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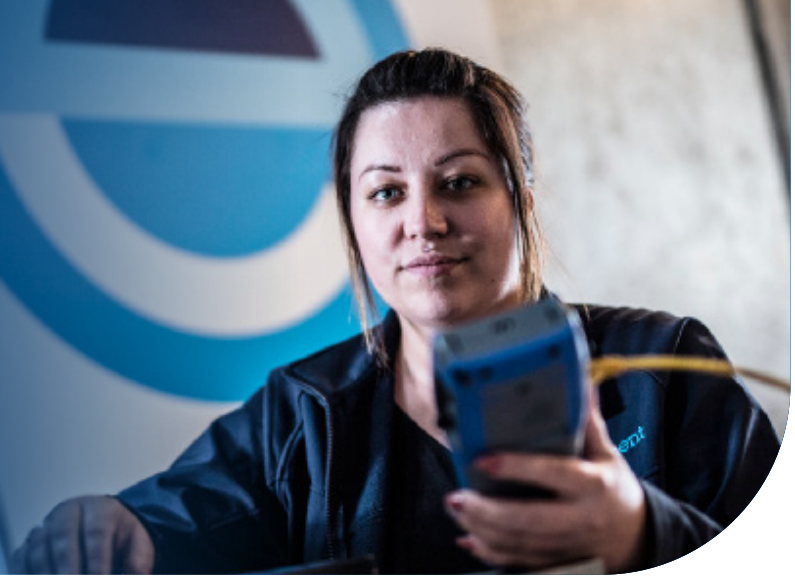
Electromagnetic Compatibility



Electromagnetic Compatibility (EMC) Testing Services

Element Korea supports manufacturers in ensuring that their products comply with Electromagnetic Compatibility (EMC) regulations, enabling safe and reliable use in global markets. EMC testing is a critical process that evaluates a product's immunity to external electromagetic interference and its potential to cause electromagnetic disturbances to other devices.

Scope of EMC Testing Services

- Emission Testing : Verifies that the electromagnetic emissions generated by the product remain within the regulated limits.
- Immunity Testing : Assesses the product's resistance to external electromagetic interference.
- EMI/EMS Testing : Measures electromagnetic interference (EMI) and electromagnetic susceptibility (EMS) to ensure the product stability and immunity under real-world operating conditions.

Applicable Products for EMC Testing

- High-frequency equipment used in industrial, scientific or medical applications
- Automotive components and devices that may affect or be affected by electrical/electronic systems during vehicle operation
- Broadcasting receivers and audio/ideo equipment
- Household electronic and motor-driven appliaces
- Lighting equipment, including fluorescent lamps
- Information and office equipment
- Digital devices
- Telecommunication equipment carrying currents above 9 kHz through power lines
- Low-power radio-frequency devices
- Electrical switches and circuit breakers
- Protective components for electrical products
- Isolating transformers
- Measuring and inspection instruments
- Equipment used for industrial and scientific purposes
- Accessories for wired communication systems
- Electrical equipment for railway systems
- Other devices incorporating oscillators operating at frequencies above 9 kHz

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Electrical Safety

Electrical Safety Testing Services

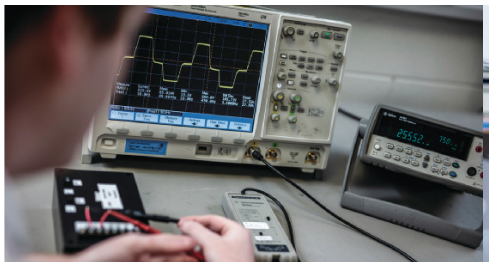
Element Korea provides comprehensive electrical safety testing services for a wide range of electrical products, helping ensure compliance with safety standards and creating a secure environment for end users. Electrical safety testing is essential to prevent hazards such as fire, electric shock, and explosion during product use.

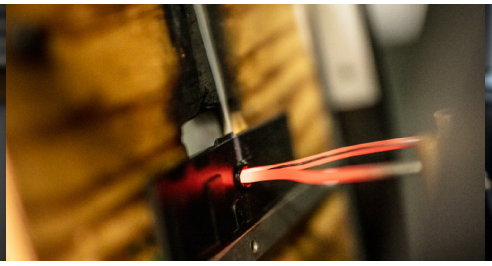
Scope of Electrical Safety Testing Services

- Insulation Resistance Test : Evaluates the product's insulation performance to prevent current leakage during operation.
- Ground Resistance Test : Measures grounding performance to ensure electrical stability.
- Leakage Current Test : Verifies that no electrical current leaks to the exterior during normal operation.
- Overload and Heat Resistance Test : Assesses the product's durability and safety under overload and high-temperature conditions.
- Automotive Lighting Device Testing
- Testing in accordance with Korean National Police Agency standards
  (e.g., traffic signal lights, audible guidance devices, LED display boards)

Applicable Products for Electrical Safety Testing

- Home Appliances : Microwave ovens, refrigerators, etc.
- Industrial Equipment : Power supply units, factory machinery, and automation systems
- Lighting Devices : LED Lights, plugs, power adapters, etc.
- Portable Electronic Devices : Chargers, electric power tools, etc.
- Medical Devices : Diagnostic, therapeutic, monitoring, and surgical equipment
- Information & Office Equipment : Computers, printers, servers, monitors, and display systems
- Audio/Video Equipment : Speakers, headphones and earphones, televisions, projectors





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Radio Frequency

Wireless Testing Services

Element Korea provides wireless testing services to ensure that electronic products meet various wireless communication standards, verifying both performance and safety. This testing is essential to confirm reliable operation across multiple frequency bands and compliance with international regulations.

Scope of Wireless Testing Services

- Frequency Testing : Verifies that the product operates within autorized frequency bands.
- Transmit and Receive Performance Testing : Measures transmission power, receiver sensitivity, and other factors to assess the quality and performance of wireless signals.
- Spectrum Analysis : Analyzes the frequency to ensure no unwanted emissions are present.

Applicable Products for Wireless Testing

- Mobile Communication Devices : GCF and PTCRB testing, including SAR (Specific Absorption Rate), for GSM, WCDMA, LTE, and 5G devices.
- Bluetooth Devices : RF and profile testing for Bluetooth SIG Certification, including Bluetooth Compatibility Certification (BCC)
- WiFi Devices : Performance and security testing for compatibility and stability in diverse wireless environments, including the latest WiFi 6(802.11ax) standard.
- NFC Devices : Performance is evaluated through digital and analog protocl testing to ensure compliance with international standards.

National Certification Services

- Korea: KC Certification
- North America: FCC(USA) / IC (Canada) Testing
- Europe: CE RED Testing and Certification
- Japan: JPMIC / JATE Testing
- China, Taiwan, Middle East
- Latin America, Russia
- Africa

Accreditations

- Designated Testing Laboratory by the Radio Research Agency (RRA), Korea
- Registered Testing Lab with FCC (USA) & IC (Canada)
- Accredited by KOLAS (Korea) / A2LA (USA)
- Authorized CTIA Testing Laboratory

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Specific Absorption Rate

SAR

SAR (Specific Absorption Rate) Testing Services

Element Korea provides SAR(Specific Absorption Rate) testing services to verify the safety of wireless communication devices with regard to human exposure to electromagnetic fields.
SAR testing is a mandatory procedure that evaluates whether a device meets international safety regulations for electromagnetic absorption by human tissue.

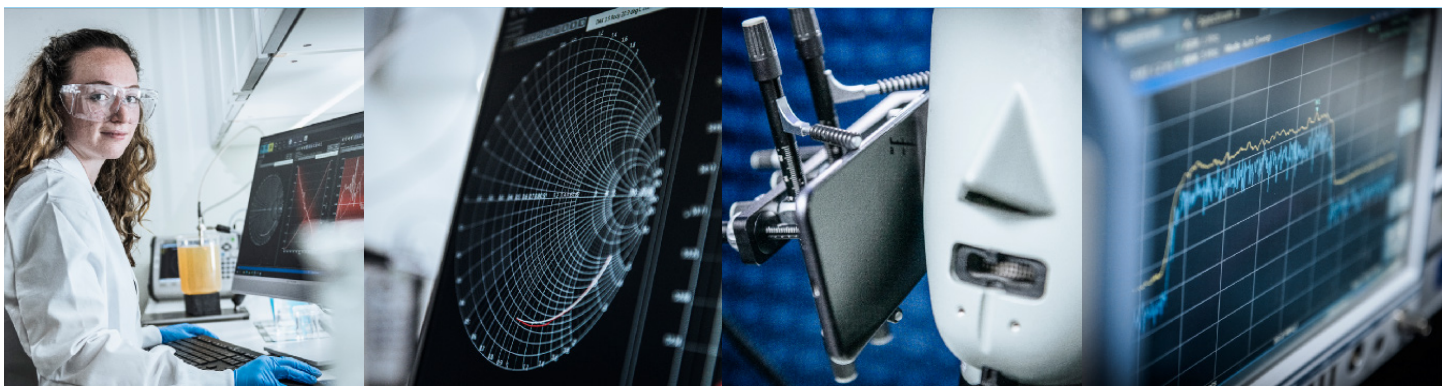
What is SAR?

SAR(Specific Absorption Rate) measures the rate at which electromagnetic energy emitted from a wireless device is absorbed by the human body. This test is expecially critical for portable and wearable devices, such as smartphones and smartwatches, to assess RF exposure.

- Global Standards Compliance : Our SAR testing complies with requirements set by global regulatory bodies such as the FCC(USA), CE (Europe) and IC(Canada).
- Testing Methodology : SAR levels are measured using precision models that simulate human tissue. The tests determine whether radiation absorption stays within the safe limits defined by international standards.

SAR Testing Coverage

- Consumer & Occupational Wireless Devices : Evaluation of RF exposure levels for both consumer and industrial-use portable wireless equipment.
- All Cellular Technologies : Testing of smartphones, tablets and other connected devices across 2G, 3G, 4G, LTE, and 5G technologies.
- RFID, Metal detectors & Vehicle Security Systems : Safety validation of various industrial RF devices using wireless frequencies.
- Wireless Power Transfer (WPT) Devices : Testing of wireless chargers and power transmitters compliant with A4WP, WPC and PMA standars.
- Wearable Devices : SAR evaluation for smartwatches, fitnesst trackers and other body-worn gadgets.
- Implantable and Body-Worn Medical Devices : Safety testing vof implantable and on-body medical devices to ensure regulatory compliace.
- Zigbee & IoT Devices : SAR assessment for devices using Zigbee protocol and other Internet of Things(IoT) technologies.
- 5G NR & mmWave Technologies : SAR testing for the latest 5G New Radio and millimeter wave-enabled devices(mmWave).
- Time-Averaged RF Exposure (TAS) : Measurement of time-averaged RF exposure during typical usage conditions.



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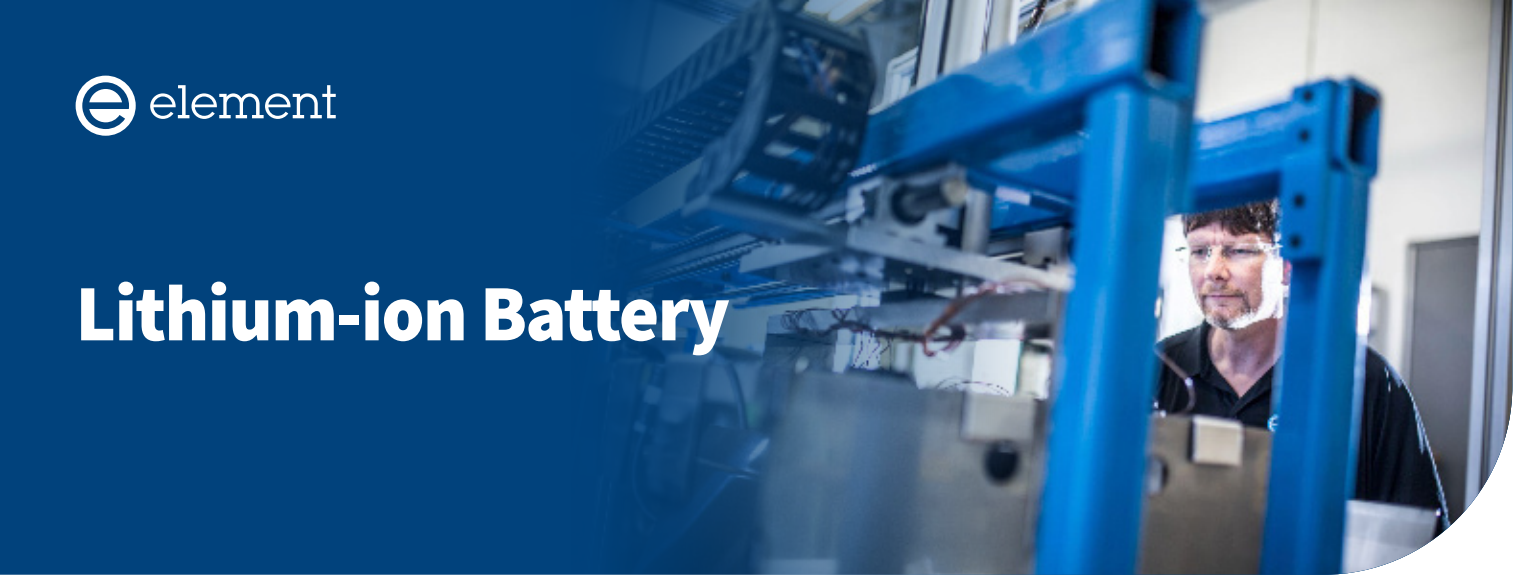
Lithium-ion Battery



Lithium-ion Battery

Element Korea offers a comprehensive range of testing services to ensure the safety, reliability and performance of lithium-ion batteries across various environments.
We support manufacturers in meeting global safety standards and expanding into international markets through rigorous testing and certification.

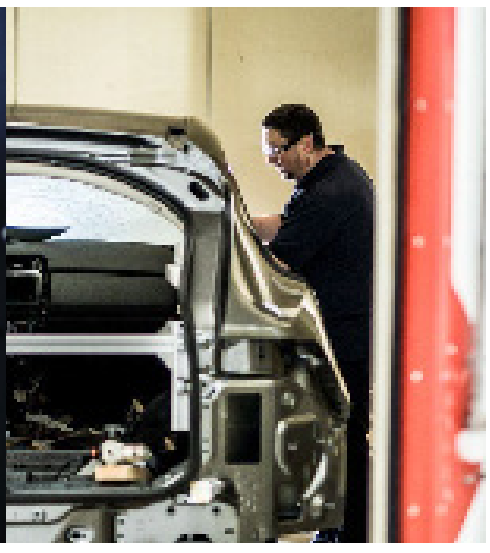
- Compliance with Global Battery Standards : Element Korea conducts testing in accordance with key international standards, incldluing: IEC 62619, IEC 62133-2, UN 38.3, UL 1973, UL 2271, UL 1642, UL 2054 and UL 9540A.
  We cover both small-sized batteries and large-sized industrial batteries, helping clients ensure full regulatory compliance.

Scope of Battery Testing Services

- Performance Testing : Measures charge/discharge efficiency and evaluates lifecycle performance to verify overall battery effectiveness.
- Safety Testing : Assesses battery response to overcharge, over-discharge, short circuit and overheating conditions to prevent fire and explosion risks.
- Envirionmental Testing : Evaluates battery stability and functionally under extreme temperatures, humidity and other environmental stresses.
- Lifecycle and Durability Testing : Tests long-term operational durability and service life of batteries under repetitive use.
- UN 38.3 Transport Safety Testing : Ensures batteries are safe for transport by land, sea and air through vibratoin, shock, altitude, thermal and impact test.

Applicable Battery Types

- Electric Vehicle (EV) Batteries : High-power, high-durability battery packs used in electric vehicles. Tested for safety, performance and thermal stability.
- Portable Device Batteries : Batteries for smartphones, laptops, tablets and other handheld consumer electronics.
- Energy Storage Systems(ESS) : Large-scale batteries used for grid stabilization, backup power, and renewable energy integration.
- Drone & Aerial Vehicle Batteries : Lightweight and high-efficiency batteries for drones and unmanned aerial systems(UAS), tested for reliability and safety.
- Industrial Batteries : Heavy-duty batteries for use in industrial equipment and machinery, tested for endurance and compliance under demanding conditions.



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Reliability Test

Reliability Testing Services

Element Korea offers a wide range of reliability testing services to validate the long-term performance and stability of products under repeated stres and harsh environment conditoins. These tests are essential for identifying potential failures in advance and maximizing overall product quality throughout its lifecycle.

Scope of Reliability Testing Services

- Thermal Shock Testing : Evaluates product durability under rapid and extreme temperature fluctuations.
- High/Low Temperature Testing : Assesses product safety and functionality under extreme hot and cold conditions.
- Humidity Testing : Measures durability and performance of the product in high-humidity environments over time.
- Vibration Testing : Verifies product resistance to mechanical vibrations that may occur during transportation or operation.
- Shock Testing : Evaluates the product's physical resistance to sudden impacts or drops.
- Altitude Testing : Tests product stability and pressure resistance during high-altitude transportation, such as in aviation.
- Cycle Life Testing : Confirms that the product maintains performance after repeated use cycles.

Reliability Testing Standards & Solutions

1. Defense & Aerospace
   - MIL-STD-810 Series
   - RTCA DO-160G
   - MIL-STD-167-1A
2. Automotive Electronics
   - ES90000-01
   - ES90000-02
   - ES90000-03
   - ES90000-04
   - ES95400-10
   - ES91500-00, 02, 03
   - GMW 3172
   - WW80000
   - ISO 16570 Series
3. Electrical & Electronic Components
   - IEC 60068 Series
   - KS C IEC Series
4. Railway Equipment
   - KS C IEC 60571
   - KS C IEC 61373

Reliability Analysis Solutions

1. PTC windchill Risk and Reliability
   - 1. Reliability Prediction
   - 2. Maintainability Prediction
   - 3. Reliability Block Diagram(RBD)
   - 4. Markov Analysis
   - 5. Failure modes & Effects Analyais(FMEA)
   - 6. Life Data Analysis(Weibull)
   - 7. Accelerated Life Test Data Analysis(ALT)
   - 8. FRACAS(Failure Reporting, Analysis and Corrective Action System)
   - 9. Life Cycle Cost (LCC) Analysis
2. Accelerated Testing Design & Analysis
   - 1. Accelerated Life Testing (ALT)
   - 2. Accelerated Degradation Test(ADT)

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Environmental Hazardous Substances Analysis Center

Delivering comprehensive testing, inspection, and on-site technical services — committed to building a safer environment and a cleaner, healthier world for every-one.

Environmental Hazardous Substances Analysis Center

The center specializes in safety and regulatory testing for food, livestock, and agricultural products, as well as environmental compliance analysis services for dioxins, PCBs, RoHS, and more. We continuously expand our regulatory and performance testing capabilities with advanced facilities for quality, safety, and environmental management. From early stage R&D through complex regulatory approvals and production, we provide end-to-end support including material testing, quality evaluation, analytical services, and technical consulting.

FOOD TESTING DIVISION

Element's Food Testing Division provides comprehensive analytical services, on-site inspections, and certification (TIC: Testing, Inspection & Certification) across the entire food industry — from farm to table.

We continuously develop and align with global quality programs such as HACCP, ISO 22000, FSMA, and GFSI to meet regulatory requirements and evolving customer needs. From the R&D stage to full-scale production, we support our clients in ensuring safety, compliance, and quality throughout the food supply chain.

Also, Element ensures food safety and quality through advanced physicochemical and microbiological testing methods.

Our accredited laboratories, designated by the MFDS and NAQS, guarantee accurate and reliable results.

With fast turnaround times and globally recognized quality systems, we provide trusted testing, inspection, and certification services — helping your products reach consumers' tables with the highest standards of safety and quality.

ENVIRONMENTAL TESTING

Element's Environmental Testing Division is dedicated to protecting human health and enhancing quality of life by addressing pollution, safety, and health challenges.

• With the emergence of new pollutants and the tightening of environmental regu-lations, ensuring that our communities remain safe and clean has become a vital concern.

• Our vision is to support industries worldwide in developing products that safe-guard both the environment and human health. As a trusted partner for a sus-tainable future, we help customers comply with global environmental regulations and bring innovative, eco-friendly products to market.

• Grounded in scientific accuracy and ethical responsibility, we ensure that every product and process meets international environmental standards while remaining safe and sustainable. This empowers companies to take the lead in environ-mental protection while strengthening their market competitiveness.

• Looking ahead, we will continue to provide cutting-edge testing solutions that align with technological progress and regulatory evolution. Together with our cus-tomers, we strive to build a better world — protecting the environment today and leaving a healthier planet for future generations.

Food Standards & Regulatory Testing

- Self Quality Inspection

According to regulatory requirements, businesses that manufacture, process, import, or sell food, livestock products, health supplements, food additives, utensils, containers, or packaging materials must regularly verify that their products comply with applicable standards and specifications. For companies without in-house facilities or resources, Element provides recognized self-quality management services through advanced laboratories, equipment, and expert staff.

- Nutritional Analysis

Under Article 6, Paragraph 1 of the Food Sanitation Act Enforcement Regulations, all food manufacturers are required to disclose nutritional information to consumers. Element offers professional nutritional analysis services in accordance with labeling standards, covering sodium, carbohydrates, fats, cholesterol, protein, and more — linking nutritional value to product quality.

- HACCP Environmental Monitoring

Hazard Analysis and Critical Control Points (HACCP) ensures food safety from raw materials through manufacturing, processing, storage, distribution, and final consumption. Element provides environmental monitoring services to identify biological, chemical, and physical hazards, collect and analyze risk samples, and help manufacturers implement efficient hygiene management to secure product safety.

- Microplastics Testing

According to studies by the UN GESAMP (Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection), microplastics vary in absorption and mobility within the human body depending on size, raising significant health concerns. As microplastics are resistant to natural degradation and accumulate through the food chain, they pose a global environmental risk. Element provides specialized microplastic analysis services using advanced FTIR-microscope technology.

Quality Management & Hazardous Substance Testing

- Self Life/Expiration Date Analysis

While it is well known that raw and processed foods eventually reach a point where they are no longer consumable, accurately predicting how long a product can safely maintain acceptable quality is critical. Element performs scientific and reliable testing in accordance with the Korea Food and Drug Administration (KFDA) Notification No. 2007-66 “Standards for Setting Food Expiration Dates” and other trusted guidelines, ensuring safe and accurate results for our customers.

- Product Development Support Services

Element supports innovation by assisting companies in launching new products, improving existing ones, and achieving technical excellence. With advanced facilities, highly skilled researchers, and extensive field expertise, we provide precise analytical data, comprehensive testing services, and professional consulting to support product development.

- Radiation Testing Services

Radioactive substances such as uranium, plutonium, and radioactive iodine are closely monitored today as key factors in food safety management. Element offers specialized analysis of radionuclides including Cesium-134, Cesium-137, and Iodine-131 using advanced radiation spectrometry, ensuring accurate detection and safety validation.

- WEEE Analysis Services

Element is a specialized testing organization supporting the management and re-cycling of waste electrical and electronic equipment (WEEE). In compliance with EU directives, we provide essential testing and certification services to minimize environmental impact during disposal and recycling processes. Our goal is to help customers meet legal requirements while building a sustainable product ecosystem.

- POPs (PCBs, Dioxins) Analysis Services

Persistent Organic Pollutants (POPs) such as PCBs and dioxins are toxic substances that resist natural degradation and accumulate in the food chain, potentially causing immune system disruption and neurological damage. They are typically generated during industrial processes and low-temperature waste incineration. Element is a leading testing provider in the field of POPs analysis, helping safeguard human health and the environment to maintain clean and safe living conditions.

- Biodegradability Testing Services

Element provides specialized biodegradability testing services to evaluate how quickly and safely plastics, packaging materials, chemicals, and biodegradable substances break down in natural environments. In today’s market, where eco-friendly and sustainable product development is essential, our biodegradability testing enables companies to comply with environmental regulations and deliver products that earn consumer trust.

- Packaging Material & Structure Evaluation

Element operates advanced laboratories dedicated to packaging material and structural evaluation. We conduct precise analysis of the physical and chemical properties of packaging used across industries and assess its structural performance to provide reliable data. As packaging plays a critical role in protecting, storing, and transporting products, accurate quality and performance evaluation is essential. With industry-leading expertise and technology, Element ensures that packaging solutions meet the highest standards of reliability and safety.

Electrical & Electronic Product Safety Testing

- RoHS Testing Services

Element is a leading provider of RoHS (Restriction of Hazardous Substances) testing and certification services. We help ensure that electrical and electronic products meet environmental regulatory requirements, supporting safe and eco-friendly manufacturing. Our expertise enables customers to achieve compliance with the RoHS directive and succeed in global markets.

- REACH Analysis Services

Element offers specialized testing and certification services for REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) and SVHC (Substances of Very High Concern) regulations. Leveraging advanced technology and deep expertise, we deliver accurate and reliable analysis to guarantee chemical safety and regulatory compliance.

For more information or a detailed quotation regarding Element’s Environmental Hazardous Substances Analysis Center, please contact us using the details below.
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