

Travel Sheet

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

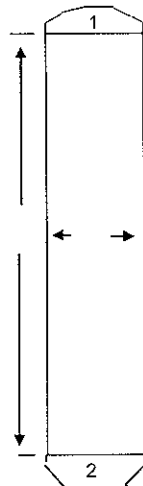
"A"-Hold Point, "I"- Inspection Point, "R"-Revision, "W"- Witness Point

Hold Points established - Sign & Date _____

(Authorized Inspector)

Vessel s/n range 11995 to 12009

Vessel Serial #	12003	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	AUTHORIZED INSPECTOR
APPROVED DRAWING			January 24, 2011	①
CALCULATIONS ON FILE			January 24, 2011	②
MATERIAL CHECKED AGAINST DRAWING, MATERIAL LIST			January 24, 2011	②
MTR'S CHECKED			January 24, 2011	②
VESSEL LAYOUT			January 25, 2011	②
NOZZLES	ORIENTATION		January 25, 2011	②
& FITTINGS	RATINGS		January 25, 2011	②
FIT	NOZZLES & FITTINGS		January 26, 2011	②
UP	SHELL & HEAD		January 26, 2011	②
INTERNALS (tray, baffles, etc)				
INTERNAL INSPECTION				
WELD SIZES			January 30, 2011	②
WELDERS I.D.			January 30, 2011	②
EXTERNAL AFTER COMPLETION OF ALL WELDING			January 31, 2011	②
RADIOGRAPHS				
OTHER N.D.E.				
IMPACT TESTS				
POST WELD HEAT TREATMENT	YES: NO: ✓			
EXTERNAL BEFORE PWHT				
PWHT CHART CHECKED				
NAMEPLATE			January 31, 2011	②
HYDROSTATIC TEST			January 31, 2011	②
DATA REPORT			January 31, 2011	②
NONCONFORMANCES				



		SPECIFICATIONS		HEAT NUMBER	VERIFIED THICKNESS
		C1	C2		
SHELL		SA-106-B		8204768 ✓	8.1mm
HEADS	1	SA-234-WPB		09H30002 ✓	7.16mm
	2	SA-516-70		7890216760 ✓	19.05mm
	3				
REPADS	1				
	2				
	3				
	4				
		SPECIFICATIONS		SIZE	SCHEDULE
NOZZLES					
FITTINGS		SA-105		1", 2"	#3000 cplg.
TUBES					

D08-2-8014
08204768

江阴市无缝钢管总厂

MILL TEST CERTIFICATE

No. 375, Zhengcheng Rd. Xiagang Tomi Jiangyin City
Jiangsu Province, China (214442) <http://www.ojgs.cn>
Tel: 86-510-86160723 Fax: 86-510-86160732

质量管理部门负责人: Quality Manager;	审核人: Auditor;	制证人: Certification-maker;
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Quality Manager:

重校人:
Aukitor;

认证人：
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 CotC# 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

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	A08 Manufacturer's order/ 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-D04	1/...
MATERIAL TEST REPORT (MTR)		B01 Product HOT ROLLED PLATES		
A05 Established inspecting body DH	A06 Purchaser ARCELOR CANADA, BURLI	A07.1 No. 60115		
	Final receiver EDMONTON STEEL, EDMON	A07.2 No. E10372-J1010-LG		
B02 Steel grade SA516-70	SA20-S5			
B03 Specifications ASME-2A:04 DIL-HUE2:REV.19-03.10.05				



12680

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
			INCH						
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78902	16750-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78902	16760-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78902	16761-01	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78902	16761-02	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78902	16761-03	ITEM 1
01	1	0,7500 x	120,50000 x	480,00000	5580 N	N	78903	16744-02	ITEM 1
**	6				33480				
02	1	1,0000 x	96,50000 x	480,00000	5959 N	N	78901	16769-02	ITEM 2
02	1	1,0000 x	96,50000 x	480,00000	5959 N	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 ATTAIN THE TARGET TEMPERATURE OVER THE WHOLE SECTION: 1-1,75 MIN/NM (25-45 MIN/INCH)
COOLING IN STILL AIR

B06 Marking

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

A04			AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
QM-System: Certification as per ISO 9001		AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department
2012/02 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.		3.1.11	B. MUELLER	Inspector's stamp
Test House Manager		Date 29.05.06	PP 1	1



DILLINGER HÜTTE

Erklärungen siehe Rückseite/Explications voir au verso/Saa 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	A08/ Manufacturer's order/ A03 Certificate No.	Sheet
MATERIAL TEST REPORT (MTR)		214210-28.05.06	306374-004	2/...
A05 Established inspecting body DH	A06 Purchaser ARCELOR CANADA, BURLI A07.1 No. 60115 Final receiver EDMONTON STEEL, EDMON A07.2 No. E10372-J1010-LG	B01 Product HOT ROLLED PLATES		
B02/ Steel grade SA515-70	SA20-S5			
B03 Specifications ASME-2A:04 DYL-HUE2:REV.19-03.10.05				

C10-C29 Tensile test

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

C30-C39 Hardness test

B09 Item No.	B08 Heat No.	B07 Rol.plate/ Test No.	B05 Reference condition	C01 C02/ C03 GRF	C33 Temp. GRF	C35 Testing method	C31 Individual values	C32 Average value
01	78902	16750		K1 O	RT HBW 10/3000	HB 142	145	143
01	78902	16760		K1 O	RT HBW 10/3000	HB 144	145	144
01	78902	16761		K1 O	RT HBW 10/3000	HB 142	142	142
01	78903	16744		K1 O	RT HBW 10/3000	HB 143	143	143
02	78901	16769		K1 O	RT HBW 10/3000	HB 144	143	144
02	78901	16775		K1 O	RT HBW 10/3000	HB 144	146	146

C40-C49 Impact test

B09 Item No.	B08 Heat No.	B07 Rol.plate/ Test No.	B05 Reference condition	C01 C02/ C03 GRF	C40 Specimen width	C41 Type of specimen	C44 Testing method	C46 Energy	C42 Individual values AV=FT.LBF	C43 Average value
01	78902	16750		K1 LV	-51	CHP-V	CHP-V	AV 111	136	206
01	78902	16760		K1 LV	-51	CHP-V	CHP-V	AV 107	125	146
01	78902	16761		K1 LV	-51	CHP-V	CHP-V	AV 83	140	144
01	78903	16744		K1 LV	-51	CHP-V	CHP-V	AV 161	144	156

A04	201/202 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		Inspector's stamp Date 29.05.06 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+AL:1995 + AS PER ISO 10474:1991		214210-28.05.06	306374-004	3/....
MATERIAL TEST REPORT (MTR)				
A05 Established inspecting body	A06 Purchaser	B01 Product		
DH	ARCELOR CANADA, BURLI	HOT ROLLED PLATES		
	EDMONTON STEEL, EDMON			
B02/ Steel grade	SA516-70			
B03 Specifications	ASME-2A:04			
	DIL-HUE2; REV.19-03.10.05			
	SA20-S5			

A07.1 No.	A07.2 No.
60115	E10372-J1010-LG
Final receiver	

C40-C49 Impact test									
B08 Heat No.	B07 Rollplate/ Test No.	B05 Reference condition	C01	C02/ C01	C03 Temp. GR.F	C41 Specimen width	C40 Type of specimen	C44 Testing method	C45 C42 Individual values AV=FT.LBF
02 78901	16769		K1 LV	LV	-51		CHP-V		AV 126 119
02 78901	16775		K1 LV	LV	-51		CHP-V		AV 109 162

C70-C99 Chemical composition % - Heat analysis									
B08 Heat	C	SI	MN	P	S	N	AL	CU	MO
78901	Y	0,186	0,339	1,18	0,012	0,0008	0,0047	0,012	0,005
78902	Y	0,179	0,373	1,20	0,010	0,0007	0,0060	0,015	0,004
78903	Y	0,169	0,360	1,18	0,012	0,0009	0,0053	0,016	0,005

C94 Heat analysis Carbon equivalent / Alloying restrictions									
B08 Heat	Ti	B	FO-02=	FO-55=	FO-78=	FO-91=	CR	NI	V
78901	Y	0,002	0,0001	0,002	0,0001	0,0001	0,054	0,019	0,000
78902	Y	0,002	0,0001	0,002	0,0001	0,0001	0,038	0,021	0,000
78903	Y	0,001	0,0001	0,001	0,0001	0,0001	0,035	0,070	0,001

C95 Heat analysis Sulphide shape control									
B08 Heat	FO-02=	FO-55=	FO-78=	FO-91=	CU	MO	NI	CR	SN
78901	6,3	6,7	7,0						
78902									
78903									

ITEM NO.: 01-02	HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL
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A04	A01
	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department
Z01/Z02 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	ADB
QM-System: Certification as per ISO 9001	B. MOELLER Test House Manager
Trademark	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	A08/ Manufacturer's order/ A03 Certificate No. 306374-004	Sheet 4/...
A05 Established inspecting body DH	A06 Purchaser ARCELOR CANADA, BURLI Final receiver EDMONTON STEEL, EDMON	A07.1 No. 60115 A07.2 No. E10372-J1010-LG	B01 Product HOT ROLLED PLATES	
B02/ Steel grade SA516-70	SA20-S5			
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	NB	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

C94 Product analysis Carbon equivalent / Alloying restrictions

B08 Heat	B07 Test No.	C01	FO-02	FO-55	FO-78	FO-91
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		201202 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		Inspector's stamp B. MUELLER	Date 29.05.06	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	5
MATERIAL TEST REPORT (MTR)				
A05 Established inspecting body IDH	A06 Purchaser ARCELOR CANADA, BURLI	A07.1 No. 60115	B01 Product HOT ROLLED PLATES	
	Final receiver EDMONTON STEEL, EDMON	A07.2 No. E10372-J1010-LG		
B02/ Steel grade SA516-70				
B03 Specifications 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	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	A01
	QM-System: Certification as per ISO 9001	ADB	
Trademark	B. MUELLER Test House Manager	Inspector's stamp	PP 1
		Date 29.05.06	

POSCO Mill Test Certificate/검사증명서

Certificate No./증명서번호: 061110-PPSA-002-015
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 DEGASSED)

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(%)									
0.75"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	L 1878	353	1142	102	16	3	22	111	Tr	1 1 17 28
	PC21414201-4202	2	8,934 19,696	SB56276	52.2 78.3 28	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
	*** Sub Total (930) ***	15			67,005 (kg)											
0.75"x120.5"x480"	HEAT TREATMENT: 890°C 30min. ***															
	PE25630001-0008	3	16,737 36,897	SB56272	50.9 76.1 27	1:110 2:117 3:117 A-115	L 1922	368	1131	91	19	2	21	93	Tr	1 1 17 30
0.75"x120.5"x480"	PE25630101-0103	3	16,737 36,897	SB56272	51.9 77.0 28	1:115 2:95 3:116 A-108	L 1922	368	1131	91	19	2	21	93	Tr	1 1 17 30

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, 3x1/1000, 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 MINA/ 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:



KT014 12 MAR.31.2005

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

Chief of material testing section

Na, C.B

Na, Chai Bong

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/치수	Product No. 제품번호	Qua- ntity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P O S I T I O N	Tensile/인장시험		Impact/충격 시험		Chemical Composition/화합성분(%)																	
						Y.P. (KSI)	TS (%)	EL (%)	V Notch 50°F		Energy SF (FT-LBS)	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V	Soi-Al			
0.75"x120.5"x480"	PB25630201-0203	3	16,737 36,897	SB56272	T	52.6	77.3	28	1:85 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	SB56272	T	53.2	77.5	28	1:73 2:122	3:99	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	SB56272	T	52.4	77.9	33	1:98 2:116	3:106	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	SB56272	T	52.5	77.9	30	1:93 2:97	3:77	L	1922	368	1131	91	19	2	21	93	Tr	Tr	1	17	30			
0.75"x120.5"x480"	PB25680701-0703	3	16,737 36,897	SB56272	T	53.1	77.7	28	1:103 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 (<0.008%) 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-3500 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, 0 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/화학성분(%)													
						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
0.75"x120.5"x480"	PB25629901-9902	2	11,158 24,598		T	51.9	77.2	27	A-117 1:126 2:100 3:96	L	1878	353	1142	102	16	3	22	111	Tr	1	1	1	17	28
0.75"x120.5"x480"	PB25630301-0303	3	16,737 36,897		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	1	17	28
0.75"x120.5"x480"	PB25630401-0403	3	16,737 36,897		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	1	17	28
0.75"x120.5"x480"	PB25630501-0503	3	16,737 36,897		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	1	17	28
0.75"x120.5"x480"	PB25630601-0603	3	16,737		T	52.4	77.6	28	A-204 1:129	L	1878	353	1142	102	16	3	22	111	Tr	1	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 Longitudinal 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. III NCA-3800 and/or KEPIC MINA/ 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, Chai Bong

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 : 0611110-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 DEGASSED)

Size/지수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재강번호	POSITION	Tensile/인장시험		Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	D I V I S I O N	Chemical Composition/화학성분(%)												
						YP (KSI)	TS (KSI)			EL (%)	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V
0.75"x120.5"x480"	P825642701-2703	3	16,737 36,897	S856276	T	51.3	76.7	27	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	P825875301-5303	3	16,737 36,897	S856276	T	50.6	76.9	28	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	P825885301-5303	3	16,737 36,897	S856276	T	51.2	76.9	30	L	1878	353	1142	102	16	3	22	111	Tr	1	1	17	28
0.75"x120.5"x480"	P826020201-0203	3	16,737 36,897	S856919	T	51.8	77.6	26	L	1842	339	1168	81	20	2	24	105	Tr	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 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 POG01 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.



Surveyor To:

Na, Chai Bong

KT-0110 10-03-01-001

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-002-019
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. 제강번호	P O S I T I O N	Tensile/인장시험 YP TS (KSI)	Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	D I V I S I O N	Chemical Composition/화학적성분(%)														
0.75"x120.5"x480"	PB26020301-0303	3	16,737 36,897	SB56919	T	51.5 77.3 30	1.90 2.83 3.78 A.83 614,970 (LBS)	L	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Tr	Tr	1	18	34	
*** Sub Total : (940) ***			50																				
*** HEAT TREATMENT *** : 890°C 35min.																							
1"x96.5"x480"	PB25641401-1403	3	17,874 39,405	SB56272	T	51.3 77.7 32	1.94 2.89 3.74 A.86 1:130 2:162 3:125 A:139	L	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Tr	Tr	1	17	30	
1"x96.5"x480"	PB25685101-5103	3	17,874 39,405	SB56276	T	50.3 75.9 28	1:130 2:162 3:125 A:139	L	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Tr	Tr	1	17	28	
1"x96.5"x480"	PB25687101-7103	3	17,874 39,405	SB56276	T	50.3 75.9 31	1:124 2:105 3:108 A:112	L	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Tr	Tr	1	17	28	
1"x96.5"x480"	PC21563801	1	5,958	SB56919	T	52.2 75.7 31	1.89	L	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Tr	Tr	1	18	34	

* 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 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.



Surveyor To:



NOV 19 2006

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

Na, Chai Bong

Chief of material testing section Na, C.B

A) This material was produced under a quality system manual Rev.5 dated JUL 01 2006 and POG01 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.



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		A10 Advice of dispatch No./ Date of dispatch	A08/ Manufacturer's order/ A03 Certificate No.	Sheet
MATERIAL TEST REPORT (MTR)		252001-05.04.07	318453-002	1/...
A05 Established inspecting body	A06 Purchaser	B01 Product		
DH	Final receiver	HOT ROLLED PLATES		
B02/ Steel design.	ARCELOR CANADA, BURLI	A07.1 No. 61216		
B03 Any suppl. requirements	EDMONTON STEEL, EDMON	A07.2 No. E10421-J1010-LG		



13292

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	B11 Length	B12 Theoretical mass	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	5708	N	292924	99513-01	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000	5708	N	292924	99513-02	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000	5708	N	292924	99513-03	ITEM 2
02	1	0,7500 x	172,00000 x	344,00000	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 Reference (heat) treatment	C01 C02/ C03 C01	C10 C11	C12 C13	C14-C15
02	292924	99513	K1 Q RT	KSI RP02 52,2	RM 76,3	A % LO=8IN 28,0

A04 Z01Z02Z03 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

B. MUELLER
Test House Manager

Inspector's stamp

Date 05.04.07

KW

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		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	A07.1 No.	A07.2 No.	
DH	ARCELOR CANADA, BURLI	61216	E10421-J1010-IG	
B02 Steel design.		B01 Product		
SA516-70		HOT ROLLED PLATES		
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. GRF	C33 Testing method	C35 Individual values	C32 Average value
02	292924	99513		K1	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. GRF	C41 Width of test place	C40 Type of test piece	C44 Testing method	C45 Energy	C42 Individual values	C43 Average value
02	292924	99513		K1	LV	-51		CHP-V			AV 164 153 128	148

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat No.	C70	Y	C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NB	SN
292924		0,183	0,371	1,19	0,008	0,006	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 Ladie treatment

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

A04				AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	Date 05.04.07	KW 1
A05 Established inspecting body		A06 Purchaser		A07.1 No.		A07.2 No.
DH		ARCELOR CANADA, BURLI		61216		E10421-J1010-IG
B02 Steel design.		SA516-70		B01 Product		HOT ROLLED PLATES
B03 Any suppl. requirements		ASME-2A: 04+A05		DIL-HUE-2: R21-2006-04-27		

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



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/ 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	3
MATERIAL TEST REPORT (MTR)				
A05 Established inspecting body	A08 Purchaser	B01 Product		
DH	Final receiver	HOT ROLLED PLATES		
B02/ Steel design.	SA516-70			
B03 Any suppl. requirements	ASME-2A:04+A05 DIL-HUE-2:R21-2006-04-27			

C70-C99 Chemical composition % - Product analysis

		C	SI	MN	P	S	N	AL	CU	MO	NI	CR	V	NE	SN
B07.2 Heat	B07.1 Test No.														
292924	99514	K1 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
B07.2 Heat	B07.1 Test No.														
292924	99514	K1 0,002	0,0001												

C94 Product analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	B07.1 Test No.	
292924	99514	K1 FO-02= 0,39 FO-55= 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

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
(ASME2004 EDITION)
Commodity/품명: HR STEEL PLATE (EN10204 3.1B)
Spec & Type/규격: ASME SA516-70 AND SA 20 (ASME2004 EDITION)

Size/지수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재강번호	P O S T I T I O N	Tensile/인장시험		Impact/충격시험 V-Notch -50°F Energy SF (FT-LBS) (%)	D I S T R I B U T I O N	Chemical Composition/화합성분(%)																
						YP (KSI)	TS (%)			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	29	3:136 A:139 1:138 2:132 3:145 A:138	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	1:138 2:132 3:145 A:138	L	1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25		
0.625"x120.50"x480"	PB47919801-9804	4	18,600 41,004	SB98670	T	55.7	80.4	27	A:138 1:173 2:151 3:148 A:157	L	1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25		
*** Sub Total (050) ***																										
*** HEAT TREATMENT 890°C 30min. ***																										
0.750"x86.50"x480"	PB46803301-3304	4	17,868 39,392	SB98741	T	50.3	76.4	26	1:137 2:148	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)
Y.P 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.

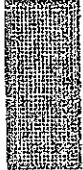
A) This material was produced under a quality system manual Rev.5 dated JUL.01.2006 and PQG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. II NCA-3800 and (or) KEPIC MNA/ SNA4300.
B) No repair welding was performed to the products.
C) The product numbers listed on this test report identifies the material 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

Chief of material testing section Jo, Won Gook

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



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
(ASME2004 EDITION)

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(ASME2004 EDITION)

Size/치수	Product No. 제품번호	COIL Quality 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	Tensile YS (KSI)	TS EL (%)	Impact V Notch -50°F Energy SF (FT-LBS)	Chemical Composition/화합성분(%)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al
0.750"x96.50"x480"	PB46805701-5704	4	17,868 39,392	SB96741	51.9	76.7	29	3.134 A:139	19.12	34.3	115.1	120	9	2	22	1	100	Tr	Tr	1	19	23
0.750"x96.50"x480"	PB46886501-6504	4	17,868 39,392	SB96743	52.1	77.5	29	3.121 A:139	19.41	33.4	113.3	88	20	2	20	1	93	Tr	Tr	1	16	34
0.750"x96.50"x480"	PB46830102-0104	3	13,401 29,544	SB96749	50.9	76.1	30	3.125 A:136	19.50	33.0	114.4	78	14	2	23	Tr	94	Tr	Tr	1	18	38
*** Sub Total (#80) ***			15																			
*** HEAT TREATMENT ***																						
0.750"x120.50"x480"	PC37142301	1	5,579 12,299	SA81498	49.9	78.6	30	147,719 (LBS)	19.01	38.1	117.0	93	15	3	24	Tr	108	Tr	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, -3x1/1000, -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 PQ001 Rev.0 dated JUL.01.2005 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3900 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.
- * This Mill Test Certificate cannot be copied for any purpose.

Surveyor To:

M.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
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. 재강번호	P O S I T I O N	Tensile/인장시험 Y _P TS EL (KSI) (%)	Impact/충격시험 V-Notch -50°F Energy SF (FT-LBS) (%)	Chemical Composition/화학성분(%)													D I S T R I B U T I O N			
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 A:139	L 1912 343 1151 120 9 2 22 1 100 Tr Tr 1 19 23	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al		
0.750"x120.50"x480"	PB46808401-8403	3	16,737 36,897	SB96741	T	50.3 76.3 29	1:125 2:137 3:150 A:138	L 1912 343 1151 120 9 2 22 1 100 Tr Tr 1 19 23	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al		
0.750"x120.50"x480"	PB46808301-8302	2	11,158 24,598	SB96741	T	50.2 75.0 30	1:135 2:118 3:116 A:122	L 1912 343 1151 120 9 2 22 1 100 Tr Tr 1 19 23	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al		
0.750"x120.50"x480"	PB46881801-1803	3	16,737 36,897	SB96743	T	53.1 77.5 29	1:128 2:153 3:142 A:141	L 1941 334 1183 88 20 2 20 1 93 Tr Tr 1 16 34	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al		
0.750"x120.50"x480"	PB46808001-8003	3	16,737 36,897	SB96743	T	50.5 76.4 28	1:114 2:124	L 1941 334 1183 88 20 2 20 1 93 Tr Tr 1 16 34	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al		

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.01.2005 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 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 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/치수	Product No. 제품번호	COIL Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	P Q S T O N	Tensile/인장시험		Impact/충격시험		Chemical Composition/화합성분(%)											
						YP	TS	EL	Energy	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti
0.750"x120.50"x480"	PB46808601-8603	3	16,737 36,897	SB96743	T	50.8	76.1	29	3.114 A.117	1941	334	1183	88	20	2	20	1	93	Tr	1	16
0.750"x120.50"x480"	PB47395401-5403	3	16,737 36,897	SB96743	T	52.5	77.7	25	2.123 3.117 A.118	1941	334	1163	88	20	2	20	1	93	Tr	1	16
0.750"x120.50"x480"	PB46808501-8503	3	16,737 36,897	SB96746	T	51.3	77.3	28	2.141 3.128 A.133	1948	334	1135	88	14	2	20	1	94	Tr	1	16
0.750"x120.50"x480"	PB47920401-0402	2	11,158 24,598	SB98670	T	54.4	79.2	29	1.102 2.102 3.100 A.101	1817	342	1151	68	15	2	23	Tr	89	Tr	1	19
*** Sub Total (970) ***						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,
* Division - L:Ladle Analysis
* Chemical Composition Unit: -2:x1/100, -4:x1/1000, -5:x1/10000.
* 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/ 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.

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

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 (LBS)	Heat No. 재강번호	Tensile/인장시험			Impact/ 충격시험 V Notch -50°F Energy SF (FT-LBS) (%)	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"	PB46830301	3	15,642 34,485	SB96741	50.3 75.6 29	1:134 2:133 3:117 A:128	1:136 2:82 3:69 A:98	1:125 2:117 3:131 A:125	L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
0.875"x96.50"x480"	PB46830201-0203	3	15,642 34,485	SB96741	51.9 76.4 32	1:130 2:119 3:84 A:111	1:125 2:117 3:131 A:125	1:125 2:117 3:131 A:125	L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
0.875"x96.50"x480"	PB46808901-8903	3	15,642 34,485	SB96741	51.1 75.9 28	1:125 2:117 3:131 A:125	1:125 2:117 3:131 A:125	1:125 2:117 3:131 A:125	L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	Tr	1	19	23
									L	1912	343	1151	120	9	2	22	1	100	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. 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 :080225-PPSA-004-001
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	POSITION	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	S898870	T	53.4	77.3 28	1:119 2:142 3:133 A:131 14,356 (LBS)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al					
*** Sub Total (ggo) ***			1			6,512 (kg)			1817	342	1151	68	15	2	23	Tr	89	Tr	Tr	1	19	25					
*** HEAT TREATMENT ***			238			1,488,417 (kg)		3,281,349 (LBS)																			
*** Lot Total ***			238			1,488,417 (kg)		3,281,349 (LBS)																			
*** Grade Total ***			238			1,488,417 (kg)		3,281,349 (LBS)																			
*** Grand Total ***						Last Item ===																					

*** LOT NO ==> VACUUM DEGASSED

MTR APPROVED

EDMONT ROYCHANGER

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. 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 material is fine grained steel.

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

* 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, 3x1/1000, 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/ 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





DAEWOO
INTERNATIONAL

www.daewoo.com

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

C.P.O Box 2810 Seoul 100-714, Korea TEL: 753-2114 / FAX: 753-9439

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/주문자: 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/지수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재질번호	Position 위치	Tensile/인장시험 YP TS (KSI) (%)	Impact/충격시험 V-notch Energy (FT-LBS) (J)	Chemical Composition/화학성분(%)														
								C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Al	
0.5"X120.5"X480"	PB90744101-4104	4	14,884 32,812	SB78545	T	53.5 77.7 27	A-85 1:119 2:123 3:118 A-120	L	1807	343	1189	112	16	3	25	Tr	100	1	1	1	18	26
								P	1784	343	1122	99	16	2	24	99	1	2	1	18	26	
0.5"X120.5"X480"	PB91473501-3503	3	11,163 24,609	SB78545	T	54.4 80.4 26	A-100	L	1807	343	1189	112	16	3	25	Tr	100	1	1	1	18	26
								P	1825	342	1134	115	16	2	24	93	1	Tr	1	18	27	
0.75"X120.5"X480"	PB90713001-3003	3	16,737 36,897	SB78539	T	54.5 78.3 27	A-103	L	1804	349	1148	98	17	2	25	1	88	1	2	1	18	31
								P	1786	340	1142	92	20	3	22	77	2	5	1	18	31	
0.75"X120.5"X480"	PB9060201-0203	3	16,737 36,897	SB78539	T	54.2 79.9 29	A-128	L	1804	349	1148	98	17	2	25	1	88	1	2	1	18	31
								P	1862	344	1147	95	16	3	23	78	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

T-L/R(Trans-Longitide Ratio)

Division : L:Ladle Analysis; P:Products Analysis

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

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) KEPIC MNAW SNA4300.

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./주문번호: 0004291917

PO. No./주문번호: 4291917
(ASME2007 EDITION)

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(ASME2007 EDITION)

Size/치수	Product No. 제품번호	Quantity 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 (%)	P S T O N	Chemical Composition/화학성분 (%)	Cu	Nb	Tr	V	Sol-A1
0.75"x120.5"x480"	PB00680401-0403	3	16,737 36,897	SB78542	T	53.7 79.2 29	1:123 2:105 3:133 A:120	1804 349 1148 98 17 2 25 1 38 1 2 1 18 31	P	1837 342 1123 90 15 3 24 76 1 3 1 15 30					
0.75"x120.5"x480"	PC68992501-2502	2	11,158 24,598	SB78542	T	52.8 77.3 28	1:117 2:85 3:118 A:106	1761 334 1135 108 19 2 25 Tr 97 Tr 1 1 20 26	P	1792 327 1128 107 21 2 23 96 Tr Tr 1 19 28					
0.75"x120.5"x480"	PB90712901-2903	3	16,737 36,897	SB78542	T	52.8 77.0 29	1:108 2:100 3:114 A:108	1761 334 1135 108 19 2 25 Tr 97 Tr 1 1 20 26	P	1746 326 1129 105 22 2 24 94 Tr 2 1 19 28					
0.75"x120.5"x480"	PB90712701-2703	3	16,737 36,897	SB78542	T	52.5 76.6 27	1:114 2:97 3:110 A:107	1761 334 1135 108 19 2 25 Tr 97 Tr 1 1 20 26	P	1756 324 1132 110 22 2 24 96 Tr 2 1 19 27					
0.75"x120.5"x480"	PB90712601-2603	3	16,737 36,897	SB78545	T	52.8 77.5 28	1:125 2:107 3:100 A:107	1807 343 1139 112 16 3 25 Tr 100 1 1 18 26	P	1813 332 1133 116 18 2 24 94 Tr 1 19 27					

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

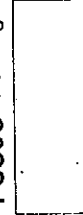
A) This material was produced under a quality system manual Rev.7 dated Sept.12,2003 and PQG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. II, NCA-3800 and (or) KEPIC MNAV SNA4300.
B) No repair welding was performed to the products.
C) The product 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 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



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

POSCO Mill Test Certificate/검사증명서

Order No./계약번호 : 0004291917

PO No./주문번호 : 4291917
(ASME2007 EDITION)

Supplier/주물자 : 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 (ASME2007 EDITION)

Size/지수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 제강번호	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	B	Cu	Mo	Nb	Ti	V	Sol-Al						
0.75"x120.5"x480"	PB90910601-0602	2	11,158 24,598	SB78545	T	51.9	77.0	27	A-111 1-103 2-103 3-71 A-92	L P	1807 1744	343 330	1139 1114	112 103	16 16	3 3	25 25	Tr	100 88	1 1	1 Tr	1 1	18 18	26 25				
	*** Sub Total (040) ***	22	122,738 (kg)			270.587 (LBS)																						
	*** HEAT TREATMENT *** Normalized : 891°C 35min. ***																											
	1.25"x121"x480"	PB90677601-7602	2	18,676 41,172	SB78542	T	50.9	75.0	31	1-105 2-113 3-117 A-111	L P	1761 1647	334 337	1135 1127	108 102	19 17	2 2	25 25	Tr	97 93	Tr	1 1	1 1	20 18	26 28			
1.25"x121"x480"	PB90677501-7502	2	18,676 41,172	SB78542	T	50.2	75.6	31	1-122 2-121 3-113 A-119	L P	1761 1781	334 332	1135 1121	108 101	19 16	2 2	25 25	Tr	97 95	Tr	1 1	1 1	20 18	26 26				
	PB90713201-3202	2	18,676 41,172	SB78542	T	49.9	77.0	32	1-128 2-100 3-113	L P	1761 1738	354 327	1135 1103	108 95	19 22	2 2	25 25	Tr	97 96	Tr	1 1	1 1	20 19	26 26				

* Position : T : Top, M : Middle, B : Bottom.
* Tensile Test : Direction : Transversal, Gauge Length : 200mm (Rectangular),
YP Method : 0.2% offset
* 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
* 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 PGG01 Rev.0 dated JUL.01.2006 audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3860 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

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

posco Mill Test Certificate/검사증명서

Order No./주문번호: 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/치수	Product No. 제품번호	Quantity 수량	Weight 중량 (kg) (LBS)	Heat No. 재강번호	Tensile/인장시험			Impact/충격시험		Chemical Composition/화학성분(%)																		
					YP	TS	EL	V-Notch -50°F	Energy SF (FT-LBS)	C	Si	Mn	P	S	Cr	Ni	B	Cu	Mo	Nb	Ti	V	Sol-Al					
0.5"x96.5"x480"	P892498901-8903	3	8,937 19,701	SB81442	51.8	77.7	27		1,105 2,126 3,174 A:135	L P	1754 1774	370 366	1142 1146	93 90	22 22	3 2	24 24	Ti Ti	88 78	2 1	2 2	16 17	34 35					
Sub Total (020) ***		3	8,937 (kg)		19,702 (LBS)																							
HEAT TREATMENT ***	Normalized : 891°C 22min. ***																											
Lot Total ***		198	867,768 (kg)		1,913,117 (LBS)																							
Grade Total ***		198	867,768 (kg)		1,913,117 (LBS)																							
Grand Total ***		198	867,768 (kg)		1,913,117 (LBS)				Last Item ***																			

RECEIVED

APPROVED

FOR

FORWARDED

LOT NO ==> VACUUM DEGASSED

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

* LOT NO ==> VACUUM DEGASSED
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 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 JUL01,2008-audited and approved by customer as conforming to the requirements of ASME Sec. III NCA-3500 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 material is fine grained steel.
* This Mill Test Certificate cannot be copied for any purpose.

M.S. JANG

Surveyor To:

Chief of material testing section Men Soo, Jang

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





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	C (%)	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
	SB81442	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

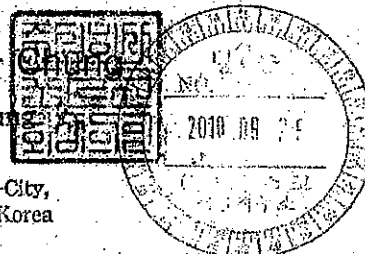


POSCO

CEO Joon Yang -

Joon-Yang Chung
CEO
posco

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



Purchaser : NATIONAL OILWELL VARGO

INSPECTION CERTIFICATE

TO EN10204 3.1



Thai Benkan Co., Ltd.
58 Soi Waiakorn, Bangkok, Prapacheng,
Sanutprakan, 10130 Thailand

D M Y Certificate No.

23/12/2009 T- 2009140813

E-No. MB-779 Purchase Order No. E06289NO/BKT Job No.

No.	MFG. No. (Heat Identification No.)	Specification for Material Made from Seamless Pipe ASTM A234-07/ASME SA234-07 Gr. WPB CSA Z245.11-05 Gr.241 CATTISS NACE MR0175ISO 15182-2: 2003		Specification for Inspection 818.9-2007		Visual Examination	Dimensional Inspection
		Product & Size (T*1)		Quantity	Heat Treatment (Note 1)		
1	09M30109	C WPB B S40		32/75	N	Good	Good
2	09K30118	C WPB 4 S40		100	N	HB : 120 - 150	
3	09D30010	C WPB 8 S40		13/75	*N	HB : 128 - 135	
4	09H30002	C WPB 8 S40		18/75	*N	HB : 120 - 150	
5	09K30112	C WPB 8 S40		11/75	N	HB : 120 - 150	

Specification	Chemical Composition %												Tensile Test *2	
	C	Si	Mn	P	S	Co	Ni	Cr	Mo	V	Nb	Cu	YS	TS
Min.	X 100	X 100	X 100	X 1000	X 1000	X 100	X 100	X 100	X 100	X 1000	X 1000	X 100	MPa	%
Max.	10	29	106	50	56	40	40	40	15	80	20	42	240	415
Material Heat No.	18	19	77	13	6	2	2	7	3	0	0	33	339	481
1 J8KA080	20	17	82	10	1	5	3	4	2	1	1	32	332	495
2 58016	26	32	109	16	6	1	1	2	0.2	17	1	39	300	486
3 H3073328	13	30	101	18	5	3	1	2	0.8	1	0	30	298	481
4 07	19	22	84	18	6	1	2	4	1	0	0	34	313	498
5 J8K1208														

(Note 1) A: Hot 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 fillings were manufactured, sampled, tested, and inspected in accordance with the specification and was found to meet the requirements.

C.F. = Cr/Mn/(C+Mn+N)/54*(Ni+Cu)/15

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.

W

Certified By

R.J.V.

*GAS FIELD
SERVICE*

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.

12003

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 760 mm

WEIGHT

50 Kg.

MIN. DESIGN METAL TEMPERATURE

TEMPERATURE

-20 °F

-29 °C

@

@

@

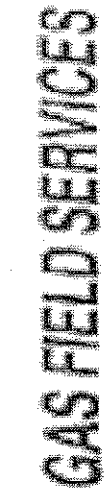
PRESSURE

150 p.s.i.

1035 Kpa.

DATE MFG.

January 2011



2681

DATE	January 24, 2011
VENDOR	V.E.G. Oilfield Supply
DATE REQUIRED	All
JOB NUMBERS	8" Stock Scrubbers
VESSEL SER#	11995 to 12000

1995 to 2009

[illegible]

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.



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 12003	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: <i>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:</i>				
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	smi'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 amovible 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
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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/ Orelles 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
---	----------------------------------	--------------------------------	------------------------------------	---

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

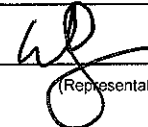
Certificate of Compliance/ Certificat de conformité

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 JAN 3 1 2011
(Representative)

Signature _____ Date _____
(Certified Individual)