MATERIALS TESTING SERVICES
INTRODUCTION

CET Infrastructure provides a range of comprehensive and market-leading services to civil engineering and infrastructure clients nationwide. Testing, monitoring and surveying services are delivered both on-site and off-site by our team of highly qualified technicians and consultants.

MATERIALS TESTING

We operate a network of strategically located regional offices and UKAS accredited laboratories throughout the UK, providing our customers with convenient access as well as local service and relationships.

For larger projects, our on-site testing facilities can provide quicker access to results, and often prove more cost-effective in the long-run. Our mobile UKAS laboratories are able to provide bespoke, on-site testing facilities to suit any project requirement.

All CET testing services are carried out to the highest industry standards including ISO/IEC 17025:2005 assessment standard, which is aligned to the management controls defined within ISO 9001.

Early involvement with CET at a project stage can help ensure best use of on-site materials, reduce the cost of imported materials and enable a thorough assessment of the most efficient and appropriate testing model for your project.

We have the experience to support our customers at all stages of a project, offering advice and expertise when required; Approval testing allows our customers to make the best use of site-won materials and reduce the costs associated with waste disposal while our Compliance testing ensures customers meet their obligations, make optimal use of on-site resources, minimise downtime and avoid the overwork of materials.

Providing a cost-effective and rapid response to our clients’ requirements is fundamental to the service we offer. A full range of approval and compliance testing is undertaken at our regional laboratories, including:

- Soils classification testing
- Earthworks monitoring and compaction control
- Mix design and site control for lime/cement stabilisation
- Aggregate testing
- Concrete trial mixes and site quality control
- Bituminous materials production and site control
- Construction chemistry
- Structural Investigation
- Pavement Evaluation
- On-site laboratories
GEOTECHNICAL CONSULTANCY

Utilising our expertise and numerous years’ experience, we offer a fully-integrated materials consultancy service in all aspects of materials engineering from investigation and testing to advising on material performance. At CET, our ability to interpret and provide accurate, detailed reports on key problem areas, not only benefits our clients, it’s what sets us apart from our closest competitors.

Our experienced geotechnical engineers address client needs in terms of quality assurance, quality of end-product and cost-efficiency. Through the expertise of our people, we are available to assist clients in:

- The interpretation of results
- Failure investigations
- Resolution of contentious materials related issues
- The production of specifications
- Ensuring on-site compliance via construction quality assurance procedures
- Producing significant cost savings
- Minimising construction problems throughout the project lifecycle
- Progressing towards zero defects
- Ensuring end-product compliance
ON-SITE MATERIALS TESTING

For over two decades CET has been successfully providing professional materials testing services to contractors, designers, local authorities and materials suppliers throughout the UK.

Materials testing services are available to meet any requirement from basic on-site testing requirements, to more demanding or bespoke mobile UKAS laboratories.

Our people make a real difference at CET, and we take pride in consistently delivering high-quality field testing services that deliver against detailed contract specifications and standards.

Experts in their field, our team of highly-qualified engineers provide nationwide sampling and testing services for a range of construction materials; by drawing on their in-depth technical knowledge, gained through experience, they ensure CET customers meet their obligations and maintain control and compliance even on the most demanding projects.

Dedicated CET field technicians are expertly trained to undertake a range of comprehensive construction testing and reporting. Working closely with clients to provide advice and guidance as to the most appropriate tests to ensure compliance and will recommend cost-effective, best-practice alternatives where applicable.

SERVICES PROVIDED

- Control of earthworks
- Fresh concrete inspection and testing
- Structural investigations/condition surveys
- Structural and pavement coring
- Quality control and testing for laying asphalt
- Aggregates and Materials sampling
- Pavement Investigations
- Asbestos surveying and quantification

KEY BENEFITS

- Demonstrates compliance
- UKAS accreditation demonstrates competence, impartiality and client confidentiality
- Professional and technical expertise
- Identifies and limits risk
- Gives confidence in materials and workmanship
Nationwide laboratory testing services are available via our network of UKAS accredited materials testing laboratories providing customers within the infrastructure, engineering and property markets with rapid access to accurate results.

We provide a complete service for all construction materials testing, through all key project stages, from pre-contract testing, to post contract issue resolution testing. Group and Flexible Scope UKAS accreditation provides additional peace of mind and ensures we provide customers with comprehensive reports and analysis; aiding quality assurance, compliance and control whilst providing vital data to support cost-effective decision making.

All our laboratories undertake materials testing to the highest testing standards using the latest testing equipment and reporting systems.

Other Specialist Laboratory Testing Services are available from CET Testing Partners each with their own relevant UKAS or MCERTS accreditation these include:

- Chemical Contamination testing
- Specialist Geotechnical testing
- Paint and coatings testing
- Thermoplastic Road Marking
- Asbestos testing

**SERVICES PROVIDED**

Our UKAS Laboratory Testing Services include

- Soils and Earthworks Testing
- Stabilised Materials Testing
- Hardened Concrete Testing
- Asphalt Testing
- Aggregate/Recycled Materials Testing
- Chemical Testing

**KEY BENEFITS**

- Demonstrates materials compliance
- Offers opportunities for material use on a project
- Identifies opportunities for cost saving by clever use of materials
- Identifies and limits risk
- Gives confidence in materials quality both in the short and long term
- UKAS accreditation demonstrates competence, impartiality and client confidentiality
- Professional and technical expertise
EARTHWORKS TESTING

SITE TESTING

Earthworks testing from CET covers a wide range of services related to the classification of excavated materials, remediation and their suitability for re-use in earthworks. With over 30 nuclear density meters in-house, CET is the largest user of nuclear density meters in the UK.

Whether traditional earthworks, stabilised or modified; each of CET’s operational units delivers a comprehensive range of tests to support improved decision making around earthworks suitability, classification, design and control. On-site earthworks testing enables certification in areas of construction; supporting continued placement and saving both time and money in the long-run.

Site tests include:

- Sampling of earthworks materials from pits, laid materials or stockpiles
- In-situ Density testing including Nuclear Density Meter surveys
- In-situ Settlement and Bearing Capacity by Plate Bearing techniques
- California Bearing Ratio (CBR)
- Soil Stiffness Modulus (LWD Techniques)
- Moisture Condition Value (MCV)
- Insitu Shear Strength
- Dynamic Cone Penetrometer (DCP)

LABORATORY TESTING

The cost, safety and life of civil engineering and building works are all dependent on ground conditions and their correct interpretation. A well-executed programme of soils testing, based on thorough geotechnical investigation, is fundamental to any design and subsequent construction works.

CET laboratories are well equipped to deal with one-off or volume testing and fully understand the importance of efficient turnaround of results.

We offer both one off sample tests, in line with client’s instructions, or bespoke testing suites in order to fully classify a material type and assist with its long term use in a project.

Laboratory tests include:

- Particle Size Distribution
- Moisture Content analysis
- As received or intact density
- Plasticity Index classification testing
- Compaction studies (2.5kg, 4.5kg and vibrating hammer)
- Particle Density
- California Bearing Ratio (CBR)
- Moisture Condition Value (MCV)
- Shear strength testing (Triaxial and Shear Box)
- One dimensional consolidation properties
- IDD of chalk and Chalk Crushing Value
SOIL STABILISATION

As a leading provider of soil stabilisation services, our team of site and laboratory engineers can provide advice and support, whatever the final use of the stabilised material.

The effective reuse of site won materials has widespread mechanical, financial and environmental benefits; so, the accurate testing of materials is essential.

Initial analysis is used to determine the physical, chemical and organic makeup of soil, to establish its suitability for stabilisation or reuse. Post-stabilisation testing may also be required, to ensure the finished materials meet design and compliance obligations.

Services include:

- Site Investigation – capabilities include desk studies, evaluation of existing test information, hand and mechanically excavated trial pits
- Laboratory Trials – scope to assess ‘host’ soil properties and improvements to stabilised materials following the addition of appropriate binders
- Field Control Testing – on-site control tests include pulverisation, MCV, in-situ CBR tests, Plate Bearing tests, in-situ density/moisture
- Value Engineering – ability to provide advice on best practice, mix design and recommended solutions tailored to specific client needs

LABORATORY TESTING

Laboratory tests include:

- Trial mixes for stabilised materials including pulverization
- Compaction characteristics
- California Bearing Ratio (CBR) including swelling potential
- Compressive strength of cubic and cylindrical specimens
- Initial consumption of lime and Chemical testing (TRL suite)
CONCRETE TESTING

SITE TESTING

Our experienced technical staff attend site and carry out UKAS accredited compliance testing of fresh concrete to determine its mechanical and physical properties. Covering any size of pour, CET offers a wide variety of on-site concrete tests for fresh concrete from each of its regional laboratories:

- Determination of Workability/consistence by slump and flow tests
- Sampling of fresh concrete, composite and spot sampling
- Determination of Air Content
- Manufacture of concrete cubes, cylinders and beams
- Temperature measurement
- Fibre content of fresh concrete

CET also offers on-site training to clients covering sampling of fresh concrete, manufacture of test cubes, including curing and storage, Slump, Air Test and Flow Certificates of training are issued on completion.

Equipment and facilities can also be audited during the training programme with new equipment being provided if required.

LABORATORY TESTING

Physical, mechanical and chemical tests on hardened concrete are undertaken to prove compliance with contract specifications of the final product as well as to gain assurance and confidence in the quality of the materials used. CET boasts an impressive range of tests in this discipline, including:

- Curing and compressive strength of cubes, cores and cylinders (including routine collection service)
- Trial Mix design
- Cement Content and Mix Proportions
- Fibre content of hardened concrete
- Tensile splitting tests
- Flexural strength of concrete beam specimens
- Chemical testing including Chloride and Sulphate Content
- Petrographic analysis

Testing of constituent materials is also undertaken, including a vast range of aggregate testing carried out to the relevant industry standards, such as:

- Los Angeles Abrasion
- Grading Analysis
- Flakiness
- Aggregate soundness
- Particle Density and Water Absorption
- Chemical analysis
UTILITY CORING

For investigating the reinstatements of openings in highways, we offer a fully impartial service including initial visual assessments, and a range of services to ensure full compliance with the SROH.

Cores are logged to clearly identify individual layer depths and material types used. Each layer can then be tested for Bulk and Maximum Density in our laboratory. This will assess the overall Air Void percentage of each layer to ensure compliance with the requirements of the SROH.

- Fully trained NRSWA operatives carry out on-site coring works
- Basic Chapter 8 traffic management set up provided on every job (full traffic management can be provided for any larger schemes)
- On-site core extraction
- Visual inspection for the overall quality and compliance of the reinstatement
- UKAS accredited procedure for measuring the cores, to confirm the depths achieved and materials used in each layer laid conform to current legislation
- UKAS accredited laboratory air void testing; carried out to comply with the requirements in the SROH
- The in-depth report includes colour photographs, which clearly shows the precise core location and the ‘Core & Scale’ on a whiteboard
- Spreadsheet summarising results to enable easy monitoring of performance by specific gangs or utilities
- Key of pass/failure guidance provides a clear indication of exactly where any non-conformances within the SROH have occurred
HIGHWAY CORING

Our UKAS laboratories, log and measure cores, in accordance with BS EN 12697-36. A photographic report is created with clear and concise tables containing individual layer depth measurements as well as the material used in each individual layer.

Beneath the extruded core we can then test the substrate layers for strength testing by using the handheld DCP or In situ CBR methods.

- Fully trained NRSWA operatives carry out on site coring works
- On-site core extraction
- UKAS accredited procedure for measuring the cores to confirm the depths achieved and materials used in each layer
- Full colour photographic report showing the precise location of the core and the ‘Core & Scale’ on a whiteboard
- On-site (early indication) and comprehensive laboratory testing can be carried out to determine presence of coal tar within the specimen
- PRD, density and air void testing can be carried out on the core samples if required
- In-situ CBR or handheld DCP testing can be carried out in the core hole to prove ground condition below
- Full traffic management service can be provided
AGGREGATE AND RECYCLED MATERIALS

The visual and physical assessment of primary and recycled aggregates is essential to ensure the best use of recovered products; maximising the potential for a recycled material, particularly through waste recovery, can offer significant cost savings compared to the use of imported primary aggregates.

CET provide a comprehensive range of aggregate and recycled materials testing services; from specialist materials advice to physical and chemical testing, confirming WRAP Quality Protocol compliance, material quality and maximising waste recovery potential.

Our UKAS accredited laboratories undertake an extensive range of compliance testing to the specification for Highway Works and relevant technical standards.

Our laboratories provide physical and chemical testing for compliance with the Specification for Highway Works Series 500 for drainage and pipe bedding, Series 600 for Earthworks (including capping materials) and Series 800 for Granular Sub Base. Testing is undertaken to all relevant standards including BS 1377, BS EN 12620 and BS EN 13242.

Routine sampling and testing of quarries and recycling plants is commonplace for CET with testing schedules created and agreed with clients based on aggregates quantities produced as well as the consistency of raw materials.

Tests include:
- Grading Analysis
- Water Content
- Los Angeles Coefficient
- Particle Density and Water Absorption
- Frost Heave
- Aggregate Soundness
- Constituent Parts of recycled aggregates
- Micro-Deval
- Flakiness and Shape
- Chemical Analysis including TRL Suite
- Magnesium Sulphate Soundness
THE WRAP QUALITY PROTOCOL

The purpose of the Protocol is to provide a standardised control process for material recyclers from which they can reasonably demonstrate that a product has been fully recovered and is, therefore, no longer waste.

The framework, created by the Protocol, also provides a clear audit trail for those responsible for meeting compliance with Waste Management legislation.

These mandated controls will aid consumer confidence in product performance as any end product will have been fully quality-managed and produced to common aggregate standards.

CET’s areas of expertise include:

- Chemistry testing
- Asbestos Identification and quantification
- Determination of coatings
- Physical testing (WRAP Quality Protocol)
- Waste classification

WASTE CLASSIFICATION

Any material needs to be accurately classified as waste when they are not economically possible for reuse. CET’s environmental scientists can carry out hazard assessments to define the type of tests that are required and indicate the appropriate options for the materials’ remediation or disposal.
PAVEMENT EVALUATION

CET provide vital road, runway and pavement evaluation services to the UK critical infrastructure industry.

Our qualitative and quantitative tests range from simple visual condition and surface regularity to CBR profiling using DCP techniques, Falling Weight Deflectometer surveying and the use of Ground Penetrating Radar (GPR).

Accurate information on the condition of pavement assets enables more strategic planning for future works – scheduling maintenance on a priority basis and in the form of a preventative measure, rather than a cure.

Our comprehensive surveys and reports provide valuable information on the condition and life expectancy of pavement constructions across the country; supporting informed decision making and making the case for remedial action to maximise the pavement life of the asset.

Our Road, Runway and Pavement Evaluation Services include:

- Falling Weight Deflectometer Surveying
- California Bearing Ratio (CBR) Profiling (using DCP techniques)
- Surface Stiffness Evaluation (lightweight LWD deflectometer)
- Coring of carriageway surfaces
- Visual Condition Surveying
- Skid Resistance and Texture Depth Testing
- Surface Regularity
- Ground Penetrating Radar (GPR)
- Factual and interpretive reporting
- Utility and Service Detection
CHEMICAL TESTING SERVICES

Chemical testing of aggregates and soils within the construction and civil engineering industry has wide-ranging implications for the re-use of materials and remediation works as well as general project timelines and budgets. With so much potentially riding on the outcomes, it is important that the tests deliver the results you need and, when required, comply to national standards.

Our chemistry laboratory specialises in the chemical analysis of a wide range of construction materials including soils, aggregates, concrete, mortar, paints and coatings.

- pH Value
- Organic Matter
- Water Soluble and Acid (total) Soluble Sulphate Content
- Sulphate Content
- TRL Suite
- Water Soluble Chloride and Water Soluble Sulphate
- Total Sulphur
- Acid Soluble Sulphates
- Loss on ignition

Tests are conducted in accordance with international standards, using traditional wet chemistry gravimetric methods and complimented by state-of-the-art ICP and Sulphur Analyser instrumentation.

In association with our approved sub-contract laboratories, we can test soils, effluents or waters for various contaminants including TPH, PAH, BTEX, PCB’s, Phenols as well as other organic compounds and metals.

Our team of environmental consultants provide technical services and advice on the redevelopment of contaminated sites and accurate testing and assessment of waste soils, which can significantly reduce the risk of incorrect classification.
ASPHALT TESTING

SITE TESTING

Asphalt testing has been a core component of the CET materials testing portfolio since we were first established and is one of our original service offerings; it continues to be an important part of our day-to-day operations.

Our technical staff have significant experience and expertise within the asphalt industry and we have established a well-earned reputation as one of the leading service providers in the UK. CET works with regional and national surfacing contractors treating every project with the same degree of service and professionalism, whether it’s a small housing estate road or a major highway infrastructure project.

Site tests include:

• Nuclear density meter surveys (density and air voids)
• Sampling of delivered and laid materials
• Surface regularity (rolling and transverse straightedge)
• Texture and macrotexture analysis
• Temperature and materials laying records
• Coring of pavement surfaces
• Rate of Spread of chippings
• Skid resistance (Pendulum)
• Falling Weight Deflectometer
• Ground Penetrating Radar

LABORATORY TESTING

CET provides laboratory testing and analysis of bituminous materials, either as a stand alone service or in support of our site testing services. Testing can be part of an ongoing pavement project confirming compliance to the specification, as quality checks of one-off or routine samples or as part of a failure investigation.

Whatever the situation, testing of bituminous materials is important in identifying whether the final performance of the laid material is adequate for the life cycle of the structure, whether a road, a car park or private driveway.

Quality and workmanship of the materials is critical to determining compliance with contract specifications and ultimately the end performance of the laid materials, ensuring longevity of the pavement and reduced maintenance costs.

Laboratory tests include:

• Binder content and aggregate grading
• Density and Refusal Density including air voids of cored material
• Maximum density
• Binder recovery
• Binder softening point and penetration
• Hot Sand Test for adhesivity on pre-coated chippings
• Core logging and photography
• Tar content

Testing of constituent materials is also undertaken; including a vast range of aggregate testing carried out to the relevant industry standards.
MOBILE UKAS LABS

For major projects, on-site facilities can provide a faster and often more cost-effective solution for materials testing. We can provide a bespoke, on-site testing service to major infrastructure, construction and engineering projects across the UK using our Mobile UKAS Laboratories.

Our mobile laboratory service is a turn-key solution that is purposely designed to meet the specific requirements of your project. Our consultants work closely with customers to define the scope and scale of the laboratory before designing and deploying the testing facility on site.

Our UKAS Flexible Scope Accreditation means a mobile laboratory can provide immediate access to test facilities, analysis and reporting. Additional support is also available from our occupational health, safety and quality teams. The speed and accuracy of on-site laboratories can generate significant savings in both time and money over the lifecycle of a project.

Offering everything from basic soil classification to running surface tests CET’s on-site UKAS laboratories are staffed by fully-qualified engineers and technicians and ensure a responsive, high-quality service with technical reporting and on-site support and materials advice.

Our UKAS mobile laboratories are supported by the CET Structures Ltd Occupational Health, Safety & Quality Department, who are able to assist with laboratory design, installation and management of the units.

ONLINE TEST MANAGEMENT SYSTEM

CETi® is a unique and highly-intuitive web based Test Management System set to change the way materials testing works.

Developed to enable real-time tracking and monitoring of test progress, the app seamlessly integrates ordering, scheduling, time-sheet management, reporting and invoicing work flows with 24/7 access.

CETi provides a much-needed automation and intelligence to what has traditionally been a manual process. You can book tests, track projects and receive status updates direct to your smart phone, tablet or desktop, anytime from anywhere. CETi also includes a powerful suite of reporting and analytics tools, helping turn your information into actionable intelligence. Plus, with its powerful suite of reporting and analytics tools it can help turn simple and complex information into actionable intelligence.

CETi® is fully integrated with electronic time sheets and back-office applications for seamless, error-free invoicing.

- Access from anywhere, at anytime, from any device
- Improve collaboration and communications within teams
- Ease administration processes with less manual tasks and improved automated process
- Easily record working times and project status’ to track work and product accurate invoices
- Incorporate signees/approvers into projects for management control
- Customisable MI reports, tailored to meet project needs
- Archive results for later use
Our specialist structural division carry out intrusive and non-intrusive surveys on buildings, road and rail structures. We are able to assess the overall condition and deterioration of structural concrete and steel reinforcement within bridges and culverts and assess the suitability for refurbishment of buildings.

Working with a range of client types, we are able to offer bespoke testing and investigation packages in line with clients requirements and objectives.

Our experienced teams are experts in visual, destructive and non-destructive condition surveys on all types of reinforced and mass concrete, brick and steel structures including bridges, roads, car parks, tunnels, viaducts, culverts, facades and buildings.

Tests include:

- Investigating the corrosion of reinforcements
- Visual Assessment of structural elements
- Half-cell survey for reinforcement corrosion
- Location and depth of cover of reinforcement using electromagnetic cover meter
- Concrete resistivity, delamination, dust sampling, coring and break outs
- Reinforcement mapping using Ferro Scanning techniques
- Ultrasonic / PUNDIT Crack surveys
- Crack surveys using traditional and remote crack monitors
- Bridge bash alert by remote devices
- Asbestos testing and surveys
- Coatings and paint surveys
- Pull-Off and Pull-Out testing
- Rebound hammer surveys
- Depth of Carbonation
- Structural fabric surveys
- Dynamic sampling
- Load/deflection performance
- Borescope surveys
- In situ metallography and microscopy
- Steel sampling
- Measurement of residual metal thickness
- Corrosion testing
SUMMARY

CET provides an integrated, multi-disciplinary ground risk management service. Our geotechnical and environmental consultancy teams are supported by in-house site investigation and materials testing services. Our unique approach allows us to deliver significant cost and quality benefits to our clients.

The benefits of working with CET, include:

- Fast and efficient, multi-disciplined testing across all construction sectors
- Experienced in construction and civil engineering projects
- UKAS accredited laboratories giving confidence in testing undertaken and data produced
- National network of testing laboratories
- A single point of contact or Account Management system can be provided to the client ensuring effective and efficient communication
- Professional engineers and environmental scientists can be involved in projects ensuring that the scope of investigations, material use, design and specification is managed to maximise data acquisition whilst minimising costs
- By providing investigation and testing from in-house resources and supply chain partners CET are able to maintain control of quality and programme
To find your nearest CET office, visit:
cet-uk.com/contact-us