

Report No. 07-337

INSPECTION CERTIFICATE

&

INSPECTION REPORT



Global Pakistan

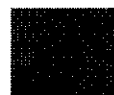


80.0L

240bt

(FT204859 ~ FT205098)

BUREAU VERITAS



FINETEC

329, Boche-Ri, Miyang-Myun, Ansung-Shi, Kyungki-Do 456-843, Korea
Tel 82-31-677-7002 Dir 82-31-678-7261~4 Fax 82-31-677-7024



INSPECTION CERTIFICATE Nr. 740055-3-IC

BV Job Nr: 3.30.861

PROJECT: Global Pakistan	Ref: -
BV Client: Global Pakistan	P/o nr: - (client to BV)
Manufacturer: Finetec Corporation	P/o nr: MOR-707201 (client to Manufacturer)
Inspection requested by: Finetec Corporation	

SUPPLY / SUBJECT OF INSPECTION	ITEM / TAG Nr	QTY
FT 80 Cr-Mo (250bar) 273 SEAMLESS HIGH PRESSURE GAS CYLINDER 80 L (80.0x ø273 x 7.5T (15.0/ Bottom Thickness) x 1,680L)	FT204859 ~ FT 205098 (Shape of bottom: Concave type)	240 PCS

Scope of inspection:

Carried out inspection in accordance with applicable code & drawings and that the results are satisfactory.

- Reviewed inspection certificate with satisfactory results
- Reviewed mill test certificate and cylinder drawing with satisfactory results
- Reviewed heat treatment records and charts with satisfactory results
- Witnessed physical test with satisfactory results
- Reviewed ultrasonic test report with satisfactory results
- Reviewed hardness test report with satisfactory results
- Reviewed volumetric expansion test, tightness test, tare weight & water capacity test report with satisfactory results
- Witnessed pressure burst test with satisfactory results
- Reviewed endorsement of Manufacturer's Inspection and Test Reports with satisfactory results

The undersigned, inspector to Bureau Veritas, certifies that the here above mentioned supply was inspected in conformity with the applicable requirements of the purchase order and the contractual requirements governing the mission entrusted to Bureau Veritas without any remarks.

Survey carried out by : Jae Hwan Kim
Name

Report issued by : Jae Hwan Kim
Name

Signature



Date of issue: 27 July 2007...

Inspection centre: BV Korea

Distribution: ☒ CLIENT ☒ MANUFACTURER ☐ ☐


☐ Interim
☒ Final

INSPECTION REPORT Nr. 740055-3-IR

BV Job nr: 3.30.861

PROJECT: GLOBAL PAKISTAN	Ref: -
BV Client: GLOBAL PAKISTAN	P/o nr: - (client to BV)
Manufacturer: : Finetec Corporation	P/o nr: MOR-707201 (client to Manufacturer)
Inspection requested by: Finetec Corporation	

SUPPLY / SUBJECT OF INSPECTION	ITEM / TAG Nr	QTY
FT 80 Cr-Mo (250bar) 273 SEAMLESS HIGH PRESSURE GAS CYLINDER 80 L (80.0Lx ø273 x 7.5T (15.0/ Bottom Thickness) x 1,680L)	FT204859 ~ FT 205098 (Shape of bottom: Concave type)	240 PCS

DOCUMENTS OF REFERENCE : See continuation sheet for additional documents: ☐ Yes ☒ No				
Title	Reference n°	Rev.	Approved by	Date
International Standard	ISO 9809-1		-	-
Applicable Drawing	FTS-0060-4	0	Bureau Veritas	-
Inspection and Test Plan(ITP)	FT(3)-QMIE-S04(0)	0	Bureau Veritas	-

INSPECTIONS : Inspection place & Date or Period: Finetec Corp. Ansung, Gyunggi-Do, Korea on 25 & 27 July 2007 (2 days) Stage of inspection : ☐ Before manufacturing ☐ During manufacturing ☒ Final ☐ Packing Kind of inspection: ☐ Pre-inspection meeting ☐ Witnessing tests ☒ Final inspection ☒ Document review ☐ Expediting & vendor assessment ☐ Packing (for details see continuation sheet) Stamping : ☐ No ☒ ☐		Results of inspection : ☒ Satisfactory ☐ Unsatisfactory Non Conformities Reports (NCR): None ☐ NCR's issued during reported period : ☐ List of outstanding NCR's : Main Conclusions & Remarks: (for details see continuation sheet) <u>Reviewed inspection certificate with satisfactory results</u> <u>Reviewed mill test certificate and cylinder drawing with satisfactory results</u> <u>Reviewed heat treatment records and charts with satisfactory results</u> <u>Witnessed physical test with satisfactory results</u> <u>Reviewed ultrasonic test report with satisfactory results</u> <u>Reviewed hardness test report with satisfactory results</u> <u>Reviewed volumetric expansion test, tightness test, tare weight & water capacity test report with satisfactory results</u> <u>Witnessed pressure burst test with satisfactory results</u> <u>Reviewed endorsement of Manufacturer's Inspection and Test Reports with satisfactory results</u> Next visit scheduled : N/A
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☐ Interim
☒ Final

INSPECTION REPORT Nr 740055-3-IR

(continued)

BV Job nr: 3.30.861

Following inspection already carried out.

1. Inspection Performed,

9.1. Manufacturer's endorsed documents review

- Reviewed inspection certificate with satisfactory results
- Reviewed mill test certificate and cylinder drawing with satisfactory results
- Reviewed heat treatment records and charts with satisfactory results
- Reviewed physical test report with satisfactory results
- Reviewed ultrasonic test report with satisfactory results
- Reviewed hardness test report with satisfactory results
- Reviewed volumetric expansion test, tightness test, tare weight & water capacity test report with satisfactory results
- Reviewed pressure burst test report with satisfactory results
- Reviewed endorsement of Manufacturer's Inspection and Test Reports with satisfactory results

The results of inspection were found to be satisfactory in accordance with applicable code and ITP.

2. Physical test & Pressure burst test

Witnessed physical test & pressure burst test for each batch/ 200pcs) in accordance with applicable specification and that the results are satisfactory

Products.	Serial No	
80.0 l x ø273 x 7.5T (15.0/ Bottom Thickness) x 1,680L	UM1-25, UM9-25	Physical test
	UM1-24, UM9-24	Pressure burst test

3. Spot witness of visual & dimensional inspection

Checked general appearance, surface condition, construction, workmanship and dimension for randomly selected samples according to applicable code.

The results of inspection were found to be satisfactory without harmful defects for using.

--- The end of this report ---

ANNEXES ☐ Yes (Total number of pages:) ☒ No

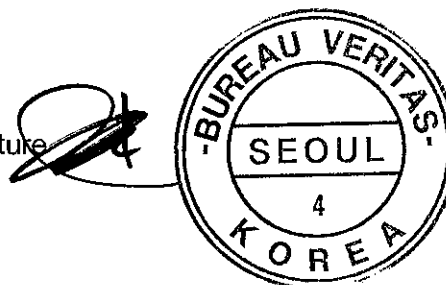
Survey carried out by : Jae Hwan Kim
Name

Report issued by : Jae Hwan Kim
Name

Date of issue : 27 July, 2007

Inspection centre: BV Korea

Signature



Distribution: ☒ CLIENT ☒ MANUFACTURER ☐

INSPECTION REPORT

REPORT NO. 07-337

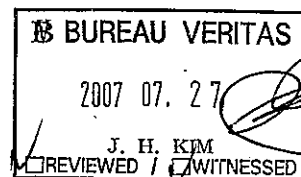
July. 27, 2007

A. PARTICULARS OF CYLINDER

1. Customer : Global Pakistan
2. Manufacturing Specification : ISO 9809-1
3. Process of Manufacture : Heating and Spinning
4. Shape of Bottom : Concave type
5. Water Capacity : 80.0 liters (Tolerance ; +5%,-0%)
6. Size : 273mm (O.D) x 1,680mm (Length) x Min7.5/15.0mm(Body/Bottom Thick)
7. Tare Weight of Cylinder Only : 102.0 Kgs (Tolerance ; $\pm 5\%$)
8. Weight of Gas : N/A
9. Serial No. : FT 204859 ~ FT 205098
- 10 Quantity : 240 PCS
11. Material Of Construction : Seamless Chromium Molybdenum Steel Pipe-CrMo
(Spec. ASTM A519-4134)
12. Approved Dwg. No. : FTS-0060-4 Rev.0(Ref. FTS-0061-4)
13. Approved Date : February. 06, 2007
14. Attached Reports

B. CONTENTS

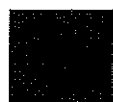
1. INSPECTION CERTIFICATE
2. MILL TEST CERTIFICATE & CHEMICAL ANALYSIS REPORT
3. HEAT-TREATMENT REPORT (HEATING TIME CHART)
4. PHYSICAL TEST REPORT
5. ULTRASONIC TEST REPORT
6. HARDNESS/GEOMETRY/BASE CHECK SHEET
7. VOLUMETRIC EXPANSION TEST, TIGHTNESS TEST, TARE WEIGHT &
WATER CAPACITY TEST REPORT
8. PRESSURE BURST TEST REPORT
9. PROTO-TYPE TEST
(CYCLING TEST REPORT)



Bureau Veritas

INSPECTION CERTIFICATE

(완제품 검사 성적서)

**FINETEC****FINETEC CORP.**

329, Boche-ri Miyang-myun Ansong-shi
 Kyungki-do 456-840. KOREA
 TEL: (031)677-7002 FAX: (031)677-7041
 URL <http://www.finetec.co.kr>
 E-mail webmaster@finetec.co.kr

Cert. No.	07-337	Date	July. 27. 2007
Customer	Global Pakistan	Standard	ISO 9809-1
Gas	N/A	P/O No.	-
Quantity	240 PCS	Serial No.	FT 204859 ~ FT 205098
Dwg. No.	FTS-0060-4 Rev.0 Ref.FTS-0061-4	Mfg. method	SPUN TYPE

Material & Chemical Composition

Material		Seamless CrMo Steel Tube			Specification		JIS G3429 STH 21/ ASTM A519-4134		
Mill Heat No.	FINETEC CODE NO.	C	Si	Mn	Cr	Mo	P	S	P+S
Spec.	MIN	0.25	0.10	0.40	0.80	0.15	-	-	-
	MAX	0.38	0.40	1.00	1.20	0.40	0.02	0.01	0.025
02742108V	UM	.379	.261	.791	1.033	.182	.001	.003	.004

Inspection Process**1. Physical Test**

Lot No.	Method of test	T.S. (N/mm ²)	Y.S. (N/mm ²)	Elongation (%)	Test pieces of Hardness	Result
Spec.	MIN	930	770	14.0	260	
UM-1	ISO 6892	1083	1007	14.4	344	ACCEPTED
UM-2		1024	917	14.5	307	

2. Impact Test

Lot No.	Method of test	Specimen Size	Test temperature	Min (J/cm ²)	Mean (J/cm ²)	Result
Spec.	MIN	Trans		32	40	
UM-1	ISO 148	55X10X7.5T	-50°C ± 2°C	58.9/56.3/61.8	59.0	ACCEPTED
UM-2				63.2/56.3/58.8	59.4	

3. Bend Test

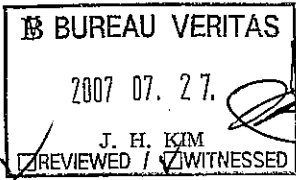
Lot No.	Type of Test	t (thickness)	Mandrel Dia.	Angle of Bend(Deg.)	Result
UM-1	ISO 7438	7.75/8.06/7.94/8.14	40	180°	ACCEPTED
UM-2		8.27/8.16/7.76/8.13			

4. Visual/ Dimension				
Item	Inspection Standard		Result	Remark
Visual	(Deviation from vertical shall not exceed 10mm per metre length.)		ACCEPTED	
Shape of bottom	Concave Type		ACCEPTED	
O.D x t (Body/Bottom) x L(mm)	273 x Min7.5/15.0 x 1,680		ACCEPTED	
W.C(ℓ) / T.W.(Kg)	80.0 $\pm$ 5 / 102.0 $\pm$ 5%		ACCEPTED	
Weight of CNG	N/A		N/A	
Thread	DIN 477		GOOD	
Neck Ring	N/A	☐ WITH ☒ WITHOUT	ACCEPTED	
Cap		☐ WITH ☒ WITHOUT		
5. Ultrasonic Test	(No crack or other harmful defects and minimum thickness)		ACCEPTED	
6. Hydraulic test	(No abnormal expansion allowed; permanent increasing rate less than 10% after 30 seconds test under the test pressure)		ACCEPTED	TP:375BAR
7. Tightness test	(No leakage allowed after the max. pressure charged for one minute)		ACCEPTED	FP:250BAR
8. Pressure burst test Pressure cycling test	→ Pb ≥ 600 bar → 12,000 count 375bar		ACCEPTED	
9. Hardness test (ISO 6508)	min 260 (HBR)		ACCEPTED	
10. Appearance	Color : WHITE		ACCEPTED	

* CALIBRATION DATE

UTM(FT-QES-001) : 2007.03.23

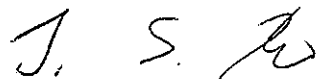
PRESSURE GAUGE(FT-QES-097, 102) : 2007.03.27



2007 07. 27.

J. H. KIM

REVIEWED / WITNESSED



Quality Assurance Dept.
Manager

CODE UM, A

Contract No : 07-5-1

P.O. NO.:

TOTAL : 131PIECES, 19 BUNDLES, 38.678MT

HUAI'AN ZHENDA STEEL TUBE MANUFACTURING CO., LTD QUALITY CERTIFICATE

Name of Customer: SHANGHAI NANLIANGCHENG EX AND IM CO., LTD.
DESCRIPTION: SEAMLESS STEEL TUBES FOR HIGH PRESSURE GAS CYLINDER

DATE:2007/0704 PAGE:

QUALITY CERTIFICATE										DATE:2007/0704										PAGE:									
SPEC: Stainless steel pipes			STEEL KIND: Gas cylinder			MAKING METHOD: COLD DRAWN			DELIVERY STATE			CERTIFICATE NO : 0017586																	
NO	BATCH NO	HEAT NO	STEEL GRADE	SIZE	Normal Thickness	BUNDLES	PIECES	METRE	THEORETICAL WEIGHT (MT)	ACTUAL WEIGHT(MT)																			
1	Hd0706506-3	0742108V	34CrMo4	273×7.5×1820×3mm double random length	8.25mm	9	63			18630																			
2	Hd0706507-2	0742108V	34CrMo4	273×7.5×1820×3mm double random length	8.25mm	6	40			11796																			
3	Hd0706506-1	0742109V	34CrMo4	273×7.5×1820×3mm double random length	8.25mm	4	28			8252																			
4																													
5																													
NONDESTRUCTIVE TEST											CHEMICAL COMPOSITION %																		
NO	BATCH NO	HEAT NO	DELIVERY CONDITION	EMI TEST		ULTRASONIC TEST		C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V												
1	Hd0706506-3	0742108V	Anneal	GOOD		GOOD		0.28-0.38	0.15-0.40	0.4-1.00	≤0.02	≤0.01	≤0.35	≤0.60	0.9-1.2	0.15-0.40	≤0.030												
2	Hd0706507-2	0742108V	Anneal	GOOD		GOOD		0.35	0.24	0.82	0.007	0.004	0.07	0.03	1.04	0.19	0.014												
3	Hd0706506-1	0742109V	Anneal	GOOD		GOOD		0.35	0.24	0.82	0.007	0.004	0.07	0.03	1.04	0.19	0.014												
4						GOOD		0.36	0.26	0.83	0.007	0.005	0.07	0.03	1.00	0.19	0.013												
5																													
NO	BATCH NO	HEAT NO	σb (MPa) TENSILE STRENGTH	σs (MPa) YIELD STRENGTH	δ (%) ELONGATION		Ak _v (°2) Low Temperature impact		Ak _v (°2) Normal Temperature impact		NON-METALLIC INCLUSION		MICROSCOPIC STRUCTURE		HEAT TREATMENT														
					Min1000	Min900	Min14																						
1	Hd0706506-3	0742108V	1045/1075	975/990	14.5/15.0		80/86/90/90/89/85		100/108/113/101/98/95																				
2	Hd0706507-2	0742108V	1070/1095	980/990	15.0/16.0		82/85/89/90/88/83		109/101/100/98/99/106																				
3	Hd0706506-1	0742109V	1045/1065	985/990	15.0/14.5		90/79/83/82/89/90		96/99/108/110/105/95																				
4																													
5																													

永钢管制造有限公司

REMARKS : SPECIMEN SIZE : (Pipe end, Longitudinal, Gauge Length= 5.65

A. For pipes ≤ 1 " full length specimen were used;

B. For pipes-1" longitudinal strip specimen were used; the width of the gauge length portion is 3/4"

BUREAU VERITAS
9/27
2007 07. 27.
J. H. KIM
REVIEWED / TWITNESSED

☒ Reviewed ☐ Witnessed
By: [Signature]
Date: 2007.07.23

		CHEMICAL ANALYSIS REPORT				Prepared by	Checked By	Approved By				
												
M/O NO. : MOR-707201		LOT NO. : UM-1~2				Page 1 of 1						
PROJECT NAME : Global Pakistan		Record NO. : CAR070727-01				DWG.NO. FTS-0060-4 Ref. FTS-0061-4						
Project NO. : N/A		Traveler NO. : UM1~10(19)				Procedure NO. : FT(3)-QMID-S07						
Date Heat Treated : 2007. 07. 24		Method Heat Treated : 열처리 방법 Q & T				Procedure NO. : N/A						
LABORATORY NO. : FT(3)-SGC		ANALYSIS METHOD : EMISSION				Material : STH21						
Test Number	Heat Number	Check Analysis Number	Cylinders Represented	CHEMICAL ANALYSIS								
				C	Si	Mn	Cr	P	S	Mo	P+S	-
1	0742108V	—	UM-1~10(19)	0.25 ~0.38	0.10 ~0.40	0.40 ~1.00	0.80 ~1.20	<0.02	<0.01	0.15 ~0.40	<0.025	

Date: 27.07.2007 Time: 13:18.52 Matrix: FE Progr.: FE1

Sample No. UM1-25(Heat No.02742108V) Alloy 34CrMo

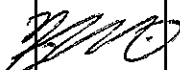
Remarks Global Pakistan

Average calculated from: 1

I-Fe	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Al	Ti	V	Fe	B
57868	0.379	0.261	0.791	<0.001	0.003	1.033	0.028	0.182	0.072	0.009	0.001	0.004	<0.001	<0.0001

BUREAU VERITAS														
2007 07. 27														
J. H. KIM														
REVIEWED / WITNESSED														

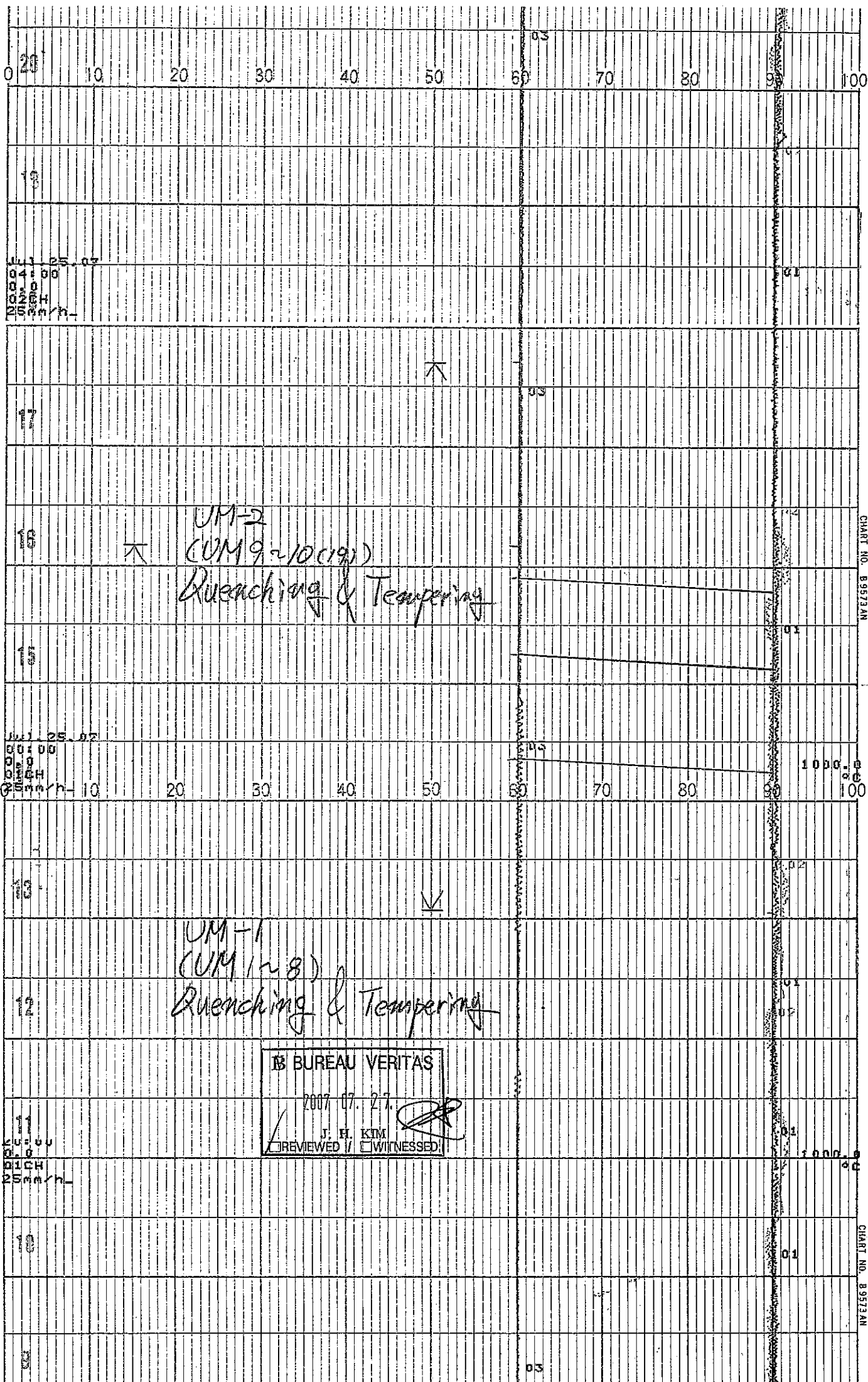
NOTE

 FINETEC	HEAT TREATMENT RECORD				Prepared By	Checked By	Approved By
							
M/O NO. : MOR-707201		Project Name 공사명 Global Pakistan		Record NO. 기록번호 HTR070724-01			
Mill Heat NO. 밀시트 열처리 번호 0742108V		Code & Lot NO. 코드 및 로트번호 UM-1~2		Date 시행일자 2007. 07. 24			
Method Heat Treated 열처리 방법 Q & T		Material 재질 STH 21		Chart NO. 기록지번호 HTC070724-01~02			
1. Furnance Condition (열처리 조건)							
LD NO. 관리번호	Heat Source	Quenchant Name	Temp.Measurement Method 온도측정방법	Thermo Couple 열전대 종류			
FT-PE-3S-005	L N G	OIL	Atmosphere	K-TYPE			
2. Heat Treatment Condition (열처리 조건)							
	Quen-ching Temp.	Holding Time 유지시간	Heating Time 예열시간	Cooling Temp. 냉각온도	Holding Time 유지시간	Tempering Temp. 템퍼링 온도	Holding Time 유지시간
Control Limit	820~920℃	30 min	30 min	50~70℃	1'40"	560~650℃	30 min
Actual	890~910℃	36 min	36 min	60℃	2'00"	600℃	54 min
3. Remark (비고) *Attached ; Chart of Heat Treatment(2 pages)						 2007 07. 27. J. H. KIM ☒ REVIEWED / ☐ WITNESSED	

UM-1
(UM 1 ~ 8)
Quenching & Tempering

2007 07 27

J. H. KIM
☒ REVIEWED / ☐ WITNESSED



UM-2
(UM 9~10(19))
Quenching & Tempering

UM-1
(UM 1~8)
Quenching & Tempering

B BUREAU VERITAS
2007 07 27
J. H. KIM
[REVIEWED] [WITNESSED]

CHART NO. 89573AN

CHART NO. 89573AN

 FINETEC	PHYSICAL TEST REPORT		Prepared By	Checked By	Approved By
					
Test Date 시험일자	2007. 07. 27		Recorded By 작성자		송 상 현
Report No.	PTR070727-01		LOT No.		UM-1

1. TENSILE TEST (인장시험)

Specimen NO. (시험번호)	Applied Standard (적용규격)	Specimen Spec. 시험 규격 (mm)			Test Result (시험 결과)			
		Thickness (두께)	Width (폭)	Area 단면적 (mm ²)	Tensile Stress N/mm ²	Yield Strength N/mm ²	Elongation (%)	Result
					Min 930	Min 770	Min 14.0	
UM1-25	ISO 6892	8.35	25.21	210.5	1083	1007	14.4	Accepted

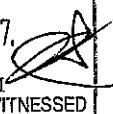
2. BEND TEST (굽힘시험)

Specimen NO. (시험번호)	Applied Standard	Thickness (두께,mm)	Diameter of Former (굽힘봉지름,mm)	Criteria (판정기준)	Result
UM1-25	ISO 7438	7.75	40	Without any crack when bent inwards around the former until the inside surfaces are not further apart than the diameter of the former. (굽힘부에 흠, 균열이 없을것)	Accepted
UM1-25		8.06	40		Accepted
UM1-25		7.94	40		Accepted
UM1-25		8.14	40		Accepted

3. IMPACT TEST (충격시험)

Specimen NO. (시험번호)	Applied Standard	Temperature (시험 온도,℃)	Criteria of Impact Strength (판정기준)	Test Result	
UM1-25	ISO 148	-50℃±2℃	32 J/cm ²	58.9 J/cm ²	Accepted
UM1-25				56.3 J/cm ²	Accepted
UM1-25				61.8 J/cm ²	Accepted
Average			40 J/cm ²	59.0 J/cm ²	Accepted

Remark

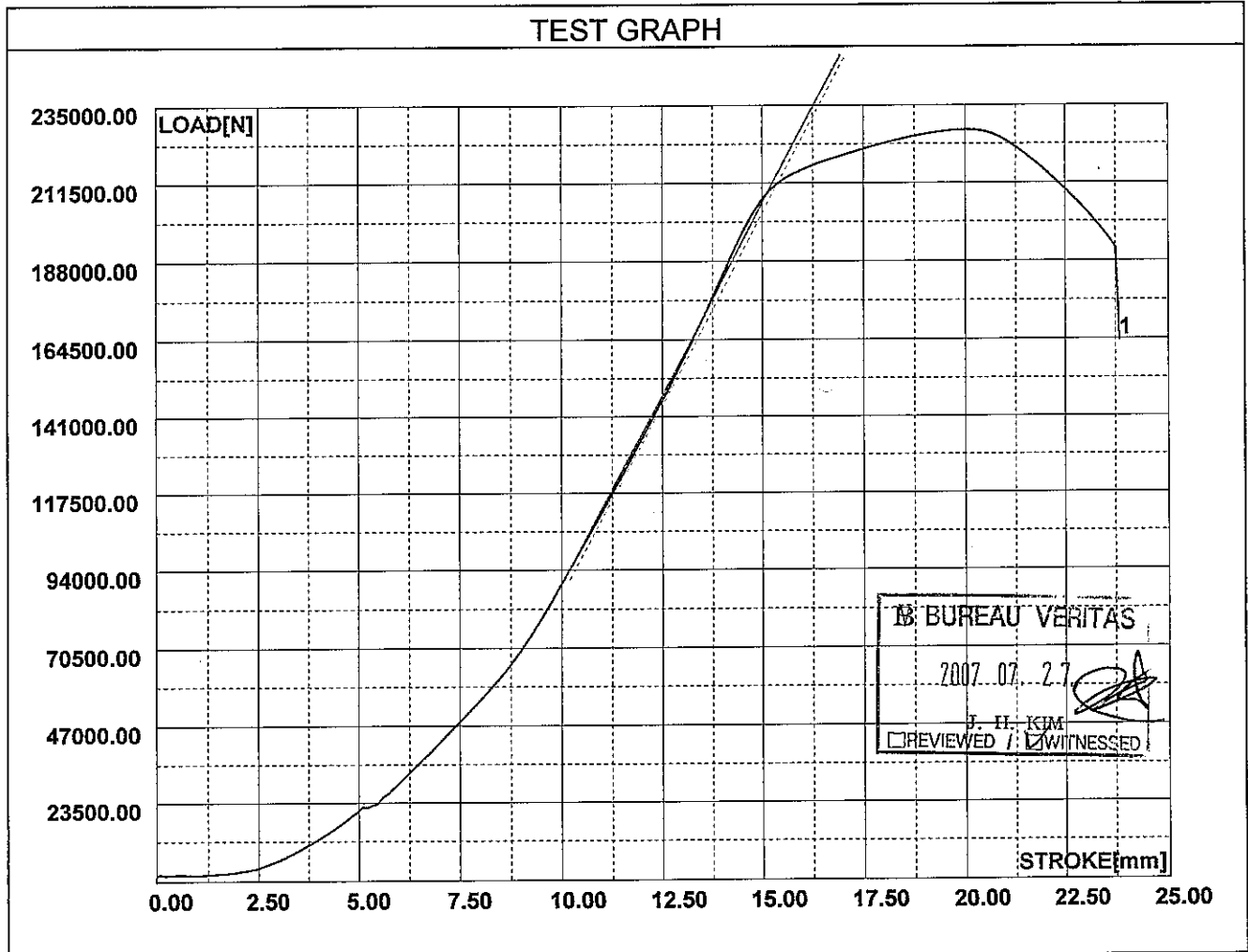
BUREAU VERITAS	
2007 07. 27	
J. H. K/M	
☐ REVIEWED	☒ WITNESSED

TEST CERTIFICATE

인장시험

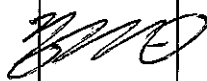
Tested by	Reviewed by	Certified by
김형숙	[Signature]	J. S. Kim

TEST CONDITION			
시험일자	2007년7월27일	시험규격	80.0L(ISO 9809-1(BV))
시험자	김형숙	제작일	2007.07
분사조건	0.8BAR	시험번호	UM1-25
시험설비	DS-U0211	Lot No.	UM-1
온도조건	890/60/600	재질	CrMo



NO	단면적 Area [mm ²]	인장강도 T.Stren [N/mm ²]	인장하중 T.Load [N]	항복강도 Y.Stren [N/mm ²]	항복하중 Y.Load [N]	연신율 Elongat [%]
MAX	-	1100	-	-	-	-
MIN	-	930	-	770	-	14
1	210.00	1083.57	227548.60	1007.13	211497.57	14.41
AVERAGE	210.00	1083.57	227548.60	1007.13	211497.57	14.41

FINETEC

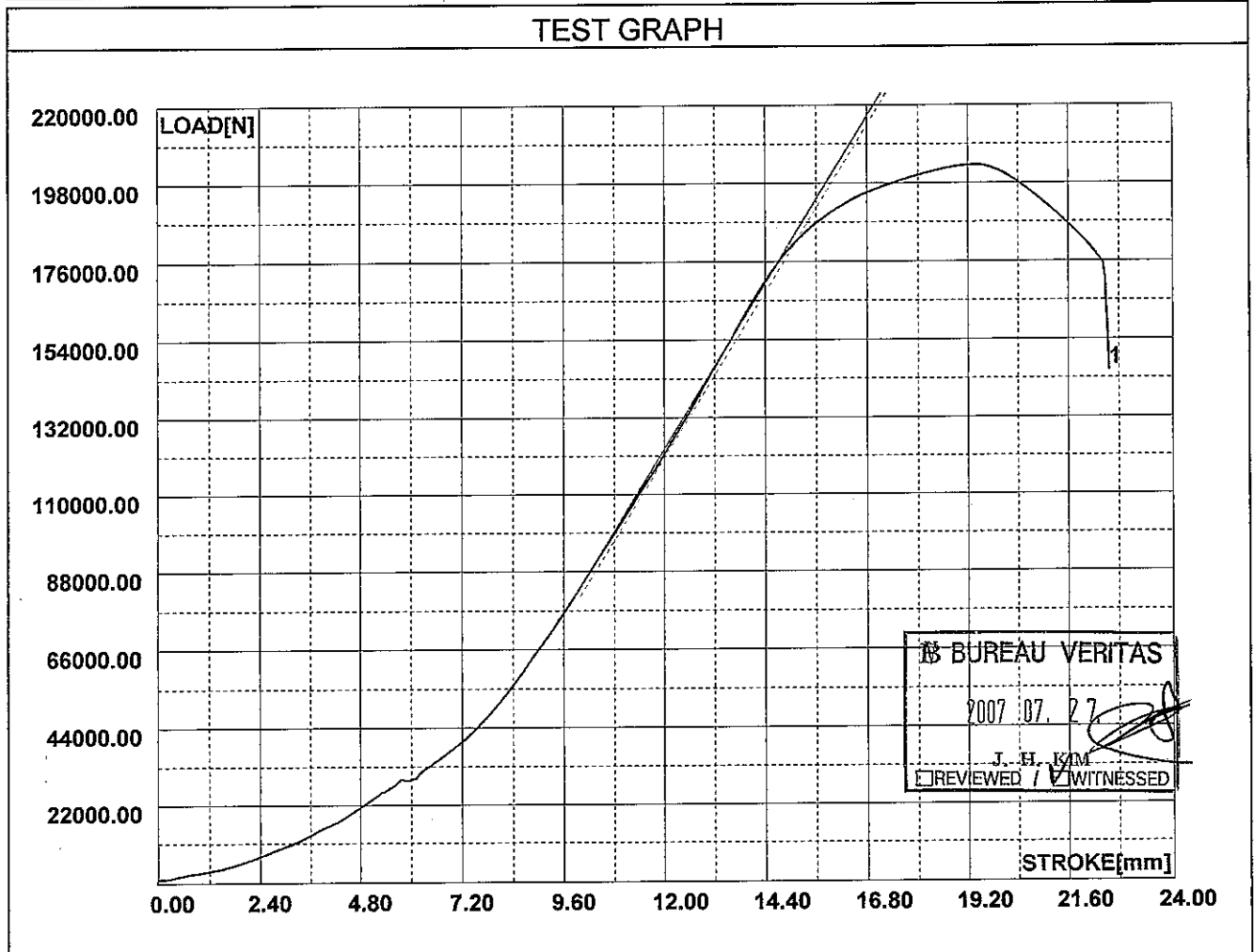
 FINETEC	PHYSICAL TEST REPORT			Prepared By	Checked By	Approved By		
								
Test Date 시험일자	2007. 07. 27			Recorded By 작성자	송 상 현			
Report No.	PTR070727-02			LOT No.	UM-2			
1. TENSILE TEST (인장시험)								
Specimen NO. (시험번호)	Applied Standard (적용규격)	Specimen Spec. 시험 규격 (mm)			Test Result (시험 결과)			
		Thickness (두께)	Width (폭)	Area 단면적 (mm ²)	Tensile Stress N/mm ²	Yield Strength N/mm ²	Elongation (%)	Result
					Min 930	Min 770	Min 14.0	
UM9-25	ISO 6892	7.89	25.13	198.3	1024	917	14.5	Accepted
2. BEND TEST (굽힘시험)								
Specimen NO. (시험번호)	Applied Standard	Thickness (두께,mm)	Diameter of Former (굽힘봉지름,mm)	Criteria (판정기준)	Result			
UM9-25	ISO 7438	8.27	40	Without any crack when bent inwards around the former until the inside surfaces are not further apart than the diameter of the former. (굽힘부에 흠, 균열이 없을것)	Accepted			
UM9-25		8.16	40		Accepted			
UM9-25		7.76	40		Accepted			
UM9-25		8.13	40		Accepted			
3. IMPACT TEST (충격시험)								
Specimen NO. (시험번호)	Applied Standard	Temperature (시험 온도,℃)	Criteria of Impact Strength (판정기준)	Test Result				
UM9-25	ISO 148	-50℃±2℃	32 J/cm ²	63.2 J/cm ²	Accepted			
UM9-25				56.3 J/cm ²	Accepted			
UM9-25				58.8 J/cm ²	Accepted			
Average			40 J/cm ²	59.4 J/cm ²	Accepted			
Remark				 2007 07. 27. J. H.  ☐ REVIEWED / ☒ WITNESSED				

TEST CERTIFICATE

인장시험

Tested by	Reviewed by	Certified by
7.10.14	2007.07.27	2.5.10

TEST CONDITION			
시험일자	2007년7월27일	시험규격	80.0L(ISO 9809-1(BV))
시험자	김형숙	제작일	2007.07
분사조건	0.8BAR	시험번호	UM9-25
시험설비	DS-U0211	Lot No.	UM-2
온도조건	890/60/600	재질	CrMo



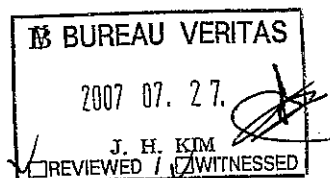
NO	단면적 Area [mm ²]	인장강도 T.Stren [N/mm ²]	인장하중 T.Load [N]	항복강도 Y.Stren [N/mm ²]	항복하중 Y.Load [N]	연신율 Elongat [%]
MAX	-	1100	-	-	-	-
MIN	-	930	-	770	-	14
1	198.28	1024.82	203196.24	917.54	181925.62	14.53
AVERAGE	198.28	1024.82	203196.24	917.54	181925.62	14.53

FINETEC

[illegible]

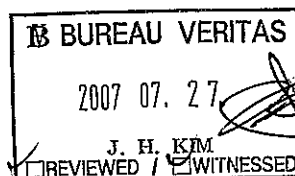
**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

Hydraulic Test Pressure : 37.5 Mpa				Leakage Test Pressure : 25.0 Mpa				pag01		
No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
1	204859	97.3	80.8	414.6	11.7	2.82	ACCEPTED	UM1-1	CNG	070725
2	204860	99.8	80.7	412.9	11.5	2.79	ACCEPTED	UM1-2	CNG	070725
3	204861	97.0	81.3	415.0	11.1	2.67	ACCEPTED	UM1-3	CNG	070725
4	204862	96.7	81.5	415.1	9.1	2.19	ACCEPTED	UM1-4	CNG	070725
5	204863	96.4	81.0	415.4	8.6	2.07	ACCEPTED	UM1-5	CNG	070725
6	204864	96.6	81.4	411.7	12.1	2.94	ACCEPTED	UM1-6	CNG	070725
7	204865	96.7	81.4	411.4	9.6	2.33	ACCEPTED	UM1-7	CNG	070725
8	204866	96.6	81.0	415.7	9.2	2.21	ACCEPTED	UM1-8	CNG	070725
9	204867	95.7	80.6	411.3	9.2	2.24	ACCEPTED	UM1-9	CNG	070725
10	204868	97.3	81.3	416.5	9.4	2.26	ACCEPTED	UM1-10	CNG	070725
11	204869	95.7	80.8	411.8	11.2	2.72	ACCEPTED	UM1-11	CNG	070725
12	204870	96.0	81.4	414.7	11.5	2.77	ACCEPTED	UM1-12	CNG	070725
13	204871	96.9	80.9	415.3	9.6	2.31	ACCEPTED	UM1-13	CNG	070725
14	204872	93.8	81.1	415.8	11.3	2.72	ACCEPTED	UM1-14	CNG	070725
15	204873	94.0	81.2	416.3	9.3	2.23	ACCEPTED	UM1-15	CNG	070725
16	204874	95.3	81.2	412.5	10.5	2.55	ACCEPTED	UM1-16	CNG	070725
17	204875	95.2	81.5	412.5	9.1	2.21	ACCEPTED	UM1-17	CNG	070725
18	204876	95.2	80.9	414.1	10.9	2.63	ACCEPTED	UM1-18	CNG	070725
19	204877	96.6	80.6	411.0	8.5	2.07	ACCEPTED	UM1-19	CNG	070725
20	204878	96.4	81.1	414.4	11.7	2.82	ACCEPTED	UM1-20	CNG	070725
21	204879	94.3	81.3	414.5	10.1	2.44	ACCEPTED	UM1-21	CNG	070725
22	204880	94.3	80.7	411.3	10.3	2.50	ACCEPTED	UM1-22	CNG	070725
23	204881	94.5	81.3	416.8	11.5	2.76	ACCEPTED	UM1-23	CNG	070725
24	204882	94.0	80.9	412.7	10.3	2.50	ACCEPTED	UM2-1	CNG	070725
25	204883	96.4	81.2	413.8	11.0	2.66	ACCEPTED	UM2-2	CNG	070725
26	204884	94.6	81.3	410.3	10.9	2.66	ACCEPTED	UM2-3	CNG	070725
27	204885	95.1	81.0	416.3	9.7	2.33	ACCEPTED	UM2-4	CNG	070725
28	204886	95.1	80.6	410.8	9.9	2.41	ACCEPTED	UM2-5	CNG	070725
29	204887	94.4	81.5	415.4	9.8	2.36	ACCEPTED	UM2-6	CNG	070725
30	204888	96.1	80.8	413.1	11.3	2.74	ACCEPTED	UM2-7	CNG	070725
31	204889	95.7	80.6	411.2	8.6	2.09	ACCEPTED	UM2-8	CNG	070725
32	204890	95.8	80.7	416.9	9.6	2.30	ACCEPTED	UM2-9	CNG	070725
33	204891	95.1	81.5	415.1	9.1	2.19	ACCEPTED	UM2-10	CNG	070725
34	204892	95.8	80.8	415.4	8.6	2.07	ACCEPTED	UM2-11	CNG	070725
35	204893	95.9	81.2	411.7	12.1	2.94	ACCEPTED	UM2-12	CNG	070725
36	204894	96.1	80.1	411.1	10.4	2.53	ACCEPTED	UM2-13	CNG	070725
37	204895	95.6	81.5	411.4	9.6	2.33	ACCEPTED	UM2-14	CNG	070725
38	204896	96.2	81.3	413.4	11.1	2.69	ACCEPTED	UM2-15	CNG	070725
39	204897	96.3	80.6	416.2	9.9	2.38	ACCEPTED	UM2-16	CNG	070725
40	204898	95.5	80.9	414.1	10.9	2.63	ACCEPTED	UM2-17	CNG	070725



**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

Hydraulic Test Pressure : 37.5 Mpa					Leakage Test Pressure : 25.0 Mpa			pag02		
No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
41	204899	96.0	81.7	414.3	11.5	2.78	ACCEPTED	UM2-18	CNG	070725
42	204900	96.3	80.4	411.6	10.7	2.60	ACCEPTED	UM2-19	CNG	070725
43	204901	96.7	80.7	412.5	11.8	2.86	ACCEPTED	UM2-20	CNG	070725
44	204902	96.8	80.2	411.4	12.1	2.94	ACCEPTED	UM2-21	CNG	070725
45	204903	94.2	80.6	413.3	9.0	2.18	ACCEPTED	UM2-22	CNG	070725
46	204904	96.8	81.1	414.6	10.1	2.44	ACCEPTED	UM2-23	CNG	070725
47	204905	96.2	80.9	414.8	11.4	2.75	ACCEPTED	UM2-24	CNG	070725
48	204906	95.4	81.3	411.1	11.5	2.80	ACCEPTED	UM2-25	CNG	070725
49	204907	96.3	80.8	410.5	8.5	2.07	ACCEPTED	UM3-1	CNG	070725
50	204908	96.4	80.3	415.6	9.9	2.38	ACCEPTED	UM3-2	CNG	070725
51	204909	96.6	80.4	414.9	8.6	2.07	ACCEPTED	UM3-3	CNG	070725
52	204910	94.1	81.7	413.2	8.7	2.11	ACCEPTED	UM3-4	CNG	070725
53	204911	97.2	80.9	416.9	11.7	2.81	ACCEPTED	UM3-5	CNG	070725
54	204912	96.4	80.6	415.3	11.2	2.70	ACCEPTED	UM3-6	CNG	070725
55	204913	95.1	81.1	415.1	9.4	2.26	ACCEPTED	UM3-7	CNG	070725
56	204914	96.4	81.0	410.8	8.9	2.17	ACCEPTED	UM3-8	CNG	070725
57	204915	95.7	80.9	410.3	11.1	2.71	ACCEPTED	UM3-9	CNG	070725
58	204916	94.2	81.3	413.7	10.6	2.56	ACCEPTED	UM3-10	CNG	070725
59	204917	96.6	80.7	411.5	10.1	2.45	ACCEPTED	UM3-11	CNG	070725
60	204918	96.6	80.8	415.2	11.4	2.75	ACCEPTED	UM3-12	CNG	070725
61	204919	96.6	81.3	412.8	12.0	2.91	ACCEPTED	UM3-13	CNG	070725
62	204920	95.6	80.5	415.2	8.7	2.10	ACCEPTED	UM3-14	CNG	070725
63	204921	96.7	80.9	414.4	11.2	2.70	ACCEPTED	UM3-15	CNG	070725
64	204922	96.4	80.9	410.1	10.0	2.44	ACCEPTED	UM3-16	CNG	070725
65	204923	93.9	81.2	416.6	8.8	2.11	ACCEPTED	UM3-17	CNG	070725
66	204924	95.5	81.3	413.5	8.9	2.15	ACCEPTED	UM3-18	CNG	070725
67	204925	96.3	81.0	412.8	9.4	2.28	ACCEPTED	UM3-19	CNG	070725
68	204926	96.5	80.8	414.9	10.1	2.43	ACCEPTED	UM3-20	CNG	070725
69	204927	97.3	81.1	412.5	10.0	2.42	ACCEPTED	UM3-21	CNG	070725
70	204928	95.4	81.3	415.2	11.5	2.77	ACCEPTED	UM3-22	CNG	070725
71	204929	95.8	80.7	414.5	9.7	2.34	ACCEPTED	UM3-23	CNG	070725
72	204930	96.2	81.1	410.5	9.9	2.41	ACCEPTED	UM3-24	CNG	070725
73	204931	96.6	80.9	410.7	8.9	2.17	ACCEPTED	UM3-25	CNG	070725
74	204932	96.4	81.8	413.5	12.3	2.97	ACCEPTED	UM4-1	CNG	070725
75	204933	96.4	81.3	416.7	10.6	2.54	ACCEPTED	UM4-2	CNG	070725
76	204934	96.6	81.4	411.5	9.8	2.38	ACCEPTED	UM4-3	CNG	070725
77	204935	96.7	81.9	412.8	9.4	2.28	ACCEPTED	UM4-4	CNG	070725
78	204936	95.7	80.5	413.5	8.8	2.13	ACCEPTED	UM4-5	CNG	070725
79	204937	95.1	81.8	413.6	12.2	2.95	ACCEPTED	UM4-6	CNG	070725
80	204938	95.7	81.9	413.9	12.0	2.90	ACCEPTED	UM4-7	CNG	070725



**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

Hydraulic Test Pressure : 37.5 Mpa

Leakage Test Pressure : 25.0 Mpa

pag03

No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
81	204939	94.4	80.8	414.6	10.1	2.44	ACCEPTED	UM4-8	CNG	070725
82	204940	94.4	81.0	414.9	8.6	2.07	ACCEPTED	UM4-9	CNG	070725
83	204941	94.3	80.9	415.3	11.2	2.70	ACCEPTED	UM4-10	CNG	070725
84	204942	95.1	80.9	413.5	8.9	2.15	ACCEPTED	UM4-11	CNG	070725
85	204943	95.1	81.2	411.6	9.6	2.33	ACCEPTED	UM4-12	CNG	070725
86	204944	95.2	80.8	415.5	8.5	2.05	ACCEPTED	UM4-13	CNG	070725
87	204945	95.0	81.1	413.6	11.4	2.76	ACCEPTED	UM4-14	CNG	070725
88	204946	94.9	81.3	415.8	9.2	2.21	ACCEPTED	UM4-15	CNG	070725
89	204947	95.8	81.2	415.6	9.7	2.33	ACCEPTED	UM4-16	CNG	070725
90	204948	96.0	80.7	414.7	12.0	2.89	ACCEPTED	UM4-17	CNG	070725
91	204949	96.5	81.5	416.8	11.7	2.81	ACCEPTED	UM4-18	CNG	070725
92	204950	96.0	80.7	413.3	11.9	2.88	ACCEPTED	UM4-19	CNG	070725
93	204951	95.6	81.5	416.1	10.0	2.40	ACCEPTED	UM4-20	CNG	070725
94	204952	95.4	81.4	415.8	10.0	2.41	ACCEPTED	UM4-21	CNG	070725
95	204953	96.6	80.7	410.9	12.2	2.97	ACCEPTED	UM4-22	CNG	070725
96	204954	96.3	81.2	415.6	11.2	2.69	ACCEPTED	UM4-23	CNG	070725
97	204955	95.3	80.7	413.2	9.7	2.35	ACCEPTED	UM4-24	CNG	070725
98	204956	96.5	80.9	412.8	8.3	2.01	ACCEPTED	UM4-25	CNG	070725
99	204957	96.3	81.1	410.7	9.3	2.26	ACCEPTED	UM5-1	CNG	070725
100	204958	95.2	80.6	411.2	8.9	2.16	ACCEPTED	UM5-2	CNG	070725
101	204959	96.9	80.8	413.6	10.0	2.42	ACCEPTED	UM5-3	CNG	070725
102	204960	95.1	81.3	414.5	11.8	2.85	ACCEPTED	UM5-4	CNG	070725
103	204961	96.6	80.8	411.7	11.5	2.79	ACCEPTED	UM5-5	CNG	070725
104	204962	96.0	80.6	416.3	9.9	2.38	ACCEPTED	UM5-6	CNG	070725
105	204963	96.9	81.5	413.5	9.1	2.20	ACCEPTED	UM5-7	CNG	070725
106	204964	96.6	80.6	411.5	10.0	2.43	ACCEPTED	UM5-8	CNG	070725
107	204965	96.4	81.3	412.3	11.5	2.79	ACCEPTED	UM5-9	CNG	070725
108	204966	96.8	81.2	411.7	11.9	2.89	ACCEPTED	UM5-10	CNG	070725
109	204967	96.4	80.9	413.8	10.5	2.54	ACCEPTED	UM5-11	CNG	070725
110	204968	95.8	80.6	416.1	9.4	2.26	ACCEPTED	UM5-12	CNG	070725
111	204969	96.6	80.8	414.3	9.9	2.39	ACCEPTED	UM5-13	CNG	070725
112	204970	96.6	81.3	417.0	9.5	2.28	ACCEPTED	UM5-14	CNG	070725
113	204971	95.3	80.6	414.9	10.0	2.41	ACCEPTED	UM5-15	CNG	070725
114	204972	96.5	81.1	412.7	11.8	2.86	ACCEPTED	UM5-16	CNG	070725
115	204973	96.6	81.2	414.1	12.1	2.92	ACCEPTED	UM5-17	CNG	070725
116	204974	95.8	81.4	413.6	9.6	2.32	ACCEPTED	UM5-18	CNG	070725
117	204975	94.5	81.3	411.8	9.0	2.19	ACCEPTED	UM5-19	CNG	070725
118	204976	96.5	80.9	412.4	8.2	1.99	ACCEPTED	UM5-20	CNG	070725
119	204977	95.1	81.2	415.2	11.8	2.84	ACCEPTED	UM5-21	CNG	070725
120	204978	96.3	80.9	414.4	8.7	2.10	ACCEPTED	UM5-22	CNG	070725

BUREAU VERITAS

2007 07. 27

J. H. KIM

☒ REVIEWED ☒ WITNESSED

**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

Hydraulic Test Pressure : 37.5 Mpa

Leakage Test Pressure : 25.0 Mpa

pag04

No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
121	204979	95.3	81.6	415.7	11.4	2.74	ACCEPTED	UM5-23	CNG	070725
122	204980	96.1	81.3	415.0	9.4	2.27	ACCEPTED	UM5-24	CNG	070725
123	204981	95.8	81.2	410.4	9.3	2.27	ACCEPTED	UM5-25	CNG	070725
124	204982	95.7	81.4	413.1	8.6	2.08	ACCEPTED	UM6-1	CNG	070725
125	204983	95.8	80.6	412.9	9.7	2.35	ACCEPTED	UM6-2	CNG	070725
126	204984	94.3	80.8	410.8	12.3	2.99	ACCEPTED	UM6-3	CNG	070725
127	204985	95.7	81.2	414.4	10.7	2.58	ACCEPTED	UM6-4	CNG	070725
128	204986	94.0	81.5	416.3	10.7	2.57	ACCEPTED	UM6-5	CNG	070725
129	204987	94.1	80.6	411.7	11.8	2.87	ACCEPTED	UM6-6	CNG	070725
130	204988	96.2	80.6	410.5	10.0	2.44	ACCEPTED	UM6-7	CNG	070725
131	204989	95.5	81.2	415.3	9.3	2.24	ACCEPTED	UM6-8	CNG	070725
132	204990	95.1	81.6	412.7	9.9	2.40	ACCEPTED	UM6-9	CNG	070725
133	204991	94.7	81.4	413.7	9.4	2.27	ACCEPTED	UM6-10	CNG	070725
134	204992	94.8	81.3	414.1	9.2	2.22	ACCEPTED	UM6-11	CNG	070725
135	204993	94.7	80.9	411.8	8.3	2.02	ACCEPTED	UM6-12	CNG	070725
136	204994	95.5	80.8	415.8	11.6	2.79	ACCEPTED	UM6-13	CNG	070725
137	204995	97.0	81.0	410.6	11.9	2.90	ACCEPTED	UM6-14	CNG	070725
138	204996	96.2	81.4	415.5	9.7	2.33	ACCEPTED	UM6-15	CNG	070725
139	204997	94.4	80.9	410.8	10.9	2.65	ACCEPTED	UM6-16	CNG	070725
140	204998	95.2	81.4	416.6	11.8	2.83	ACCEPTED	UM6-17	CNG	070725
141	204999	95.5	80.6	416.3	9.3	2.23	ACCEPTED	UM6-18	CNG	070725
142	205000	96.6	81.0	415.4	11.8	2.84	ACCEPTED	UM6-19	CNG	070725
143	205001	96.3	80.7	413.1	10.3	2.49	ACCEPTED	UM6-20	CNG	070725
144	205002	96.3	81.4	412.7	9.1	2.20	ACCEPTED	UM6-21	CNG	070725
145	205003	96.5	80.6	412.3	10.0	2.43	ACCEPTED	UM6-22	CNG	070725
146	205004	96.9	81.0	411.1	10.8	2.63	ACCEPTED	UM6-23	CNG	070725
147	205005	97.0	80.9	410.7	9.1	2.22	ACCEPTED	UM6-24	CNG	070725
148	205006	95.6	81.4	414.8	10.3	2.48	ACCEPTED	UM6-25	CNG	070725
149	205007	96.6	80.8	411.3	12.3	2.99	ACCEPTED	UM7-1	CNG	070725
150	205008	94.0	80.9	413.3	8.3	2.01	ACCEPTED	UM7-2	CNG	070725
151	205009	94.3	81.4	413.0	9.5	2.30	ACCEPTED	UM7-3	CNG	070725
152	205010	94.4	81.3	415.3	12.0	2.89	ACCEPTED	UM7-4	CNG	070725
153	205011	97.0	80.8	415.8	9.1	2.19	ACCEPTED	UM7-5	CNG	070725
154	205012	95.6	81.3	410.8	8.3	2.02	ACCEPTED	UM7-6	CNG	070725
155	205013	96.6	81.2	411.1	9.8	2.38	ACCEPTED	UM7-7	CNG	070725
156	205014	96.7	80.6	411.3	12.2	2.97	ACCEPTED	UM7-8	CNG	070725
157	205015	94.7	80.7	416.1	10.7	2.57	ACCEPTED	UM7-9	CNG	070725
158	205016	97.2	81.2	415.1	8.9	2.14	ACCEPTED	UM7-10	CNG	070725
159	205017	94.0	80.9	411.8	8.3	2.02	ACCEPTED	UM7-11	CNG	070725
160	205018	94.5	80.8	415.8	11.6	2.79	ACCEPTED	UM7-12	CNG	070725

BUREAU VERITAS

2007 07. 27

J. H. KIM

REVIEWED / WITNESSED

**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

Hydraulic Test Pressure : 37.5 Mpa

Leakage Test Pressure : 25.0 Mpa

pag05

No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
161	205019	96.1	81.4	415.5	9.7	2.33	ACCEPTED	UM7-13	CNG	070725
162	205020	95.5	80.8	413.2	10.6	2.57	ACCEPTED	UM7-14	CNG	070725
163	205021	95.5	81.4	415.6	10.6	2.55	ACCEPTED	UM7-15	CNG	070725
164	205022	95.5	80.8	411.4	9.1	2.21	ACCEPTED	UM7-16	CNG	070725
165	205023	95.1	80.7	412.6	10.7	2.59	ACCEPTED	UM7-17	CNG	070725
166	205024	95.2	80.8	413.2	10.6	2.57	ACCEPTED	UM7-18	CNG	070725
167	205025	95.0	81.3	412.4	10.4	2.52	ACCEPTED	UM7-19	CNG	070725
168	205026	94.9	80.9	410.4	10.5	2.56	ACCEPTED	UM7-20	CNG	070725
169	205027	95.6	80.9	413.0	10.6	2.57	ACCEPTED	UM7-21	CNG	070725
170	205028	95.5	81.2	416.5	12.4	2.98	ACCEPTED	UM7-22	CNG	070726
171	205029	95.7	81.5	411.4	12.1	2.94	ACCEPTED	UM7-23	CNG	070726
172	205030	95.7	80.7	415.6	12.4	2.98	ACCEPTED	UM7-24	CNG	070726
173	205031	95.7	81.2	415.9	10.0	2.40	ACCEPTED	UM7-25	CNG	070726
174	205032	95.7	81.0	412.4	11.1	2.69	ACCEPTED	UM8-1	CNG	070726
175	205033	96.7	81.1	411.8	8.9	2.16	ACCEPTED	UM8-2	CNG	070726
176	205034	95.7	80.7	412.0	9.9	2.40	ACCEPTED	UM8-3	CNG	070726
177	205035	97.0	81.3	414.9	8.4	2.02	ACCEPTED	UM8-4	CNG	070726
178	205036	94.8	80.7	412.1	11.6	2.81	ACCEPTED	UM8-5	CNG	070726
179	205037	96.7	81.5	410.8	8.7	2.12	ACCEPTED	UM8-6	CNG	070726
180	205038	95.9	81.6	413.1	8.6	2.08	ACCEPTED	UM8-7	CNG	070726
181	205039	95.1	81.1	413.9	9.6	2.32	ACCEPTED	UM8-8	CNG	070726
182	205040	95.2	81.1	412.8	11.7	2.83	ACCEPTED	UM8-9	CNG	070726
183	205041	96.1	81.4	412.2	9.8	2.38	ACCEPTED	UM8-10	CNG	070726
184	205042	94.8	81.4	412.9	9.7	2.35	ACCEPTED	UM8-11	CNG	070726
185	205043	96.0	81.3	410.8	12.3	2.99	ACCEPTED	UM8-12	CNG	070726
186	205044	95.8	81.2	412.9	11.3	2.74	ACCEPTED	UM8-13	CNG	070726
187	205045	95.6	81.5	416.7	11.1	2.66	ACCEPTED	UM8-14	CNG	070726
188	205046	95.9	80.7	414.6	10.0	2.41	ACCEPTED	UM8-15	CNG	070726
189	205047	95.9	80.9	413.6	9.2	2.22	ACCEPTED	UM8-16	CNG	070726
190	205048	96.3	80.8	414.4	10.7	2.58	ACCEPTED	UM8-17	CNG	070726
191	205049	95.4	80.6	414.1	11.4	2.75	ACCEPTED	UM8-18	CNG	070726
192	205050	96.5	81.2	413.2	12.0	2.90	ACCEPTED	UM8-19	CNG	070726
193	205051	94.6	81.0	412.0	11.0	2.67	ACCEPTED	UM8-20	CNG	070726
194	205052	95.6	81.4	415.4	11.8	2.84	ACCEPTED	UM8-21	CNG	070726
195	205053	95.8	81.1	413.1	10.3	2.49	ACCEPTED	UM8-22	CNG	070726
196	205054	96.0	80.8	416.2	9.5	2.28	ACCEPTED	UM8-23	CNG	070726
197	205055	95.6	80.9	412.7	9.1	2.20	ACCEPTED	UM8-24	CNG	070726
198	205056	96.1	81.1	412.6	8.3	2.01	ACCEPTED	UM8-25	CNG	070726
199	205057	95.5	81.3	412.1	12.3	2.98	ACCEPTED	UM9-1	CNG	070726
200	205058	95.9	80.7	415.3	10.7	2.58	ACCEPTED	UM9-2	CNG	070726

B BUREAU VERITAS

2007 07. 27.

J. H. RM
REVIEWED / WITNESSED

**VOLUMETRIC EXPANSION TEST, LEAKAGE TEST(TIGHTNESS TEST),
TARE WEIGHT & WATER CAPACITY TEST REPORT**

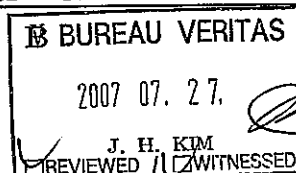
Hydraulic Test Pressure : 37.5 Mpa

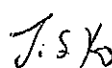
Leakage Test Pressure : 25.0 Mpa

pag06

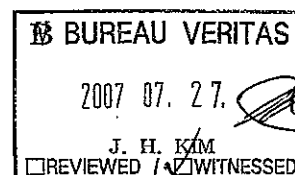
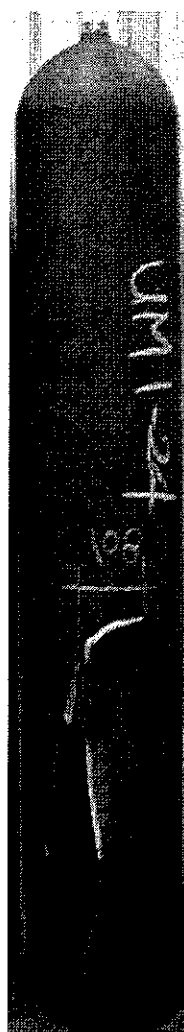
No.	Serial No.	Tare Weight (Kg)	Water Capacity (ℓ)	Total Exp. (cc)	Permanent Exp. (cc)	Ratio Permanent Exp. (%)	Leakage Test Result	Traveller No.	Gas	Test Date
201	205059	96.6	80.4	414.2	9.4	2.27	ACCEPTED	UM9-3	CNG	070726
202	205060	94.8	80.5	413.6	11.6	2.80	ACCEPTED	UM9-4	CNG	070726
203	205061	95.6	80.4	416.0	8.7	2.09	ACCEPTED	UM9-5	CNG	070726
204	205062	96.5	81.5	413.8	10.0	2.42	ACCEPTED	UM9-6	CNG	070726
205	205063	96.0	81.2	410.5	10.0	2.44	ACCEPTED	UM9-7	CNG	070726
206	205064	95.5	80.8	414.9	10.4	2.51	ACCEPTED	UM9-8	CNG	070726
207	205065	95.5	81.3	412.8	12.1	2.93	ACCEPTED	UM9-9	CNG	070726
208	205066	95.2	81.6	416.9	10.8	2.59	ACCEPTED	UM9-10	CNG	070726
209	205067	96.3	81.4	413.7	10.8	2.61	ACCEPTED	UM9-11	CNG	070726
210	205068	95.6	80.8	410.2	11.4	2.78	ACCEPTED	UM9-12	CNG	070726
211	205069	95.3	80.7	410.6	8.9	2.17	ACCEPTED	UM9-13	CNG	070726
212	205070	95.3	80.8	412.0	8.3	2.01	ACCEPTED	UM9-14	CNG	070726
213	205071	95.1	80.7	411.1	10.0	2.43	ACCEPTED	UM9-15	CNG	070726
214	205072	95.3	81.1	413.8	10.5	2.54	ACCEPTED	UM9-16	CNG	070726
215	205073	96.4	81.5	415.5	8.5	2.05	ACCEPTED	UM9-17	CNG	070726
216	205074	96.6	80.7	412.8	8.5	2.06	ACCEPTED	UM9-18	CNG	070726
217	205075	96.6	80.7	412.2	10.7	2.60	ACCEPTED	UM9-19	CNG	070726
218	205076	96.3	81.1	413.6	10.7	2.59	ACCEPTED	UM9-20	CNG	070726
219	205077	96.6	81.2	412.3	12.0	2.91	ACCEPTED	UM9-21	CNG	070726
220	205078	96.1	81.1	415.4	10.7	2.58	ACCEPTED	UM9-22	CNG	070726
221	205079	96.1	80.7	413.0	11.3	2.74	ACCEPTED	UM9-23	CNG	070726
222	205080	95.6	81.1	411.1	8.4	2.04	ACCEPTED	UM10-1	CNG	070726
223	205081	96.6	81.0	411.7	11.4	2.77	ACCEPTED	UM10-2	CNG	070726
224	205082	95.2	81.1	416.7	9.8	2.35	ACCEPTED	UM10-3	CNG	070726
225	205083	95.5	80.8	414.8	11.6	2.80	ACCEPTED	UM10-4	CNG	070726
226	205084	96.0	80.8	410.2	11.4	2.78	ACCEPTED	UM10-5	CNG	070726
227	205085	96.6	80.9	413.4	9.1	2.20	ACCEPTED	UM10-6	CNG	070726
228	205086	95.9	81.1	410.4	10.5	2.56	ACCEPTED	UM10-7	CNG	070726
229	205087	96.5	81.5	414.2	12.0	2.90	ACCEPTED	UM10-8	CNG	070726
230	205088	95.9	80.9	416.6	11.0	2.64	ACCEPTED	UM10-9	CNG	070726
231	205089	96.7	80.7	410.1	10.9	2.66	ACCEPTED	UM10-10	CNG	070726
232	205090	97.1	81.1	416.8	8.4	2.02	ACCEPTED	UM10-11	CNG	070726
233	205091	96.5	81.3	416.7	8.7	2.09	ACCEPTED	UM10-12	CNG	070726
234	205092	95.3	81.5	412.1	10.7	2.60	ACCEPTED	UM10-13	CNG	070726
235	205093	94.6	80.6	415.7	8.5	2.04	ACCEPTED	UM10-14	CNG	070726
236	205094	96.7	81.1	410.4	10.5	2.56	ACCEPTED	UM10-15	CNG	070726
237	205095	96.3	80.7	412.2	9.9	2.40	ACCEPTED	UM10-16	CNG	070726
238	205096	96.4	80.9	413.6	11.3	2.73	ACCEPTED	UM10-17	CNG	070726
239	205097	93.8	81.5	413.2	9.6	2.32	ACCEPTED	UM10-18	CNG	070726
240	205098	93.9	81.5	410.5	9.9	2.41	ACCEPTED	UM10-19	CNG	070726

Total 240



 FINETEC	BURST TEST REPORT		Prepared By	Checked By	Approved By
					
Raw Material	HZST273	Test Date	2007. 07. 27		
Capacity	80.0L	Traveler No.	UM1-24		
Standard	ISO 9809-1	Burst Crack	Accepted		
Burst pressure	638 bar	Result	Accepted		

#Photograph



REMARK

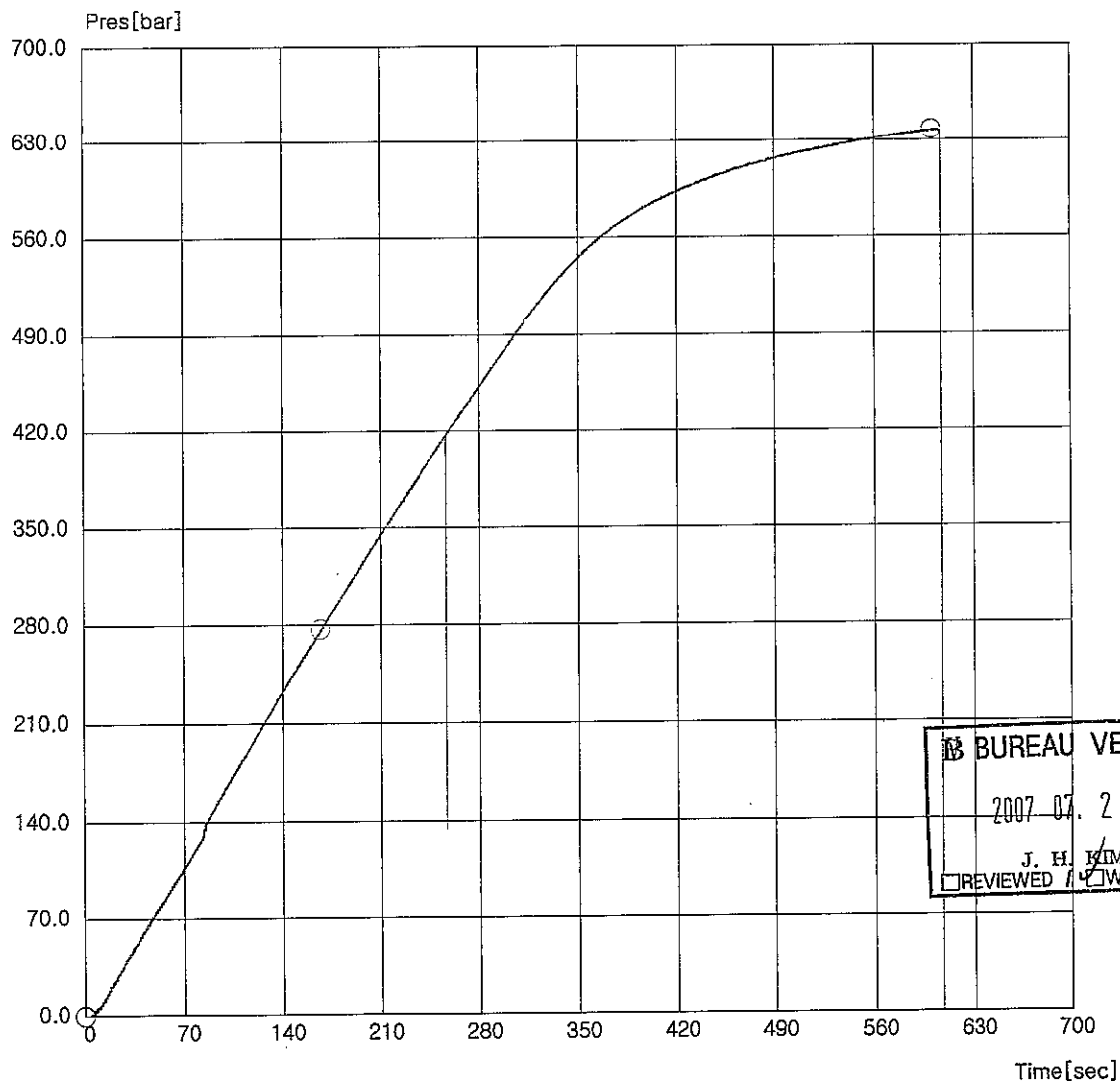


파열시험(Burst Test)

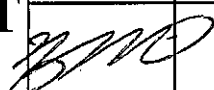
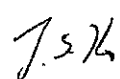
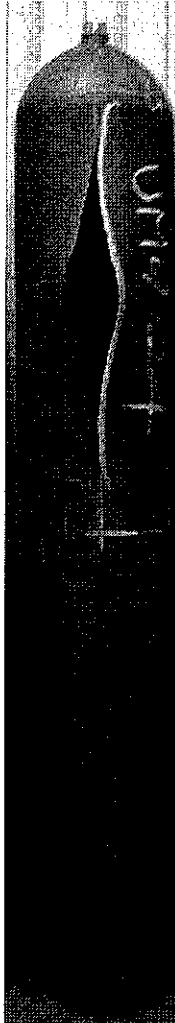
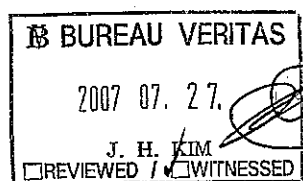
작성	검토	승인
결재		

시험일자	2007-07-27	제품명	SGC
시험자	JINSU SEO	재질명	CrMO
시험기준	ISO9809-1	온도	20℃
LOT번호	UM-1(UM1-24)	습도	
제품규격	80.0L	기타	

	최대압력 T.L	최대시간 T.T	파단압력 B.L	파단시간 B.T
	bar	sec	bar	sec
SPEC				
NO.				
070727UM-1(UM1-24)	638.10	600.8	0.00	0.0
Average	638.10	600.8	0.00	0.0
Stand.Devi.	0.00	0.0	0.00	0.0



BUREAU VERITAS
2007-07-27
J. H. KIM
REVIEWED / WITNESSED

 FINETEC	BURST TEST REPORT		Prepared By	Checked By	Approved By
					
Raw Material	HZST273	Test Date	2007. 07. 27		
Capacity	80.0L	Traveler No.	UM9-24		
Standard	ISO 9809-1	Burst Crack	Accepted		
Burst pressure	658 bar	Result	Accepted		
#Photograph  					
REMARK					

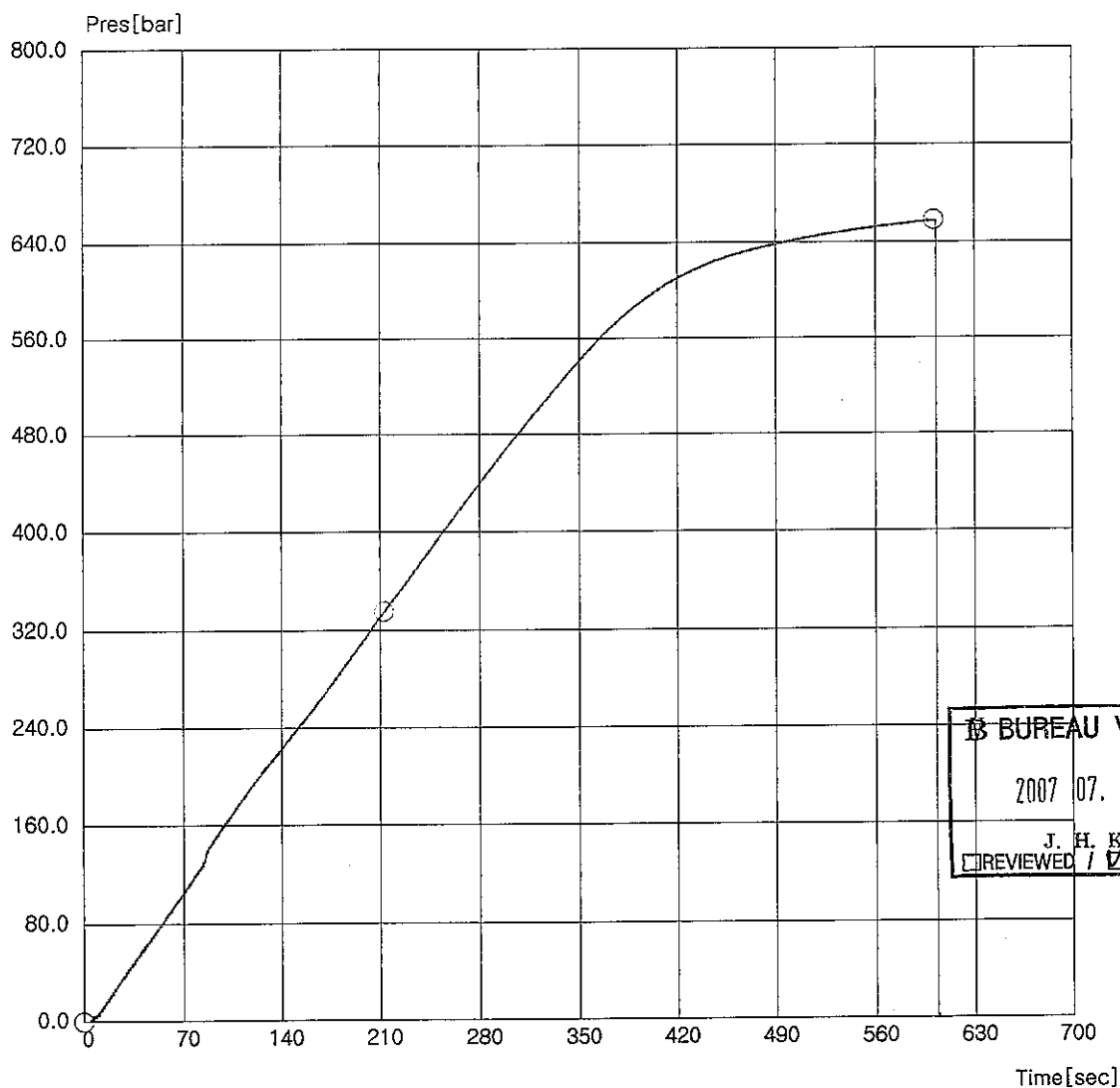


파열시험(Burst Test)

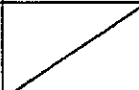
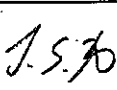
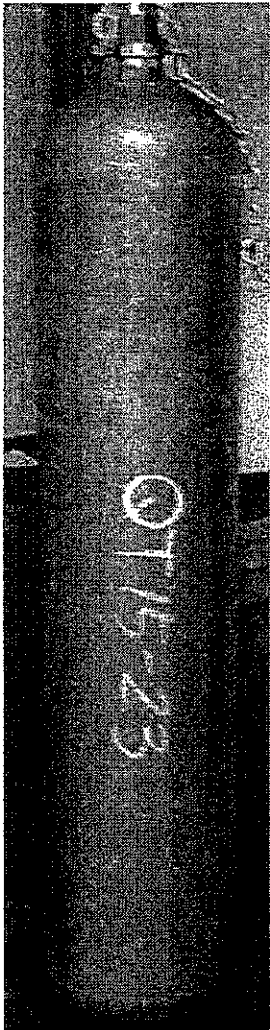
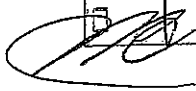
작성	검토	승인
결재		

시험일자	2007-07-27	제품명	SGC
시험자	JINSU SEO	재질명	CrMO
시험기준	ISO9809-1	온도	20℃
LOT번호	UM-2(UM9-24)	습도	
제품규격	80.0L	기타	

	최대압력 T.L bar	최대시간 T.T sec	파단압력 B.L bar	파단시간 B.T sec
NO. / SPEC				
070727UM-2(UM9-24)	658.20	601.1	0.00	0.0
Average	658.20	601.1	0.00	0.0
Stand.Devi.	0.00	0.0	0.00	0.0



BUREAU VERITAS
2007 07. 27.
J. H. KIM
REVIEWED / WITNESSED

 FINETEC	Pressure Cycling Test		Prepared By	Checked By	Approved By								
													
Raw Material	TPCO273	Test Date	2006. 12. 28~2007.01.05										
Capacity	80L	Heat treatment	900-60-630(℃)										
Standard	ISO 9809-1	Traveler No.	QT15-23										
Cycle Test Pressure	below 20bar / above 375bar	Count	not failed until 13,697 cycle										
		Result	Accepted										
#Photograph  <table border="1"> <tr> <td>☒ WITNESSED</td> <td>DATE</td> </tr> <tr> <td>☒ REVIEWED</td> <td>26/01/07</td> </tr> <tr> <td>☒ VERIFIED</td> <td>BY SURVEILL</td> </tr> <tr> <td>☒</td> <td>J. H. KIM</td> </tr> </table> 						☒ WITNESSED	DATE	☒ REVIEWED	26/01/07	☒ VERIFIED	BY SURVEILL	☒	J. H. KIM
☒ WITNESSED	DATE												
☒ REVIEWED	26/01/07												
☒ VERIFIED	BY SURVEILL												
☒	J. H. KIM												
REMARK													

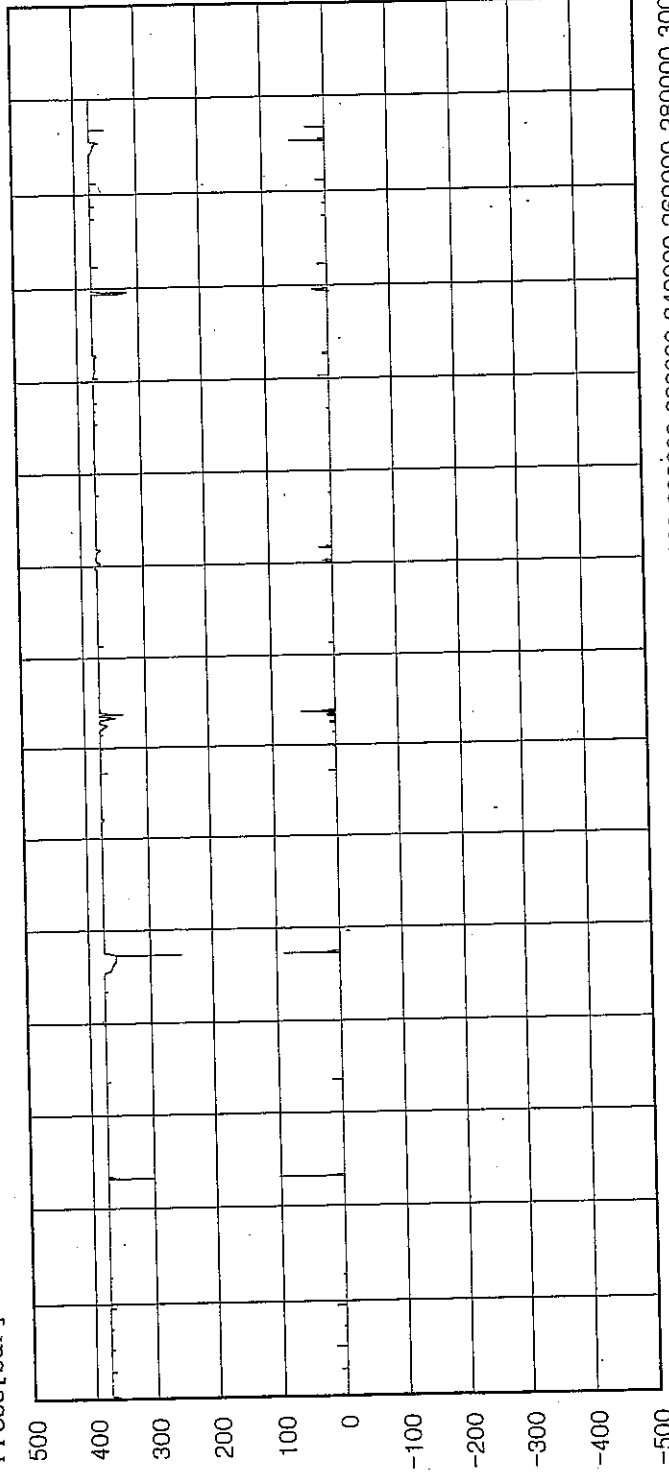


Pressure Cycling Test

결	재	담당	과장
		<i>[Signature]</i>	<i>[Signature]</i>

시험일자	2006-12-28 ~ 2007-01-05	제품규격	80.0L
시험자	SANGJIN PARK	제품명	SEAMLESS GAS CYLINDER
시험기준	ISO 9809-1 (12,000회 이상)	제질명	STH21
LOT번호	QT15-23	온도	20(±2)°C

Press[bar]



0 20000 40000 60000 80000 100000 120000 140000 160000 180000 200000 220000 240000 260000 280000 300000

Time[sec]

시	용자정의	Angle	Cycle	주파수	책임자
험			13, 6P1	0.05Hz	
조			14000-303		
건					

종합판정 : Accepted.
기타 :

WITNESSED
REVIEWED
VERIFIED
J. H. KIM

(주)화인텍