INTERNATIONAL ELECTROTECHNICAL COMMISSION SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)

Title: Re-assessment Report for the continued acceptance of Korea Gas Safety Corporation (KGS), Korea as an Ex Test Laboratory (ExTL) within the IECEx System

To: Members of the IECEx Management Committee, ExMC

Introduction

This document contains the IECEx Re-assessment Report for Korea Gas Safety Corporation (KGS), Korea, as an Accepted Ex Test Laboratory (ExTL) in accordance with the 5-year re-assessment plan for the surveillance and monitoring of bodies under the IECEx System.

This Report is issued for information and noting during the next IECEx Meeting.

Chris Agius

IECEx Secretariat

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IECEx RE-ASSESSMENT REPORT FOR KGS ExTL (IECEx TEST LABORATORY)

Type of Assessment: (please mark)

Re-Assessment of ExTL	**X**
Scope Extension of ExTL	**X**

1. OBJECT AND FIELD OF APPLICATION

1.1. ***Country:***
Republic of Korea

1.2. ***Name of Candidate TL***
Institute of Gas Safety Technology
Korea Gas Safety Corporation (KGS)

1.3. ***Members of the Assessment Team***
Jim Munro, Chairman Panel of Assessors - Lead Assessor
Ron Webb, FM Approvals Ltd – Expert assessor

1.4. ***Place and Date of Assessment***
KGS
332-1 Daeya Dong, Shiyhung-Shi
Gyonggi-Do
KOREA 429-712

3-4 December 2007 (4 man-days)

1.5. ***Assessment References***

i) IECEx 02 Third Edition 2006-11 IECEx Scheme rules of procedure
ii) IECEx Operational Document OD 003 IECEx Assessment procedures
iii) IECEx Operational Document OD 009 Issuing of CoCs, ExTRs and QARs
iv) ISO/IEC 17025:2005
v) IECEx Technical Guidance Documents (TGDs)
vi) ExTAG decision sheets (DSs)

1.6. Scope of Application (to be selected)

Number	Title
60079-0	Electrical apparatus for explosive gas atmospheres Part 0: General requirements
60079-1	Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures 'd' **EDITION 6**
60079-2	Electrical apparatus for explosive gas atmospheres Part 2: Electrical apparatus, type of protection 'p' (Pressurization)
60079-7	Explosive atmospheres - Part 7: Equipment protection by increased safety 'e' **EDITION 4**
60079-11	Electrical apparatus for explosive gas atmospheres Part 11: Intrinsic safety 'i'
60079-15	Electrical apparatus for explosive gas atmospheres Part 15: Electrical apparatus with type of protection 'n' (Non-Sparking)
60079-18	Electrical apparatus for explosive gas atmospheres Part 18: Encapsulation 'm'

Scope change for new editions as shown above.

The scope is for Group II.

1.7. *Candidate TL Persons Interviewed*

Name	Position
Changwoo Lee	Manager ExTL
S D Lim	Increased safety
D S Moon	Increased safety
YH Choi	Flameproof, 'e' and calibration
H B Jun	Under training for 'e', 'n' and 'p'

1.8. Legal Entity of The Candidate TL

KGS is a public body established under Article 28 of the High Pressure Gas Safety Control Law. There is a certificate of registration 140-82-00740 with the Taxation Department for KGS.

1.9. *Associated ExCB*

The ExCB is integral with the ExTL.

1.10. *Financial Support*

KGS receives about 50% financial support from the Government. The rest is met from inspection, training, R&D, testing and certification income.

1.11. History

Initially established in 1974 with the name KGS being used since 1979. In 1995 the Institute of Gas Safety Technology was established as an annex research centre. In 1998 it became an affiliate of the Ministry of Commerce, Industry and Energy, and was designated as a certification body for electrical explosion-proof performance.

2. ORGANISATION

2.1. Names, Titles and Experience of the Senior Executives

Name	Title	Experience
Hae Duk Jung	General Manager	14 years in Ex
Chang Woo Lee	Manager ExTL	12 years in Ex

2.2. Name, Title and Experience of the Quality Management Representative

Name	Title	Experience
Hae-Duk Jung	Manager, Hazardous Locations Equipment, and Quality Manager	14 years in Ex

2.3. Name and Title of Nominated Principal Contact

Name	Title	Comments
Hae-Duk Jung	As above	

2.4. Employees

Name	Title	Experience in Ex
ChangWoo Lee	Manager ExTL	Major concepts : Ex “i” Ex “e” Ex”n” 12 years
YeonHee Choi	Certification Engineer	Major concepts : Ex “e” Ex “d” Ex DP 12 years
JinSu Lee	Certification Engineer	Major concepts : Ex “e” Ex “d” Ex”p” 12 years
DaeSik Moon	Certification Engineer	Major concepts : Ex “n” Ex “i” Ex”m” 7 years
SooDong Lim	Certification Engineer	Major concepts : Ex “e” Ex “d” Ex DP 5 years
JaSong Koo	Certification Engineer	Major concepts : Ex “p” Ex “d” 3 years
HoByong Jun	Certification Engineer	Major concepts : Ex “p” Ex “m” 2 years

2.5. Organizational Structure

See Annex 1.

3. RESOURCES

The ExTL has a shared General Manager with the ExCB and seven staff. It is well resourced with test equipment and has a new test laboratory under construction that is planned to complete mid December 2007. A tour was made of the building under construction. This will clearly provide a significant improvement to the testing. The building is situated close to the existing buildings, including the flameproof testing area that will remain where it is. Some new equipment had been purchased for the new building. Much of this had already been delivered and was viewed by the assessment

team. The assessment team was confident from what they saw that the KGS will be able to deliver a compliant testing operation from the new building.

4. DOCUMENTATION

4.1. Quality Manual

The main quality manual used for the Ex operation is called 'Manual' and is structured in accordance the clauses of ISO/IEC 17025 with each section numbered Ex-M-xx.

4.2. Test Methods/Procedures

The next level in the system is the procedures which are numbered Ex-P-xx.

4.3. Test Records

There are test records keep for most tests and in general found to be quite good. However, there were a few issues that were identified and subsequently resolved to the satisfaction of the assessment team. These included:

- In one instance a test record was found to be missing but this was subsequently located.
- A chart on file was missing a job identification number
- The need to clearly identify the condition after the thermal shock test

4.4. Document Change Control

Document control is covered in Ex-P-04. All procedures and related documents are in printed form and subject to a document change control process. However, they are also available on the intranet system. The existing system did not address control of IEC standards and IECEx documents but this was subsequently addressed to the satisfaction of the assessment team.

5. TEST REPORTS

5.1. Test Reports Issued

Number of test reports issued under the IECEx, national or regional schemes in the preceding four years for each type of protection:

Local Reports - only internal use. These test reports are not issued to the clients:

	2005	2006	2007	May 30 2008
Ex d	232	197	311	113
Ex e	126	236	293	89
Ex p	53	30	96	20
Ex i	24	8	8	4
DP	3	35	13	6
Total	438	506	721	232

IECEx test reports issued:

	2005	2006	2007	May 30 2008
Ex d		2	4	2(Ex de) 2(Ex dem)
Ex e			3	
Ex p			1	
Ex i			2	
Total		2	10	4

6. CALIBRATION

Most equipment is calibrated externally but there is some internal calibration, mainly for pressure and length measurement. There is a database on the intranet that shows all equipment and its calibration status. There are calibration labels on equipment showing the calibration date but most don't show the calibration due date. However, after the assessment the procedures were changed so that the test records will now show the calibration due date so it is clear that the equipment used is in calibration. Some other issues were found with calibration that resolved to the satisfaction of the assessment team with the details contained in the site assessment report.

7. CONFIDENTIALITY

Confidentiality is addressed in Ex-M-27. Each staff member is required to sign a confidentiality agreement. The file containing these was viewed.

8. NATIONAL ACCREDITATION

KGS has national accreditation from KOLAS number 182 (see Annex 2). At the time of the assessment visit the scope of this accreditation did not cover the latest editions of the standards covered by the scope shown in this report. KGS indicated that an assessment visit occurred just before the IECEx re-assessment but that revised accreditation scope had not yet been issued. The revised accreditation was subsequently provided. Annex 2 includes relevant extracts of the scope from the accreditation.

9. RECOGNITION AND AGREEMENTS

There are mutual recognition agreements in place with a number of bodies including Baseefa in the UK, LCIE in France, NEPSI in China, Simtars in Australia and FTZU in the Czech Republic.

10. INTERNAL AUDIT AND PERIODIC REVIEW

Management review is in Ex-M-15 and Ex-P-15. The internal audit for 7-8 August 2007 was viewed. It used a lead ISO auditor and a technical expert who is also an external auditor of manufacturers (not in the Ex field). The audit indicates it covers ISO/IEC 17025 and 17020. Another report was viewed that took place on 11 December 2006. The audit for 2007 was scheduled for the week after the IECEx re-assessment. The 17025 audit raised an NCR on control of standards similar to that raised elsewhere in this report. This indicated that the may be a deficiency in the corrective action process. The procedures

were subsequently revised to the satisfaction of the assessment team enabling closure of previous non-conformities.

11. COMPLAINTS AND APPEALS (Including appeals to IECEx)

Procedure Ex-P-09 addresses appeals, complaints and disputes. It includes specific reference to the potential to use of the IECEx Board of Appeal by the ExCB or the applicant. The process is managed by the Quality Manager. The applicant is informed of the appeal provision in the application form in Ex-P-18.

12. SPECIAL FACTS TO BE NOTED

12.1. *Supporting Documentation*

Copies of additional supporting information for this assessment have been provided to the applicant and the IECEx Secretariat. These include:

- Details of issues raised and how these have been resolved to the satisfaction of the assessment team
- Checklist for ISO/IEC 17025
- Completed technical guidance notes (TGDs)
- Photos of the facilities

12.2. Tests Witnessed

The following tests were witness during the assessment visit:

- A pressure determination test on a flameproof enclosure
- A temperature rise test of a luminaire
- An IP6X/5X test

12.3. ExTRs Reviewed

The following ExTRs were reviewed and where appropriate issues or comments were made and have been detailed in the site report. All issues were subsequently resolved to the satisfaction of the assessment team.
KR/KGS/ExTR07.0003/00
KR/KGS/ExTR07.0007/00
KR/KGS/ExTR07.0010/00

12.4. New Facilities

At the time of the assessment visit KGS was in the process of building a new Ex laboratory near the flameproof testing laboratory. A portion of the existing testing was planned be transferred to the new laboratory. These include intrinsic safety testing and temperature rise testing (but not flameproof testing). A new chamber for temperature rise testing has been purchased for installation in the building and was demonstrated to the assessment team prior to installation. There is also provision for staff to be accommodated in the new building

The construction was sufficiently advanced for the assessment team to tour the building and to make a recommendation that a further review of the facilities on completion will not be necessary. However, the there was an opportunity for a member of the assessment team (Jim Munro) to view the finished facilities on 29 October 2008.

13. COMMENTS (Including issues found during assessment)

In general KGS was found to be a well equipped and with a competent range of skilled staff. However, a number of issues were found that were subsequently resolved to the satisfaction of the assessment team. In addition to those issues documented elsewhere in this report the issues below were found and addressed. In one instance the testing for a report was directly affected. This was addressed and it was confirmed that no equipment had been sold based on the earlier report and certificate. None of the other issues were considered to impact sufficiently on previous testing to require any retesting or change to reports.

- Lack of adequate circulation of dust in the dust chamber.
- Identification of a chart recorder.
- Identification of one batch of samples.
- Clarity on start and stop times of a 24 hour endurance test.
- Improving termination of thermocouples.
- Flameproof testing for a job for an extended temperature range.
- Availability of a hydrogen/methane mix for IIB pressure piling test.

14. RECOMMENDATION

Based on the assessment performed on 3-4 December 2007, KGS is recommended for continued acceptance in the IECEx scheme as an IECEx Testing Laboratory (ExTL) according to the scope of the standards listed in this document including the extension of scope for later standard editions.

Jim Munro	Ron Webb
Lead Assessor	Expert Assessor

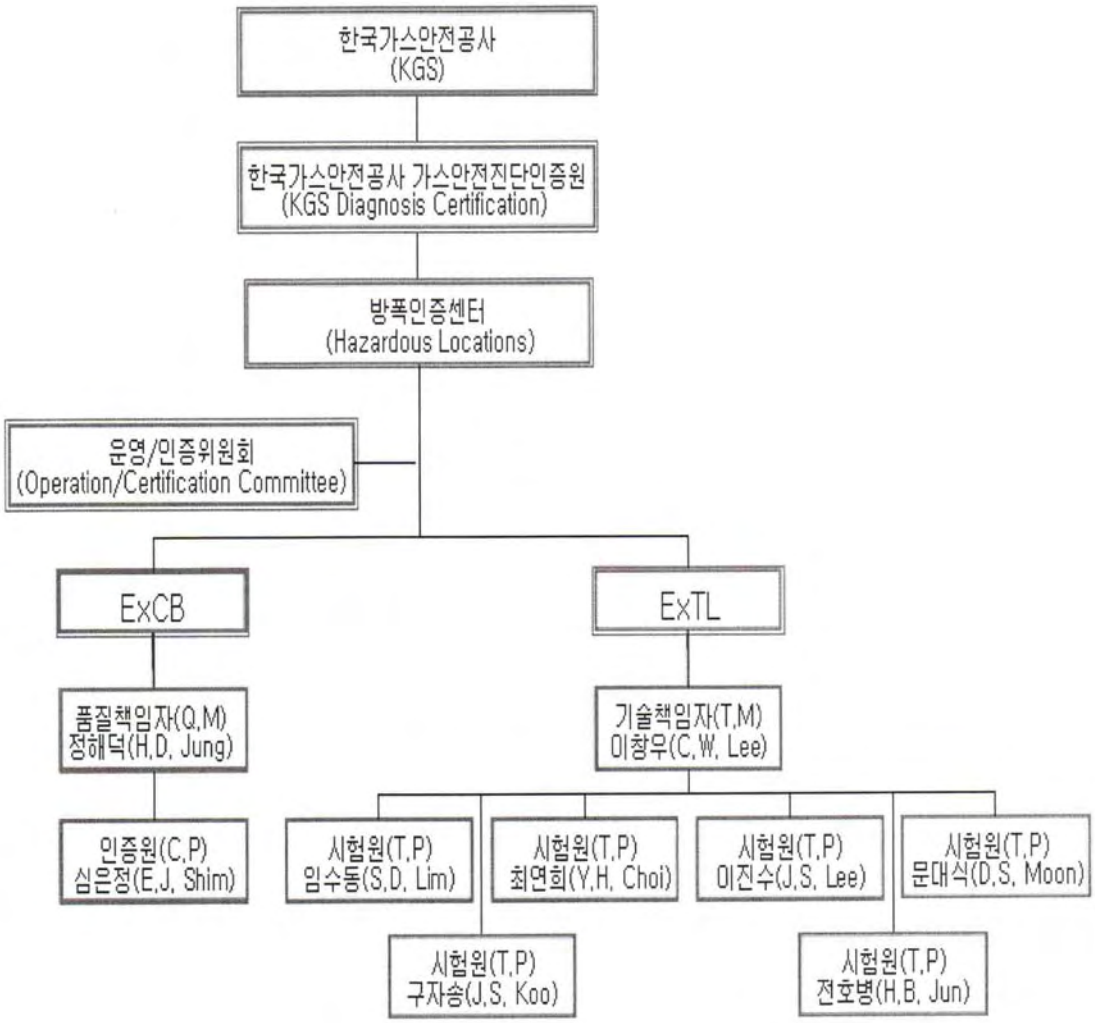
Date: 12 December 2008

List of Annexes:

1. Overall Organization Chart of KGS
2. Organization Chart of the Hazardous Locations Group
3. Accreditation to KGS ISO/IEC 17025

Annex 1
Overall Organization Chart of KGS

Annex 2
Organization Chart of the Hazardous Locations Group



Annex 3
Accreditation to ISO/IEC 17025

No. 186(1/9)

CERTIFICATE OF ACCREDITATION

Name of Laboratory : Korea Gas Safety Corporation

Representative : Lee, Hon-Man

Address of Headquarters : 332-1, Daeya-dong, Shihung-Shi, Kyungki-do, Korea

Address of Laboratory : 332-1, Daeya-dong, Shihung-Shi, Kyungki-do, Korea

Duration : December 26, 2007 ~ December 25, 2011

Scope of Accreditation
(Scope of Accreditation is described in the accompanying Annex)

This is to certify that the above Laboratory is accredited as Testing Laboratory in accordance with the provisions of Article 23 of the National Standards Act.

These criteria encompass the requirements of ISO/IEC 17025 : 2005.

April 11, 2008

Nam, Insuk

Administrator,
Korea Laboratory Accreditation Scheme(KOLAS)

제186호 (1/10)

국제공인시험기관인정서

기 관 명 : 한국가스안전공사

대 표 자 : 이 헌 만

법인등록번호 : 114671-0001406

사업자등록번호 : 133-82-02018

법 인 주 소 : 경기도 시흥시 대야동 332-1

사업장소재지 : 경기도 시흥시 대야동 332-1

유 효 기 간 : 2007년 12월 26일 ~ 2011년 12월 25일

인정분야 및 범위 : 별첨

국가표준기본법 제23조 및 동법시행령 제16조의 규정과 KS A ISO/IEC 17025 : 2006 인정요건에 의거 위와 같이 국제공인 시험 기관으로 인정합니다.

2008년 4월 11일

한 국 인 정 기 구 장

제186호(3/10)

2.012 가스류

규격번호	규격명
ASTM D 2163:1996	Standard Test Method for Analysis of Liquefied Peroleum (LP) Gases and Propene Concentrates by Gas Chromatography
ASTM D 2713:2001	Standard Test Method for Dryness of Propane (Valve Freeze Method)
ASTM D 4468:2006	Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry
KS M ISO 19739:2005	천연가스-가스크로마토그래프에 의한 황 화합물의 농도 결정
KS M ISO 7996:2006	대기-질소산화물의 질량농도 측정 (화학발광법)
KS M 1014:2006	산소표준가스
KS M ISO 2718:2004	가스크로마토그래피에 의한 화학분석방법표준구성

3. 전기시험

3.006 산업용 전기기기

규격번호	규격명
KS B 0161 : 1999	표면 거칠기 정의 및 표시
KS C IEC 60079-0 : 2006	방폭 전기 기계·기구 - 일반요구사항
KS C IEC 60079-1 : 2006	방폭 전기 기계·기구 - 제1부 : 내압방폭구조
KS C IEC 60079-11 : 2001	방폭 전기 기계·기구 - 제11부 : 본질안전방폭구조
KS C IEC 60079-15 : 2006	방폭 전기 기계 기구-제15부:비점화 방폭 구조
KS C IEC 60079-18 : 2006	방폭 전기 기계 기구-제18부:몰드 방폭 구조
KS C IEC 60079-2 : 2006	방폭 전기 기계·기구 - 제2부 : 압력방폭구조
KS C IEC 60079-5 : 2001	방폭 전기 기계 · 기구 – 제5부 : 충전 방폭 구조
KS C IEC 60079-7 : 2001	방폭 전기 기계·기구 - 제7부 : 안전증방폭구조
KS C IEC 60112 : 2005	습한 조건에서 고체 절연 재료 비교 트래킹 지수 및 내트래킹 지수 평가 방법
KS C IEC 61241-1-1 : 2003	분진 방폭 전기 기계 기구-제1-1부:용기 및 표면 온도 제한에 의한 보호
KS C IEC 61241-2-1 : 2003	분진 방폭 전기 기계 기구-제2부:시험 방법-제1절:분진의 최소 점화 온도
KS C IEC 61241-2-3 : 2003	분진 방폭 전기 기계 기구-제2부:시험 방법-제3절:분진/공기 혼합물의 최소 점화 에너지
노동부고시 제2003-18호 : 2003	방호장치성능검정규정
IEC 60079-0 : 2000	Electrical apparatus for explosive gas atmospheres Part 0: General requirements

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3.006 산업용 전기기기

규격번호	규격명
IEC 60079-1 : 2007	Electrical apparatus for explosive gas atmospheres Part 1: Construction and verification test of flameproof enclosures of electrical apparatus
IEC 60079-2 : 2007	Electrical apparatus for explosive gas atmospheres Part 2: Electrical apparatus, type of protection 'p' (Pressurization)
IEC 60079-5 : 2007	Electrical apparatus for explosive gas atmospheres Part 5: Powder filling "q"
IEC 60079-6 : 2007	Electrical apparatus for explosive gas atmospheres Part 6: Oil-immersion 'o'
IEC 60079-7 : 2006	Electrical apparatus for explosive gas atmospheres Part 7: Increased safety 'e'
IEC 60079-11 : 2006	Electrical apparatus for explosive gas atmospheres Part 11: Intrinsic safety 'i'
IEC 60079-15 : 2005	Electrical apparatus for explosive gas atmospheres Part 15: Electrical apparatus with type of protection 'n' (Non-Sparking)
IEC 60079-18 : 2004	Electrical apparatus for explosive gas atmospheres Part 18: Encapsulation 'm'
IEC 60112 : 2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials
IEC 60529 : 2001	Degrees of protection provided by enclosures (IP Code)
IEC 61241-0 : 2004	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
IEC 61241-1 : 2004	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"
IEC 61241-4 : 2001	Electrical apparatus for use in the presence of combustible dust - Part 4: Type of protection "pD"
IEC 61241-11 : 2005	Electrical apparatus for use in the presence of combustible dust - Part 11: Protection by intrinsic safety 'iD'
IEC 61241-18 : 2004	Electrical apparatus for use in the presence of combustible dust - Part 18: Protection by encapsulation 'mD'
IEC 61779-1 : 1998	Electrical apparatus for the detection and measurement of flammable gases Part 1: General requirements and test methods

제186호(5/10)

3.006 산업용 전기기기

규격번호	규격명
IEC 61779-4 : 1998	Electrical apparatus for the detection and measurement of flammable gases Part 4:Performance requirements for group II apparatus indicating up to 100% lower explosive limit
IEC 61779-5 : 1998	Electrical apparatus for the detection and measurement of flammable gases Part 5:Performance requirements for group II apparatus indicating a volume fraction up to 100% gas
ISO 4892-1 : 1999	Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance
KS C IEC 60529 : 2002	외곽의 밀폐 보호 등급 구분(IP코드)
IEC 60079-0 : 2004	Electrical apparatus for explosive gas atmospheres Part 0: General requirements
IEC 60079-1 : 2007	Electrical apparatus for explosive gas atmospheres Part 1: Construction and verification test of flameproof enclosures of electrical apparatus
IEC 60216-1 : 2001	Determination of thermal endurance properties of electrical insulating materials Choice of test criteria
IEC 60216-2 : 2005	Cage induction motors when fed from converters Application guide

4. 열 및 온도측정

4.003 냉난방기

규격번호	규격명
KS A ISO 1996-1 : 2004	음향-환경 소음의 표시 및 측정방법-제1부: 기본량 및 측정절차
KS A ISO 1996-2 : 2004	음향-환경 소음의 표시 및 측정방법-제2부: 적절한 토지 이용을 위한 음향데이터의 수집
KS A ISO 1996-3 : 2002	음향－환경 소음의 표시 및 측정 방법－제3부 : 소음 한계값 적용
KS B 8024 : 2002	야외용 가스히터
KS B 8101 : 2007	가스 연소기기의 시험 방법
KS B 8102 : 2007	가스 연소기기의 구조 통칙
KS B 8103 : 2007	가스 그릴
KS B 8104 : 2007	가스 오븐