006 and PQ001 Rev.0 dated JUL 01, 2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and (or) KEPIC MNA/ SNA4300.
- B) No repair welding was performed to the products.
- C) The product numbers listed on this test report identifies the material
- Via 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.
- This material is fine grained steel.
- This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

W.G. Jo

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Jo, Won Gook





DAEWOO
INTERNATIONAL

100-714 서울 중구 남대문로 5가 541 (대우빌딩) 경영사무실 2810호

P.O. Box 2810 Seoul 100-714, Korea TEL: 759-2114 / FAX: 759-9499

Mar 11, 2008

ATTN : Edmonton Exchanger.
C.C : To whom it may concern.

Subject: Posco Plate SA516 Grade 70 for Pressure Vessel Quality.

This letter is written to certify that Posco/Daewoo comply with DIN 50049/3.1B, EN10204(2004)/3.1B and ISO 10474/3.1B, also guarantee ASME 2004 Edition-2006 Addendum for PO no. 10623 and 10634 which was supplied by Posco for Edmonton Exchanger. Due to limited space in MTR electric system, it only shows ASME 2004 Edition and EN10204 3.1(or ISO10474 3.1B) which please understand.

Best Regard,

Y.H.KIM

Team Leader

Hot Rolled Steel Team 3, Steel Division 1
Daewoo International Corporation



posco Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 100818-PPSA-004-011
Date of Issue/발행일자 : Aug., 20, 2010

Order No./계약번호 : 0004291917

Supplier/주원자 : DAE WOO INTERNATIONAL CORP.

PO No./주문번호 : 4291917
(ASME2007 EDITION)
Commodity/품명 : HR STEEL PLATE (EN10204 3.1)

Customer/고객사 : EDMONTON EXCHANGER

Spec & Type/규격 : ASME SA516-70 AND SA 20(ASME2007 EDITION)



Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile YS (KSI) (%)	Impact Energy (FT-LBS) (J)	Chemical Composition/화합 성분 (%)	Q T V S C Mn P S Cr Ni Cu Mo Nb Ti V Sol-Al
0.5"x120.5"x480"	P890744101-4104	4	14,884 32,812	SB78545	53.5 77.7 27	A95 1-119 2-125 3-118	1807 343 1139 112 16 3 25 Tr 100 1 1 18 26 1784 343 1122 98 16 2 24 99 1 2 1 18 26	
0.5"x120.5"x480"	P891473501-3503	3	11,163 24,609	SB78545	54.4 80.4 26	1-105 2-75 3-119 A-100	1807 343 1139 112 16 3 25 Tr 100 1 1 18 26 1825 342 1134 115 16 2 24 93 1 Tr 1 18 27	
Sub Total HEAT TREATMENT : 981°C 25min 0.75"x120.5"x480"	P890713001-3003	3	16,737 36,997	SB78539	54.5 78.3 27	1-109 2-111 3-86 A-109	1804 349 1148 98 17 2 25 1 88 1 2 1 18 31 1786 340 1142 92 20 3 22 77 2 5 1 18 31	
0.75"x120.5"x480"	P89080201-0203	3	16,737 36,997	SB78539	54.2 79.9 29	1-122 2-128 3-134 A-128	1804 349 1148 98 17 2 25 1 88 1 2 1 18 31 1892 344 1147 95 16 3 23 73 2 4 1 12 29	

* Position : T : Top, M : Middle, B : Bottom
* Tensile Test : Direction : Transversal, Gauge Length : 200mm (Rectangular)
* YP Method : 0.2% off-set
* Impact Test : Direction : 1/4T Longitudinal,
1/2L-R (Trans-Longitudinal Ratio)
* Division : L : Ladle Analysis, P : Products Analysis
* Chemical Composition Unit : 0.01%
* Tr : It is within the standard range and include trace element.
* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.7 dated Sept.12,2008 and PQG01 Rev.0 dated JUL.01,2008 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and (or) KEPIC MNA/ SNA4300.
B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material.
- 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.
This material is fine grained steel.
* This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

M.S. JANG

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section

Man Soo, Jang



POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호 : 100818-PPSA-004-012
Date of Issue/발행일자 : Aug., 20, 2010

Order No./계약번호 : 0004291917

PO No./주문번호 : 4291917

(ASME2007EDITION)

Supplier/주원자 : DAE WOO INTERNATIONAL CORP.

Commodity/품명 : HR STEEL PLATE (EN10204 3.1)

Customer/고객사 : EDMONTON EXCHANGER

Spec & Type/규격 : ASME SA516-70 AND SA 20(ASME2007EDITION)

Size/치수	Product No. 제품번호	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile/인장시험		Impact/충격시험 V-notch, -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화합성분 (%)														
				YS (KSI)	TS (%)		C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al	
0.75"x120.5"x480"	PB90690401-0403	16,737 36,897	SB78539	T	53.7 79.2 29	1123 2105 3133	L P	1804 1837	349 342	1148 1123	98 90	17 15	2 3	25 24	1 1	88 76	1 1	3 3	1 1	15 15	30 30
0.75"x120.5"x480"	PC6992501-2502	11,156 24,598	SB78542	T	52.8 77.3 28	1117 285 3118	L P	1761 1792	334 327	1135 1128	108 107	19 24	2 2	25 23	Tr Tr	97 96	Tr Tr	1 1	19 19	26 28	
0.75"x120.5"x480"	PB90712901-2903	16,737 36,897	SB78542	T	52.8 77.0 29	1108 2100 3114	L P	1761 1746	334 326	1135 1129	108 105	19 22	2 2	25 24	Tr Tr	97 94	Tr Tr	1 2	20 19	26 28	
0.75"x120.5"x480"	PB90712701-2703	16,737 36,897	SB78542	T	52.5 76.6 27	1114 297 3110	L P	1751 1755	334 324	1135 1132	108 110	19 22	2 2	25 24	Tr Tr	97 96	Tr Tr	1 2	20 19	26 27	
0.75"x120.5"x480"	PB90712601-2603	16,737 36,897	SB78545	T	52.8 77.5 28	1125 2107 3100	L P	1807 1813	343 332	1139 1133	112 116	16 18	3 2	25 24	Tr Tr	100 94	1 Tr	1 Tr	18 19	26 27	

* Position - T : Top, M : Middle, B : Bottom
* Tensile Test : Direction : Transversal, Gauge Length : 200mm (Rectangular)
* Impact Test : Direction : 1/4 T Longitudinal

* YP Method : 0.2% offset
* TLR (Trans Longitude Ratio)
* Division : L : Laid Analysis, P : Products Analysis

* Chemical Composition Unit : 2x1/100, 3x1/1000, 4x1/10000, 5x1/100000
* Tr : It is within the standard range and include trace element
* Supply Condition : As-Rolled unless otherwise Heat Treated.

A) This material was produced under a quality system manual Rev.7 dated Sept.12,2008 and PQG01 Rev.0 dated JUL 01, 2006 audited and approved by customer as conforming to the requirements of ASME Sec. II

B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material

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.
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Surveyor To:

M.S. JANG

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Man Soo, Jang



Certificate No./증명서번호: 100818-PPSA-004-013
Date of Issue/발행일자: Aug., 20, 2010

POSCO Mill Test Certificate/검사증명서

Order No./계약번호: 0004291917
Supplier/주문자: DAE WOO INTERNATIONAL CORP.
Customer/고객사: EDMONTON EXCHANGER

PO No./주문번호: 4291917
(ASME2007 EDITION)
Commodity/품명: HR STEEL PLATE (EN10204 3.1)
Spec & Type/규격: ASME SA516-70 AND SA 20 (ASME2007 EDITION)

Size/지수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P O S I T I O N	Tensile/인장시험		Impact/ 충격시험		Chemical Composition/화학성분(%)																		
						YP (KSI)	TS (%)	EL (%)	V Notch : -50°F Energy (FT-LBS)	SF (%)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al				
0.75"x120.5"x480"	PB90910601-0602	2	11,156 24,598	SB78545	T	51.9	77.0	27	A:111 1:103 2:103 3:71 A:92		L	1807	343	1139	112	16	3	25	Tr	100	1	1	1	18	26			
	*** Sub Total (040) ***	22	122,738 (kg)			270,567 (LBS)					P	1744	330	1114	103	16	3	25	Tr	88	1	Tr	1	18	25			
	*** HEAT TREATMENT *** Normalized : 891°C-35min.	PB90677601-7602	2	18,576 41,172	SB78542	T	50.9	76.0	31	1:105 2:113 3:117		L	1761	334	1135	108	19	2	25	Tr	97	Tr	1	1	20	26		
1.25"x121"x480"	PB90677501-7502	2	18,576 41,172	SB78542	T	50.2	75.6	31	A:111 1:122 2:121 3:113		P	1781	332	1121	101	16	2	25	Tr	95	Tr	1	1	18	26			
	*** Sub Total (040) ***	2	41,172								L	1761	334	1135	108	19	2	25	Tr	97	Tr	1	1	20	26			
1.25"x121"x480"	PB90713201-3202	2	18,576 41,172	SB78542	T	48.9	77.0	32	A:119 1:128 2:100 3:113		L	1761	334	1135	108	19	2	25	Tr	97	Tr	1	1	20	26			
	*** Sub Total (040) ***	2	41,172								P	1738	327	1108	95	22	2	25	Tr	96	Tr	1	1	19	26			

* Position - T: Top, M: Middle, B: Bottom.
* Tensile Test. Direction: Transverse, Gauge Length: 200mm (Rectangular).
* YP Method: 0.2% off-set
* Impact Test. Direction: 1/4T Longitudinal, T.L.R (Trans Longitude Ratio)
* Division - L: Lade Analysis, P: Products Analysis
* Chemical Composition Unit: -2x1/100, -3x1/1000, -4x1/10000, -5x1/100000
* Tr: It is within the standard range and include trace element.
* Supply Condition: As-Rolled unless otherwise Heat Treated.

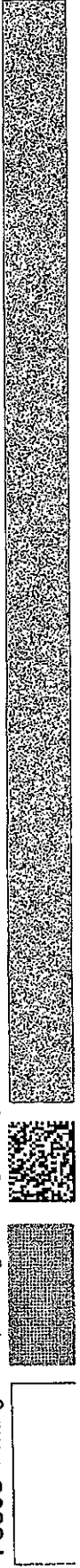
A) This material was produced under a quality system manual Rev.7 dated Sept.12,2008 and PQG01 Rev.0 dated JUL.01,2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3800 and/or KEPCO MNA/ SNA4300.
B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material
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.
This material is fine grained steel.
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Surveyor To:

M.S. JANG

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Man Soo, Jang



Certificate No./증명서번호: 100819-PPSA-002-001
Date of Issue/발행일자: Aug., 20, 2010

posco Mill Test Certificate/검사증명서

Order No./계약번호: 0004291917
Supplier/주문자: DAE WOO INTERNATIONAL CORP.
Customer/고객사: EDMONTON EXCHANGER

PO No./주문번호: 4291917
(ASME2007EDITION)
Commodity/품명: HR STEEL PLATE (EN10204 3.1)
Spec & Type/규격: ASME SA516-70 AND SA 20(ASME2007EDITION)

Size/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile/인장시험 YP TS El. (KSI) (%)		Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화합성분(%)																
0.5"x36.5"x480"	PB92498501-8903	3	8,937 19,701	SB61442	51.8	77.7	27	1:105 2:126 3:174 A:135	L	1754	370	1142	93	22	3	24	Tr	88	Tr	2	2	16	34	
*** Sub Total (020) ***					19,702 (LBS)																			
*** HEAT TREATMENT *** Normalizing : 891°C 22min					1,913,117 (LBS)																			
*** Lot Total ***					1,913,117 (LBS)																			
*** Grade Total ***					1,913,117 (LBS)																			
*** Grand Total ***					1,913,117 (LBS)																			
					=== Last Item ===																			

APPROVED

MANAGER

* LOT NO ==> VACUUM DEGASSED

CEQ (G) = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5

* LOT NO ==> VACUUM DEGAUSS
CEQ (G) = C + Mn/6 + (Ni + Cu/15 + (Cr + Mo + V)/5



* Position - T : Top, M : Middle, B : Bottom
* Tensile Test Direction : Transversal, Gauge Length : 200mm (Rectangular)
YP Method : 0.2% off-set
* Impact Test Direction : 1/4T Longitudinal, T.L.R (Trans Longitudinal Ratio)
* Division : L : Ladle Analysis, P : Products Analysis
* Chemical Composition Unit : 2x1/100, 3x1/1000, 4x1/10000, 5x1/100000
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NCA-3800 and (or) KEPIC MNA/ SNA4300.
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Surveyor To:

M.S. JANG

POSCO Pohang Works, 5 Dongchon-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-785, Korea

Chief of material testing section Man Soo, Jang





소리없이 세상을 움직입니다
www.posco.co.kr

(135-777) POSCO Center 892, Daechi 4-dong, Gangnam-gu, Seoul, Korea, Gangnam P.O. Box 777
Tel (82-2) 3457 - 0783 / Fax (82-2) 3457 - 1980 / Sender : Jae. Hak. Ok

To : EDMONTON EXCHANGER GROUP OF COMPANIES
(5545 89 STREET EDMONTON ALBERTA CANADA T6E 5W9)

Attn.: MR. ERNEST REIMER

Cc :

Subject : Confirmation letter for Nb, Mo, B composition with Order No 0004242127,
0004291917

This letter is to certify that the Chemical composition of Nb, Mo, B marked as "Tr" on the Mill
Test Certificates for steel plates supplied to Edmonton Exchanger with order No 0004242127-080
, 0004291917-010 ~ 070 means the following

Order No	Heat No	O (%)	Nb (%)	B (ppm)	Mo (%)
0004242127-080	SA49752	0.1889	0	0	0.01
	SA49754	0.1899	0	0	0
	SB78539	0.1804	0.002	1	0.01
0004291917-010 ~ 070	SB78542	0.1761	0.001	0	0.01
	SB78545	0.1807	0.002	0	0
	SBB1442	0.1754	0.002	0	0

If you have any further problems in this project, please do not hesitate and contact us.

Tel : 82-2-3457-0783, M.P:82-80-11-9377-8336

Thanks in advance with best regards

Yours sincerely.,

Date : 29th . Sept . 2010

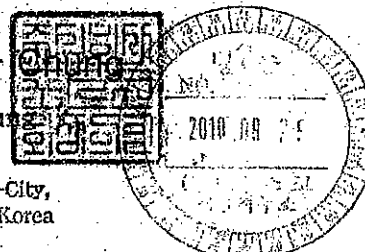


POSCO

CEO Joon Yang -

Joon-Yang Chung
CEO
POSCO

#1, Godeong, Pohang-City,
Gyeong Sang Buk-Do, Korea





2700

March 9, 2011

V.E.G. Oilfield Supply

All

8" Stock Scrubbers

12052 to 12074

Phone: (780) 632-7774

[illegible]

Authorized
Signature





JOB NUMBERS

1. The above items are to be formed to meet the requirements of ASME Section VII, Div. 1 USC 79(d).
2. Tack welds that are welded must use procedures and welders qualified to ASME Section IX
3. On all code required material, Markings must be accurately transferred to formed material or cut pieces.

Authorized
Signature



W

Certified By

*R.J.V. CASFIELD
SERVICES*

Vegreville, Alberta
Phone (780)632-7774

UNIT NAME

Fuel Gas Scrubber

M.A.W.P. Internal

150 p.s.i.
1035 Kpa.

HYDRO TEST

225 p.s.i.
1555 Kpa.

DESIGN TEMP.

100 °F
38 °C

C.R. NUMBER

F6388.231

SERIAL NO.

12055

CORR. ALLOW.

3.17 mm

SHELL MAT'L

SA-106-B

SHELL THICK.

8.1 mm

HEAD THICK.

Top - **7.16** mm

Bottom - **19.05** mm

HEAT TREATMENT

NIL

HEAD MAT'L

Top - **SA-234-WPB**
Bottom - **SA-516-70**

SIZE

219 X 762 mm

WEIGHT

50 Kg.

MIN. DESIGN METAL TEMPERATURE

TEMPERATURE

-20 °F

-29 °C

@

@

@

PRESSURE

150 p.s.i.

1035 Kpa.

DATE MFG.

March 2011

ALBERTA MUNICIPAL AFFAIRS

ABSA, the pressure equipment safety authority
9410 – 20th Avenue
Edmonton, AB T6N 0A4

**MANUFACTURER'S DATA REPORT
FOR MINIATURE PRESSURE VESSEL
DÉCLARATION DE CONFORMITÉ DU CONSTRUCTEUR
D'APPAREILS SOUS PRESSION**

Upon shipment of a pressure vessel, this form fully and correctly filled in must be mailed to the office of the Chief Inspector in the province of installation in accordance with the regulations under the Act, governing the construction and installation of pressure vessels.

Au moment de l'expédition d'un appareil sous pression, ce formulaire complété correctement, doit être envoyé au bureau de l'inspecteur en chef de la province d'installation tel que prévu dans les règlements de la loi sur les appareils sous pression.

Manufactured by Construit par	Name and address of Manufacturer/ Nom et adresse du constructeur RJV Gasfield Services 4901 Bruce Road, Vegreville, Alberta, T9C 1C3
Manufactured for Construit pour	Name and address of Purchaser or Consignee/ Nom et adresse du client ou de son représentant RJV Gasfield Services 4901 Bruce Road, Vegreville, Alberta, T9C 1C3
Ultimate owner Utilisateur	Name and address/ Nom et adresse Stock
Location of installation Lieu d'installation	Name and address/ Nom et adresse Stock

Pressure vessel/ Appareil

Type/ Genre Vertical Fuel Gas Scrubber	Overall Length/Longueur totale 762mm sm/sm	Serial No./ N° de série 12055	Year built/Année de fabrication 2011
Provincial Registration No. – C.R.N./N° d'enregistrement provincial – N.E.C. F6388.231			Drawing No./ N° de dessin V85-05 Rev.2

The chemical and physical properties of all parts meet the requirements of material specifications of the A.S.M.E. Code.
Les propriétés chimiques et physiques de toutes les composantes respectent les exigences des spécifications de matériaux de code ASME.

The design, construction and workmanship conform to CSA B51. <i>La conception, la construction et la façon sont conformes à ACNOR B51.</i>	ASME Section VIII	Division 1	Addenda/Supplément 2009b	Code case No. N° de cas N/A
---	-----------------------------	----------------------	------------------------------------	--

Manufacturer's partial data reports properly identified and signed by authorized inspectors have been furnished for the following items of the report, and attached to this report:
Les rapports partiels du constructeur adéquatement identifiés et signés par les inspecteurs autorisés ont été produits pour les items suivants du rapport, et attachés à ce rapport:

Names of parts/ Nom de la composante	Item No./ N° d'item	Manufacturer's Name/ Nom du constructeur	Identifying Stamp/ Estampe d'identification

Shell/ Virole

Description	Material Matériau	Thickness Épaisseur	Corr. Allow. Surépais. de corr.	Diameter Diamètre	Longitudinal Joints Joints longitudinaux			P.W.H.T. Traitement therm		Girth Joints Joints de circonférence		Number of courses Nombre de sections
					Type	R.T. Radiog.	Efficiency Efficacité	Temp.	Time Durée	Type	R.T. Radiog.	
Shell	SA-106-B	8.1mm	3.17mm	219mm	1	sm/s	100%	-----	-----	None	None	1

Heads/ Têtes

Description	Material Matériau	Min. Thickn. Épais minim.	Corr. Allow Surép. Corr.	Crown. Radius Rayon couron.	Knuckle Radius Petit rayon	Ellipse Ratio Rapp. ellipse	Conical Apex Angle Angle conique	Hemisph. Radius Ray. Hémisph	Flat Diameter Diam.plat	Side to pressure Côte sous pression
Top	SA-234-WPB	7.16mm	3.17 mm	-----	-----	Weld Cap	-----	-----	-----	Concave
Bottom	SA-516-70	19.05mm	3.17 mm	-----	-----	-----	-----	-----	305 mm	Flat
Removable bolts used (describe other fastenings) <i>Boulons amovibles utilisés (décrire tout autre attache)</i>						Mat'l Spec./ Spéc. du mat.		Grade		Size/ Dimension

Pressure - Temperature/ Pression - température

Pressure Vessel Part Partie de l'appareil	Constructed for max. allowable working pressure Construit pour une pression maximale de marche permise	At max. temp. A une temp. max.	Minimum design metal temp. Temp. min.	Test pressure (hydro-pneumatic or combination) Pression d'épreuve (hydro-pneumatique ou combinaison)
Vessel	1035 Kpa	38°	-29°	1555 kPa

Tube Section/ Faisceau tubulaire

Tubesheet/ Plaque tubulaire	Material/ Matériau	Diameter/ Diamètre	Nominal Thickness Épaisseur nominale	Corr. Allow. Surépais. corrosion	Attachment Mode d'attachement
Tube material/ Matériau des tubes	Diameter/ Diamètre	Nominal Thickness (gauge) Épaisseur nominale (calibre)	Number/ Nbre	Type (Straight or U) Type (Droit ou U)	Heating Surface Surface de chauffe

Jacket/ Chemise

Type of jacket/ Genre de chemise	Jacket closure Fermeture de chemise	Proof Test Pression d'épreuve	Heating Surface Surface de chauffe	Sketch/ Schéma
----------------------------------	--	----------------------------------	---------------------------------------	----------------

Safety Valve Outlets/ Soupapes de sûreté

Number/ Nombre 1	Dimension 33.4MM	Location/ Endroit Shell
---------------------	---------------------	----------------------------

Nozzles and Openings/ Tubulures et ouvertures

Purpose/ But	Number Nombre	Dimension	Type	Material Matériau	Nominal Thickness Épaisseur nominale	Reinforcement material Matériau de renfort	How attached Genre d'attaches	Location/ Endroit
Outlet	1	60.3mm	Coupling	SA-105	CL3000	N/A	UW16.1{c}	Top Head
Inlet/Drain/P.S.V.	3	33.4mm	Coupling	SA-105	CL3000	N/A	UW16.1{c}	Shell

Supports/ Supports

Skirt/ Jupe Yes/ Oui No/ Non ☐ ☒	Lugs/ Oreilles No./ Nbre No	Legs/ Pieds No./ Nbre No	Other/ Autres (Description) N/A	Attached/ Attaches (Where and How/ Méthode et endroit) Flat bottom head welded to shell
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Remarks/ Observations (Cubical capacity/ Volume)

Volume-(.022 cubic meters)
Exempt from impact test requirements as per UG 20(f) 1 to 5
Flat head o.d. is 203mm
Hydrostatically tested in the Vertical Position

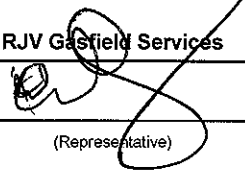
Certificate of Compliance/ Certificat de conformité

We certify that the statements made in this data report are correct and that the said vessel has been constructed in accordance with the Provincial Registered design below and the requirements of standard CSA B51.

Nous certifions que les données de la déclaration de conformité sont correctes et que l'appareil a été construit en accord avec l'enregistrement provincial ci-dessous et les exigences de la norme ACNOR B51.

Provincial Registered Design
Enregistrement provincial **F6388.231**

Manufacturer
Constructeur **RJV Gasfield Services**

Signature  Date **APR 02 2011**
(Representative)

Signature _____ Date _____
(Certified Individual)