

# SAFETY AND ENGINEERING ASSURANCE OF MILITARY CAPABILITY



*Making tomorrow safer than today*

# DEFENCE EMC & ENVIRONMENTAL TESTING

COMPLEMENTED BY DIGITAL ENGINEERING AND SAFETY ADVISORY SERVICES

## EMC TESTING

Element has the UK's largest capacity for defence EMC testing. We have military EMC chambers for smaller systems right up to our large military vehicle EMC test chamber designed for a main battle tank. Our experts design and deliver pre-compliance testing and formal defence EMC testing programmes for over 350 capabilities per year, covering a wide range of immunity and emissions required to endure in demanding military environments.

Our defence EMC testing and qualification services provide standard defence validation as well as helping companies perform rapid Urgent Operational Requirement testing, most commonly against key DEF STANs and MIL-STDs. We work with manufacturers and the Ministry of Defence to develop testing packages that cover both defence and commercial requirements with a single test programme: UKCA CE Marking, E Marking, RADHAZ Testing, Naval Acceptance Testing, EMC Interoperability testing.

## ENVIRONMENTAL TESTING

Element has an unprecedented capacity and capability for defence environmental testing in the UK. We support defence manufacturers from the writing of test strategies through to full qualification of products for harsh environments.

Our environmental test centre of excellence at Warwick is supported by facilities, including characterisation of in-service environments, modal testing, Scanning Laser Doppler Vibrometer expertise, and a broad range of capabilities from our global network of sites, enabling testing against common defence standards.

To ensure modern military capabilities can withstand and perform against extreme environmental demands, we also provide the following testing: vibration and shock, including at temperature; altitude; humidity; sand and dust; salt corrosion; ingress protection; solar heating, centrifuge; spin; low and high cycle fatigue. Additionally we have the largest available commercial temperature testing equipment and conduct Highly Accelerated Life Testing (HALT).

## DESTRUCTIVE TESTING

Element has decades of experience in testing for military applications. From mechanical testing to secure the integrity of parent materials through to advanced fracture mechanics & fatigue testing, Element has the depth & breadth of experience to ensure your mission critical assets are safe & certified. Our Laboratories are covered by ISO 17025 across Europe, offering total quality assurance. Finally we can undertake full failure analysis to investigate any parts that fail in service. We use our specialist failure analysis metallurgists to examine and report findings back to customers.

## NON-DESTRUCTIVE TESTING

Element's Non-Destructive Testing (NDT) and Inspection services help ensure the integrity and reliability of military capability and save time and money during evaluation, troubleshooting and research. NDT covers a broad group of techniques used to evaluate the properties of materials, components, welds, assemblies and systems, without materially affecting the integrity.

Element's NDT service methods comply with a variety of industry standards, unique customer requirements, government contracts, and military specifications. We can test metallic, composite and additive manufactured materials from basic materials to stand-alone components.

Element's PCN or SNT-TC-1A certified NDT technicians work with our certified weld inspectors to deliver a full range of services, including: radiographic testing; digital radiography; computed tomography; eddy current testing; liquid penetrant testing; magnetic particle inspection; dimensional inspection, visual inspection; ultrasonic testing.

## EXPLOSIVE ATMOSPHERE

Element works with manufacturers to produce and design equipment that can operate in fuel-air explosive atmospheres commonly found with aircraft, vehicle and marine fuels. Most commonly, we apply MIL-STD 810F to demonstrate the ability of the equipment to operate in these environments without causing explosion or combustion.

## LIGHTNING TESTING

Element's UK lightning simulation laboratory is accredited to DO-160 S22 and S23, ED-105, and specialises in testing for indirect effects on electrical equipment and systems, and high voltage testing of antennas and windscreens up to 500kV. Our highly specialised experts provide consultancy on all stages of aircraft lightning protection design and certification, through review, testing, and analysis.

Technical areas of expertise include; Lightning testing (High Current, High Voltage, Full Vehicle Tests/Aircraft Level, Equipment Tests); Lightning technical advisory services (Test/Certification Plan and Lightning Protection), and lightning protection training courses

## UKCA CE MARKING & E MARKING

Military equipment may be required to meet either UKCA CE Marking (electrical equipment) or E Marking (whole vehicles and components) plus defence standards. Element's experts help defence companies recognise how and when this extra certification applies and can help build it into your testing program for new capability, mid-life upgrades / spiral development, or returning to core following deployment under UOR.

## ENGINEERING BASED MODELLING & SIMULATION

Element's Digital Engineering (DE) team specialises in engineering simulation services, including advanced mathematical modelling, data science, and AI to solve complex challenges. Using our systems engineering, design and prototyping capabilities, we can support defence programmes from high-level requirements definition or pre-concept phase activity onwards. Our end-to-end capabilities can help you rapidly define and develop system, sub-system and equipment level requirements to successfully deliver a range of complex commercial and military programmes.

Our simulation tools, data analytics and modelling capabilities accelerate research and development, allow you to optimise the design process for the best possible products, realise processing and manufacturing efficiencies, and enhance industrial and commercial competitiveness.

### Our DE services include:

- advanced finite element analysis
- computational fluid dynamics
- discrete element modelling

### Augmented with:

- high performance computing
- scientific programming
- software development

### We have expertise in:

- structural mechanics
- fluid mechanics
- heat and mass transport
- materials science
- mechanical engineering
- machine learning
- experiment design
- test rig design



# ENGINEERING & SAFETY ADVISORY SERVICES

Our experts offer a range of advisory services designed to guide you through the testing, inspection, certification, and regulatory compliance landscape as materials and products are developed. We help ensure products are compliant, safe and fit for purpose. Throughout the CADMID cycle, our advisory services provide expert support based on proven methodologies.

This helps you make critical decisions to achieve first-time success when your materials or product development activities reach the testing, approvals and certification stage. Coupled with our expertise in Engineering Simulation, this makes Element the natural partner for defence manufacturers complete their environmental.

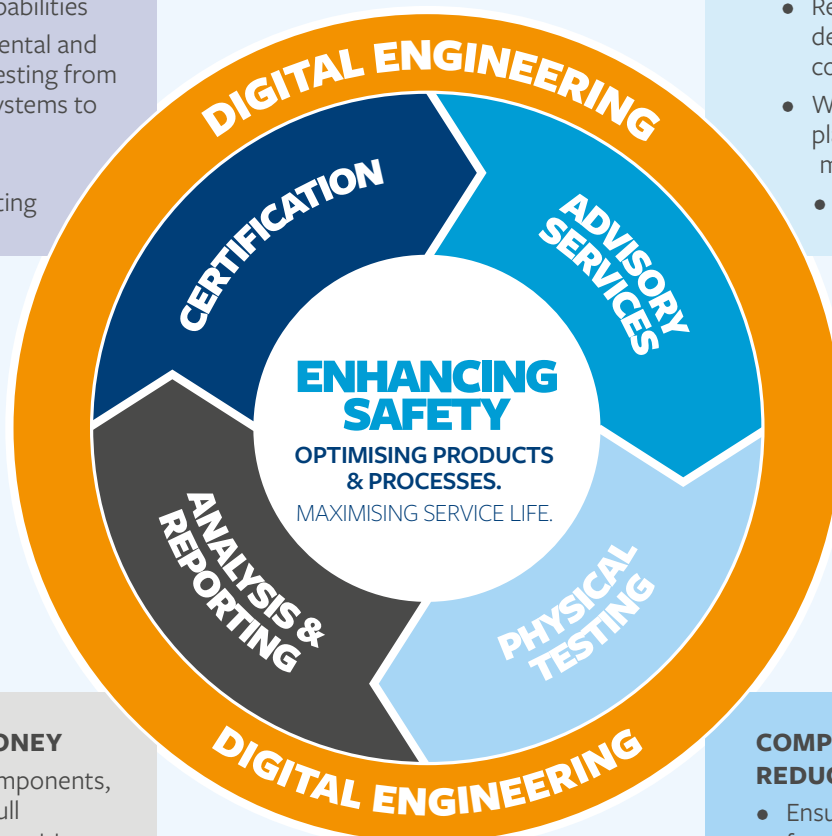
## ELEMENT'S CYCLE OF SERVICES

### SCOPE OF SERVICES

- Broad range of capabilities
- Scalable environmental and pre-qualification testing from materials to sub-systems to entire systems
- Scalable EMC and environmental testing

### ADVISORY SERVICES

- Reduced order modelling: design and analysis from concept onwards
- Writing detailed testing plans from concept to manufacture
- Safety case assurance



### SAVING TIME & MONEY

- Early testing of components, sub-systems and full systems, from concept to manufacture
- De-risking major assemblies before real-life testing

### COMPLIANCE & RISK REDUCTION

- Ensuring compliance and fit-for-purpose at each stage
- Ensure safety =>ALARP from the outset
- Early testing to reduce risk

## ASSURANCE OF MILITARY CAPABILITY

Element is a trusted global safety and engineering assurance company, with over 60 years' experience, UKAS accredited to ISO 17025. We offer military end-users, defence OEMs and their supply chains verification and validation of equipment through the entire CADMID cycle, ensuring it is fit for purpose and safe to operate in the harshest environments. We achieve this through physical testing, inspection and certification, complemented by digital engineering and advisory services.

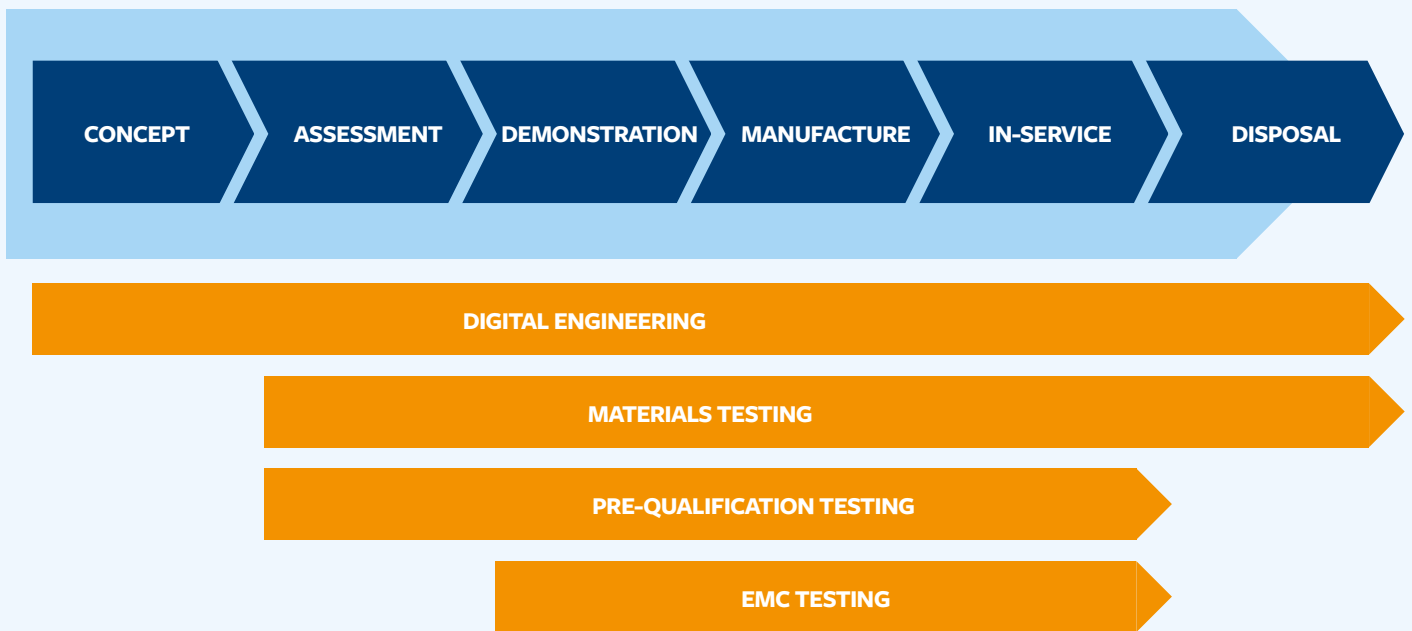
With over 35 laboratories in the UK and 275 worldwide, Element holds a wide range of international military and civil certifications. The primary sectors where we operate are Defence, Aerospace, Nuclear Industry, Connected Technologies, Hydrogen, Automotive, Life Sciences, Built Environment and Renewables.

## DELIVERING SAFETY

Element's expertise in product qualification and validation helps the entire defence supply chain demonstrate the durability and effectiveness of its products in the challenging military environments in which they will be deployed. It also ensures that products qualify against defence test standards as well as other legal obligations, such as:

- DEF STAN 61-5, 59-411, 00-35
- MIL-STD 1275, 461, 810
- AECTP-500
- CE and E Marking
- EMC Testing
- Explosive Atmosphere Testing
- Safety Testing

## ELEMENT'S END-TO-END SUPPORT TO THE CADMID CYCLE



# GLOBAL LEADERS IN TESTING, INSPECTION & CERTIFICATION



**Element Materials Technology is UKAS accredited to ISO 17025, a CyberEssentials company with key units JOSCAR accredited. We have a global capacity for EMC, environmental, and material testing.**

Our London-based global group is a leading provider for a diverse range of materials, products and technologies in advanced supply chains where failure is not an option.

We provide a comprehensive range of defence, aerospace and commercial product qualification testing services for manufacturers to evaluate and qualify the behaviour and performance of their products. Element is accredited to provide assurance to both the military end-user and the manufacturer that capabilities are safe, compliant with global and national military and civil legislation, and, above all, fit-for role in the most demanding of environments.

THAT IS HOW WE ARE  
**MAKING TOMORROW  
SAFER THAN TODAY.**

