



# ICR

## International Certification Registrar

### **Battery Test Center**

SYSTEM CERTIFICATION  
PRODUCT CERTIFICATION  
TESTING  
EDUCATION

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## ICR promises you a hopeful tomorrow with changes and innovations that are accompanied by trust with our customers.

Every company is always moving forward with better development and a brighter future. However, the company's efforts are all the more urgent to meet the needs of the rapidly changing era and take a step forward. ICR is a conformity assessment organization that constantly studies with pride that the best goal is customer satisfaction to meet these needs of corporate development and continuous management, while insisting on mutual trust as the best competitiveness.

ICR is a conformity assessment agency that provides system certification, product testing and certification services simultaneously, and includes IAS, KAB, KOLAS, PCA, RRA, etc. It is an accredited testing and certification agency registered with domestic and international accreditation organizations. In addition, ICR is designated as ExCB/ExTL by the International Explosion Proof Technology Committee (IECEX) to provide more diverse testing and certification services.

ICR is the first one-stop service certification agency in Korea and is a domestic/foreign certification partner that supports inspection, verification, test, and system certification through the company's test evaluation and certification support. As has been the case for the past 20 years, ICR promises a bright tomorrow with changes and innovations accompanied by trust with our customers.

Thank You.

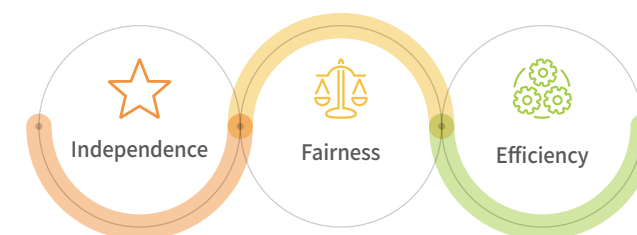
### Management Policy

ICR always endeavors to create new certification service culture of the twenty-first century with the following management policy.

**"ICR contributes to improvement of the client's management system by providing the trustworthy testing and certification services."**

### Service Strategy

ICR will achieve the management policy with independence, impartiality and efficiency of certification audits.



### Declaration of Impartiality

ICR is committed to the fulfillment of its responsibility for assuring impartiality in relation to the provision of its certification services to management systems and hereby declares the following policy of impartiality.

ICR shall not place itself in any situation where conflicting interests may exist and adversely affect or damage impartiality of interested parties while providing our certification services.

ICR shall not place itself in a situation where audit resources pursue pecuniary interest by sufficient management of resources.

All management and employees of ICR shall maintain good communication and understand the importance of impartiality to assure openness with all audit results.

ICR auditors shall maintain business characteristics of objectiveness and impartiality in performing their auditing services, and shall clearly recognize the provision of certification services through the continuous improvement of professionalism and enhanced business skills.

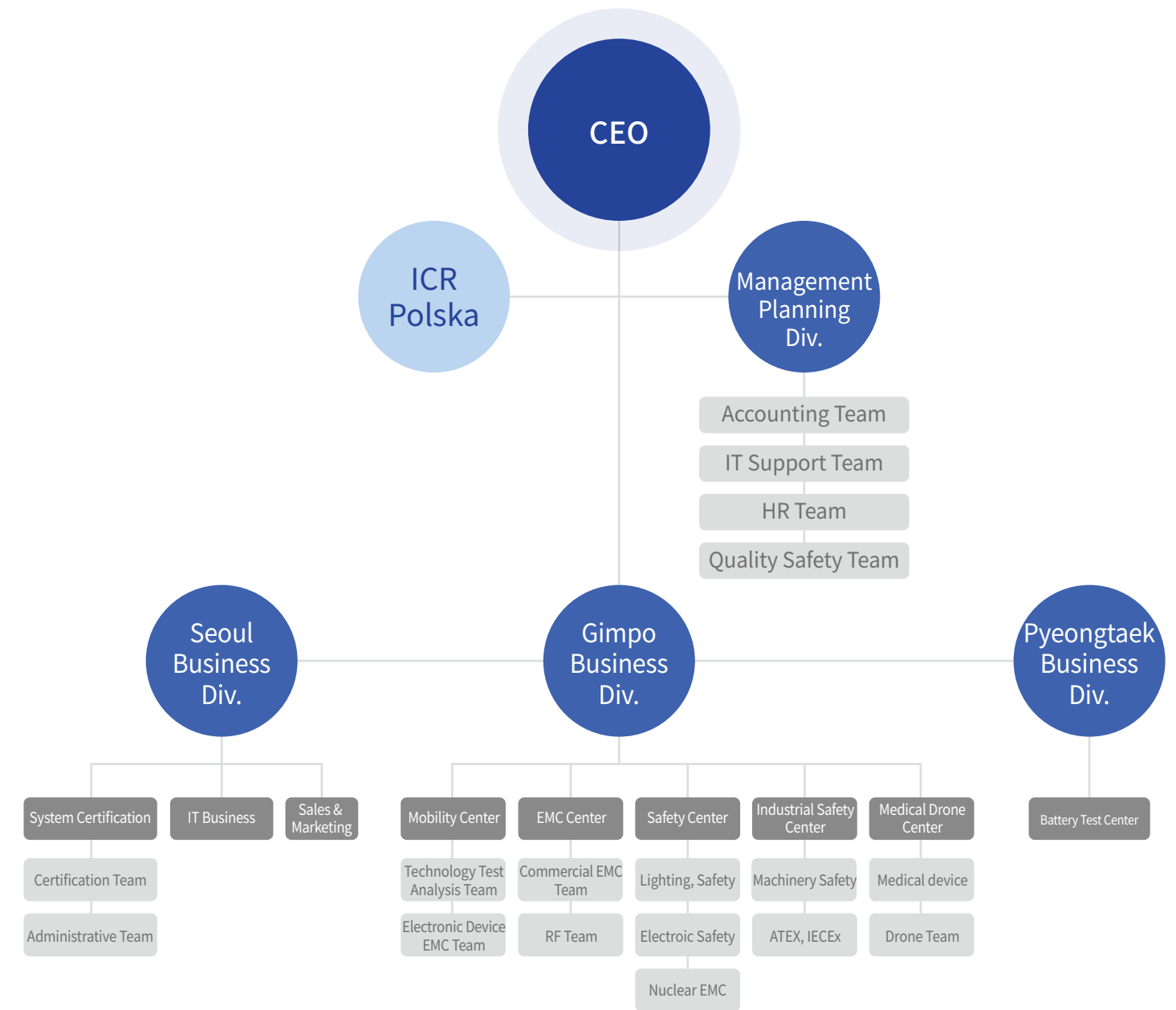
# ICR HISTORY

# ICR ORGANIZATION

To make a better tomorrow,  
ICR tries with the very best intention for clients.

- 2001**  
Established ICR International Certification Registrar Ltd.
- 2003**  
Accredited for ISO 9001/ ISO 14001 by ANAB, USA Accreditation Body.
- 2009**  
Registered as auditor training provider to RAB-QSA (Exemplar Global at present).
- 2014**  
Established ICR Polska in Warsaw, Poland.
- 2015**  
- ICR laboratory accredited by KOLAS as an internationally recognized testing laboratory.  
- Accredited for ISO 9001/ ISO 14001/OHSAS 18001 by KAB, Korea Accreditation Board.
- 2016**  
- The completion of the new ICR Head Office building  
- Established ICR internationally recognized testing laboratory.  
- ICR Polska has been notified to European Union as Notified Body (No. 2703).  
- Registered as the third party certification body by Samsung Electronics' Semiconductor - Business Department.
- 2017**  
- Appointed as Testing Laboratory by KR.  
- Accepted as CBTL by IECEE.  
- Appointed as Testing Laboratory by Standby Power.  
- Appointed as Testing Laboratory by Efficiency Management.  
- Appointed as Recognized Testing Laboratory by Intertek.  
- Accepted as a testing laboratory for broadcasting and communication equipment by the National Radio Research Agency.  
- Accredited for ISO 13485 by PCA, Polish Centre for Accreditation.
- 2018**  
- Appointed by EMC Testing Laboratory by Hyundai/Kia Motors  
- Appointed as Reliability (environment/EMC) testing Laboratory by S-ONE  
- Appointed as 5G Wireless Laboratory by National Radio Research Agency

- 2019**  
- Appointed as Testing Laboratory by Canada(IC)  
- Appointed Testing Laboratory by Samsung Electronics  
- Appointed as EMC Testing Laboratory by SSANGYONG Motor  
- Recognized as an electromagnetic performance verification agency by the Korea nuclear Safety Foundation  
- Recognized as a testing Laboratory specializing in quality verification by central research institute of Korea hydro and nuclear power Co, Ltd
- 2020**  
- Completion of Explosion proof test facilities building  
- Designated as a high-efficiency testing institution  
- Accredited for ISO 13485 by KAB, Korea Accreditation Board
- 2021**  
- Registration of a Third Party Certification body from SK hynix Selected Third Party of SK hynix  
- Designation of a medical device testing and inspection body by MFDS (Ministry of Food and Drug Safety)  
- M.O.U with TIIS(Japan) in Explosion proof Test - Certification  
- ICR Polska has been approved as ExCB by IECEx  
- ICR Polska has been accredited as certification body for drone by PCA
- 2022**  
- Completion of EV Battery test laboratory building in Pyeongtaek  
- Accredited for ISO 37001/ ISO 37301 by KAB, Korea Accreditation Board  
- Signed M.O.U with TUV Rheinland in EV Battery  
- M.O.U with High-Efficiency coexistence cooperation project  
- Seoul division(System certification, IT, Sales departments) moved to Seoul office
- 2023**  
- Accredited for ISO 9001/ ISO 14001/ ISO 45001/ ISO 13485 by IAS, The International Accreditation Services  
- Appointed as Testing Laboratory by Japan VCCI  
- Appointed as 10m Chamber VCCI  
- Additional installation of the testing equipment for Battery Module performance laboratory  
- Appointed as International Explosion proof testing laboratory (IECEx EXTL)  
- ICR Polska has been executed an M.O.U with Brazil NCC  
- ICR Polska has been registered in Team NB member



# ICR INFORMATION

ICR 소개

# ICR Polska Sp. z o.o. (NB 2703)

ICR Polska 소개



## Seoul Business Div.

- System Certification
- Products Certification
- IT Business Department
- Sales & Marketing Department



## Gimpo Business Div. (Head Office)

- Reliability Test
- Failure Mode Analysis
- Car-Electronic Device EMC Test
- EMC Test
- Wireless Test
- Medical Device Test
- Electrical Safety Test
- Nuclear/Defense Industry EMC Test
- CCTV Performance
- Illumination Test
- Energy Efficiency
- Explosion Protection
- Mechanical Safety
- Risk Assessment
- Semiconductor
- Drone Test



## Pyeongtaek Business Div.

- Medium and Large Size Battery Test
- Defense Products Reliability Test
- Seismic Test



ICR Polska Sp. z o.o. is a notified body founded in Poland by ICR Co., Ltd. in 2014. ICR Co., Ltd. established ICR Polska Sp. z o.o., the first European certification agency in Korea, and is leading the domestic product certification market with a different management policy from foreign certification agencies in Korea.

### Knowledge

ICR Polska Sp. z o.o. is active in the PCA, a recognized Polish organization, and various certification, testing, and specification development committees.

### Assurance

ICR Polska Sp. z o.o. provides independent certification of the quality management system through third-party certification, verification and audit, and conducts a secondary audit upon request from the customer.

ICR Polska Sp. z o.o. is an accredited certification body in accordance with EU regulations and conducts independent examination of products, CE Mark. Conducts a comprehensive review of product testing and conformity assessments, such as certification reviews.

### Compliance, Training and Professional Services

Products Certification: Machinery Directive, EMC Directive, Low-Voltage Directive, Radio Equipment

Directive Quality management system: ISO 13485 Product testing, Business trainings

### Partner organization

ICR Polska Sp. z o.o. has a long history and experience with several certification bodies in Poland and provides a quick and accurate compliance assessment of EU regulations through close cooperation with leading organizations in Poland's certification and testing.



### TIIS Technology Institution of Industrial Safety

TIIS is a certification and testing agency registered with IECEX for explosion-proof products and a testing and certification agency registered with Japan's Ministry of Health, Labour and Welfare.



### NCC Certificações do Crasil Ltda

NCC is a certification body registered with IECEX for explosion-proof products and is an INMETRO certification body in Brazil.



### PREDOM NB 1451, NCB

PREDOM is a professional testing agency with over 40 years of experience and is registered as the Polish NCBs in IECEE.



### BBJ Association of Polish Electricians, NCB

BBJ is a government-invested testing agency, a specialized electrical/electronic certification body and testing agency registered as the Polish NCBs in IECEE.



### PIMOT Automotive Industry Institute

PIMOT provides E-mark and e-mark certification services as a testing and inspection agency for automotive parts and equipment designated by the Road Traffic Act.



### Contact and Site

ICR Polska Sp. z o.o., Plac Przymierza 6, 03-944 Warsaw  
 Phone NO. : +48 (22) 115 70 62  
 e-mail : icrpolska@icrpolska.com  
 Main page of ICR polska : www.icrpolska.com

## Testing

Contact Information : [youngho.park@icrqa.com](mailto:youngho.park@icrqa.com)

### Secondary Battery Test

In the rapidly growing secondary battery market, the safety and quality of batteries are becoming more important. ICR has established a large-scale medium/large battery testing laboratory in Pyeongtaek, Gyeonggi-do, to ensure safer products are introduced to the market. We promise to provide the highest quality service for the safety of users and the successful business of customers.

Through ICR battery testing, our client can get the following benefits.

- ICR Pyeongtaek Battery Testing Center is divided into battery performance test building, battery safety test building, seismic test building, and is designed to focus on the safety of visiting customers, test engineers and the environment.
- By collaborating with ICR's battery testing experts, who have access to state-of-the-art battery testing facilities and equipment, including an explosion-proof room for battery safety testing, enables our client to lead in development.
- Client can conduct performance, environmental, and abuse tests for batteries all in one place at ICR.
- Reliable testing saves you time and money during product launch and R&D activities.



## Scope

- **Stationary Battery**  
ESS(Energy Storage System), UPS(Uninterruptible Power Supply) etc.
- **Motive Battery**  
EV(Electric Vehicle), Forklift, Golf cart, AGV, Railway, Marine battery etc.

## Testing Service

Testing can be conducted for all battery levels in terms of performance, environmental, and abuse tests.

	Performance	Environment	Abuse
Cell	<ul style="list-style-type: none"> <li>• Cycle Life</li> <li>• Capacity, Efficiency</li> <li>• Energy Density</li> </ul>	<ul style="list-style-type: none"> <li>• Complicated Vibration (Cycler + Chamber + Vibration)</li> <li>• IP, Immersion</li> </ul>	<ul style="list-style-type: none"> <li>• Over-charge, Over-discharge, Over-temperature, Over-current, Forced Discharge</li> </ul>
Module	<ul style="list-style-type: none"> <li>• Chamber + Chiller + CAN integration</li> <li>• High C-rate &amp; Power such as HPPC, DCIR etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Salt Spray</li> <li>• Altitude Simulation</li> <li>• Thermal Shock</li> </ul>	<ul style="list-style-type: none"> <li>• Crush /Nail Penetration</li> <li>• Thermal Propagation</li> <li>• Short-circuit</li> </ul>
Pack / System		<ul style="list-style-type: none"> <li>• High/Low temp., Humidity Storage</li> </ul>	<ul style="list-style-type: none"> <li>• Drop</li> <li>• Impact</li> <li>• Fire Resistance(TBD)</li> </ul>

### Standard Testing

- UN 38.3, UN ECE R100, UN ECE R136, ISO 12405, ISO 6469-1, IEC 62619, IEC 62620, IEC 62660-1, -2, -3, KMVSS, KS R 1204, SPS-C KBIA-10104-03-7312, UL1973, UL2271, GB 38031, GB/T 31484, GB/T 31486, OEM Specification etc.

# Test Equipment

## Performance Test

- In addition to international standard, certification, and R&D testing for all medium/large-scale batteries such as cells, modules, packs/systems, customized testing also can be conducted.

Equipment	Specification
Pack cycler	<ul style="list-style-type: none"> <li>• 1500 V, 1000 A</li> <li>• 1000 V, 500 A</li> </ul>
Module cycler	<ul style="list-style-type: none"> <li>• 200 V, 500 A</li> </ul>
Cell cycler	<ul style="list-style-type: none"> <li>• 6 V, 100 A</li> </ul>
Temp./Humid. Chamber	<ul style="list-style-type: none"> <li>• -40~150 °C, 30~98 %RH</li> </ul>
Battery cooling chiller	<ul style="list-style-type: none"> <li>• -30~60 °C, Max. 30 LPM</li> </ul>

Pack Cycler



Room Temp./Humid. Chamber



Cell Cycler



Walk-in Temp./Humid. Chamber



## Environmental Test

- We have established equipment and facilities to safely conduct environmental reliability testing for medium/large-scale batteries, in line with the changing market demands.

Equipment	Specification
Thermal shock	<ul style="list-style-type: none"> <li>• -40~120 °C</li> </ul>
Altitude simulation	<ul style="list-style-type: none"> <li>• 11.6 kPa</li> </ul>
Salt spray	<ul style="list-style-type: none"> <li>• -20~80 °C, 30~95 %RH</li> </ul>
IP (Water)	<ul style="list-style-type: none"> <li>• IPx1, 2, 3, 4, 4K, 5, 6, 6K, 7, 8, 9, 9K</li> </ul>

Thermal Shock



Salt Spray



IP Test - Water



Altitude Simulation



# Test Equipment

## Abuse Test

• Abuse testing for batteries can be proceeded in six medium/large explosion-proof rooms.

Facility	Test Items
Explosion-proof room #1	• Drop, Impact
Explosion-proof room #2	• IPx7,8 (Immersion), Heating
Explosion-proof room #3	• Crush, Nail penetration
Explosion-proof room #4	• Thermal run-away, Thermal propagation
Explosion-proof room #5	• Over-charge, Over-discharge, Over-current, Over-temperature, External short-circuit
Explosion-proof room #6	• Vibration (300kN), Mechanical shock

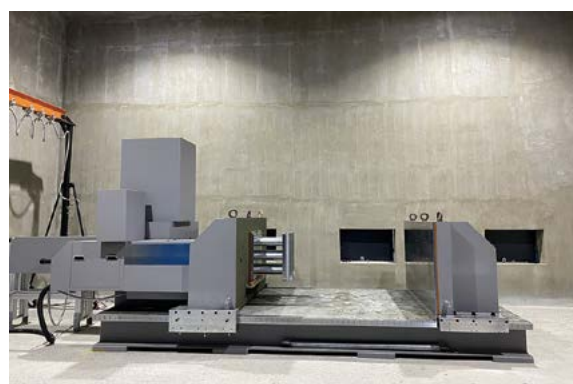
### Explosion-proof Rooms



### Heating Chamber



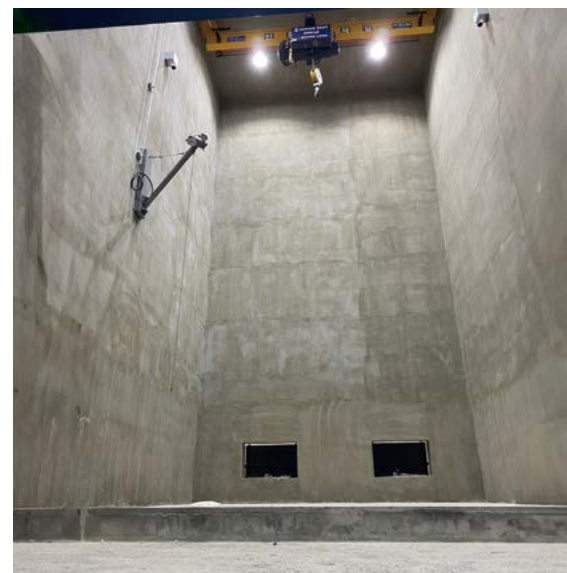
### Module/Pack Crush/ Nail Penetration



### Cell Crush/Nail Penetration



### Drop/Impact



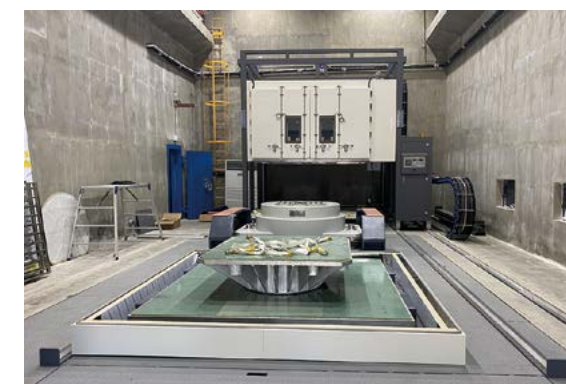
### Immersion



### Overcharge/Overcurrent/ External-Short Circuit



### Vibration with Chamber & Cyclor



### Thermal Propagation



### Cell Impact



## Test Equipment

### Fire Resistance Test

- ICR is dedicated to collaborating with customers to strive for sustainable business and innovation. To proactively support our customers' global market entry, we plan to establish facilities for fire resistance testing.
- This facility conducts tests aimed at evaluating the safety of battery packs and modules in the event of combustion and fire. These tests align with the domestic requirements specified in KMVSS (Korean Motor Vehicle Safety Standards) and are also in accordance with the UN ECE R100 certification, which is required for international market entry.

Equipment	Specification
Gasoline/LPG Fire Resistance Testing Equipment	<ul style="list-style-type: none"> <li>• UN ECE R100 Fire resistance test</li> <li>• KMVSS 48.7.3 Fire resistance test</li> </ul>

### Gasoline/LPG Fire Resistance Tester



## Product Certification

### EV Battery Test & Certification

- ICR has established the Pyeongtaek Battery Testing Center and collaborates with global certification bodies to provide suitability assessment and certification testing services for medium/large batteries. We are dedicated to delivering a one-stop comprehensive service based on trust, ensuring fast and accurate results at reasonable costs.

Standard	Category	Test Item
KMVSS UN ECE R100 UN ECE R136 GB 38031 UN 38.3 KS R 1204 IEC 62660-1, -2, -3 ISO 6469-1	Performance	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Cycle life</li> <li>• Pattern endurance cycle</li> <li>• Energy density</li> <li>• Power</li> </ul>
	Electrical Safety	<ul style="list-style-type: none"> <li>• Short-circuit</li> <li>• Over-charge</li> <li>• Over-discharge</li> <li>• Over-temperature</li> <li>• Over-current</li> <li>• Forced-discharge</li> </ul>
	Mechanical Safety	<ul style="list-style-type: none"> <li>• Vibration</li> <li>• Mechanical shock</li> <li>• Crush</li> <li>• Nail penetration</li> <li>• Drop</li> </ul>
	Environment/ Reliability	<ul style="list-style-type: none"> <li>• Thermal shock</li> <li>• High temp./humid. cycle</li> <li>• Heating</li> <li>• Immersion</li> <li>• Altitude</li> <li>• Salt spray</li> </ul>
 <a href="https://www.thelec.kr/">https://www.thelec.kr/</a>	Fire/Explosion	<ul style="list-style-type: none"> <li>• Fire resistance test</li> <li>• Thermal propagation</li> </ul>



## Testing

Contact Information : [youngho.park@icrqa.com](mailto:youngho.park@icrqa.com)

### Vibration/Mechanical Shock Test

- Vibration and mechanical shock testing is a test method used to evaluate the durability and vulnerability of a device to mechanical stress by simulating vibration and shock scenarios that can occur during installation, transportation, and operation under specific environmental conditions.
- At ICR, during vibration testing, we not only conduct battery charge/discharge tests but also have systems in place that enable communication via CAN (Controller Area Network) between batteries and equipment. This allows us to detect and respond to potential risks in hazardous situations.

Equipment	Specification
Vibration	<ul style="list-style-type: none"> <li>• Max. Sine force: 300 kN</li> <li>• Max. Half-sine Force: 900 kN</li> <li>• Max. Acceleration(Sine peak): 100 g (Vibration/Shock)</li> <li>• Max. Acceleration(Random rms): 60 grms</li> <li>• Max. Velocity sine: more than 2.0 m/s</li> <li>• Frequency Range: 5 ~ 1,700 Hz</li> <li>• Slip Table: 2.5 x 2.5 m</li> <li>• Max. Random Force: 240 kN</li> <li>• Max. Displacement: 76 mm</li> <li>• Max. Payload: 4,500 kg</li> <li>• Head Expander: 2.5 x 2.5 m</li> </ul>
Temp./Humid. Chamber	• -40~150 °C, 25~98 %RH
Pack Cyclor	• 1,500 V, 1,000 A

### 300kN Vibration Tester



## Scope

- Military, Aircraft, Vehicle, Electronics, Communications, Mechanical components
- Secondary battery and related products

## Testing Service

- Electronics, Communication : KS C 0240, IEC 60068 2-6, MIL-STD-202
- Military, Aircraft : MIL-STD-810F/G/H, MIL-PRF-28800F, TRCA/DO-160G
- Railway : KS C IEC 61379, KS C IEC 61373, KS R 9146, KS R 9186
- KS R 1034, JASO D 001-94, OEM specifications (ES, FORD, GM, VW etc.)

### Temp./Humid. Chamber



### Pack Cyclor



## Testing

Contact Information : [youngho.park@icrqa.com](mailto:youngho.park@icrqa.com)

### Seismic Test/Road Simulation Test

- **Seismic Test**  
In the event of an earthquake, this test aims to identify product design issues that can lead to malfunctions and damage in devices, communication equipment, power facilities, and buildings. Through root cause analysis, it works to enhance seismic resistance by addressing structural shortcomings, thus ensuring structural safety and functional integrity.
- **Road Simulation Test**  
The test involves subjecting components such as the car's cockpit, FEM (Finite Element Model), and fuel tank to repetitive stress equivalent to that experienced during actual driving using data measured in a test track. This aims to identify potential issues that may arise during mass production and address structural shortcomings through repeated fatigue testing.

Equipment	Specification
Seismic Simulation	<ul style="list-style-type: none"> <li>• Max. Payload: 2000 kg</li> <li>• Actuator Peak Force: 67 kN</li> <li>• Simulation Frequency(bare table): 0.8-100 Hz</li> <li>• Simulation Frequency(max payload): 0.8-100 Hz</li> <li>• Linear Displacement                             <ul style="list-style-type: none"> <li>- Vertical(Z): <math>\pm 140</math> mm</li> <li>- Lateral(Y): <math>\pm 110</math> mm</li> <li>- Longitudinal(X): <math>\pm 125</math> mm</li> </ul> </li> <li>• Linear Acceleration(bare table)                             <ul style="list-style-type: none"> <li>- Vertical(Z): 15.9 g</li> <li>- Lateral(Y): 11.6 g</li> <li>- Longitudinal(X): 12.8 g</li> </ul> </li> <li>• Linear Acceleration(max payload)                             <ul style="list-style-type: none"> <li>- Vertical(Z): 15.9 g</li> <li>- Lateral(Y): 11.6 g</li> <li>- Longitudinal(X): 12.8 g</li> </ul> </li> <li>• Table Size: 2.2 X 2.2 m</li> </ul>

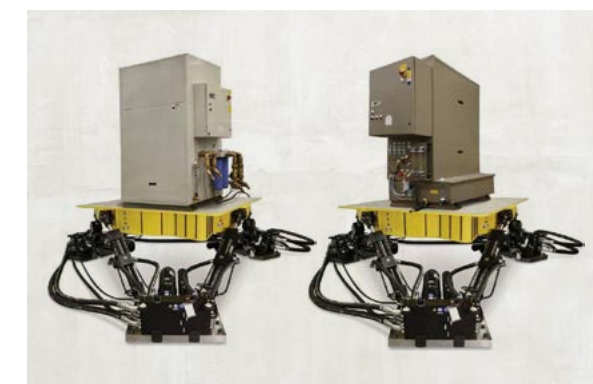
## Scope

- **Seismic Test**  
Broadcast and communication equipment, motor control panels, batteries, MCR (Main Control Room) console, measurement and control cabinets, motors, communication devices, power equipment, steel tower facilities, track structures, etc.
- **Road Simulation Test**  
Automobile Cockpit, FEM (Finite Element Model), Fuel tank, Excavator cabin etc.

## Testing

- **Seismic testing methods for broadcast and communication equipment**
- **Telcordia gr-63 zone4**
- **IEEE 344 IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations**
- **IEEE 693 IEEE Recommended Practice for Seismic Design of Substations**
- **KEPIC END2000 Seismic verification of electrical grade 1 equipment**

### MAST(Multi-Axial Simulation Table)





[www.icrqa.com](http://www.icrqa.com)



# ICR

### **Gimpo Business Headquarters**

113, 112 Hwanggeum 3-ro 7beon-gil, Yangchon-eup, Gimpo-si,  
Gyeonggi-do, Korea  
TEL : 02-6351-9002 | FAX : 02-6351-9005

### **Seoul Business Division**

Room 1501, 6F, Daeryung Post Tower, 50-3 Gasan-dong,  
Geumcheon-gu, Seoul, Korea  
TEL : 02-6351-9001 | FAX : 02-6351-9007

### **Pyeongtaek Business Division**

120 Deurimsandan-ro, Cheongbuk-eup, Pyeongtaek-si, Gyeonggi-do,  
Korea  
TEL : 02-6351-9003 | FAX : 02-6351-9006

**E-mail :** [youngho.park@icrqa.com](mailto:youngho.park@icrqa.com)