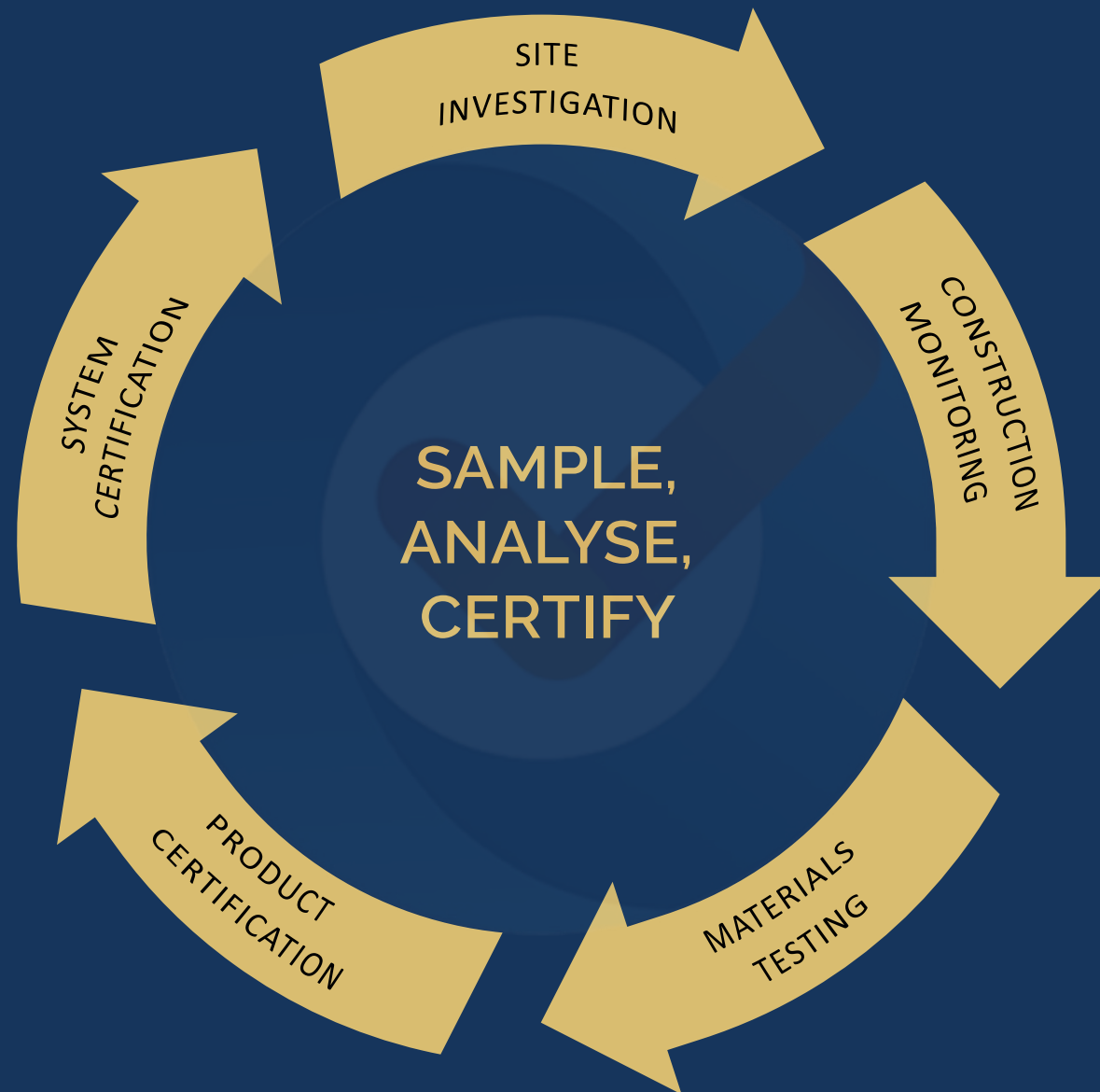


MATERIALS TESTING & CERTIFICATION

Delivering comprehensive testing, certification, and assurance services across highway materials and products





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Highway materials testing and product certification are essential components in ensuring the durability and performance of paved infrastructure. Moreover, as the foundation of modern transportation systems, highways must withstand various stresses, including heavy traffic loads, temperature variations, and environmental factors.

Materials such as asphalt, concrete, aggregates, and bituminous binders must meet strict quality standards to ensure that they perform effectively over time. Testing these materials allows engineers to assess their strength, flexibility, durability, and resistance to wear and deformation, which are critical for long-lasting road performance as well as future pavement design. At XAIS-PTS, we are the UK's leading infrastructure surveying company, delivering a wide variety of intrusive and non-intrusive site investigations alongside laboratory-based materials assessments.



Product certification further ensures that materials and products meet established national and international standards, such as those set by the British Standards (BS) and European Norms (EN). Our certification services provide an independent validation of quality, helping manufacturers, contractors, and authorities trust that the materials used in construction are fit for purpose. It also supports consistent performance, reduces the risk of premature pavement failures, and ensures that construction practices align with regulatory requirements.

As part of our end-to-end solutions and through wider management system certification services, we also help our clients adhere to regulations and legal requirements by ensuring business systems, processes and procedures are well documented and followed. This is especially important in the highways sector, where strict standards are mandated.

SITE INVESTIGATION

Assessing Pavement Construction and Material Composition

Pavements around the UK vary greatly, with multiple design standards and methods having been used over the years on the UK road network. Effective highway maintenance requires an understanding of how paved assets have been constructed and maintained therefore, and clients often need to investigate pavement construction to help determine strength of underlying base layers, level of unbound material, and drainage characteristics.

We deliver all aspects of highways and utility coring, and we have significant plant and labour resources available. We maximise safety, efficiency and quality of service, fulfilling client needs by providing clarity of performance and responsibility, value for money, and contract control.

All the information gathered during on site investigations is analysed in our materials testing laboratory to provide clients with detailed and accurate pavement reports.



Prior to site works, we refer to best practice guidance when determining the number of samples required and we pre-inspect each site to determine any site-specific features that may impact on works such as bus stops, parking bays, schools, traffic speed and volumes, working hours restrictions, forward visibility for road users, and local business access requirements. We will work with you and other stakeholders to minimise disruption to road users.

Pavement Coring

We drill, reinstate, log, and analyse over 10,000 pavement core samples annually and we are capable of drilling to 1m in depth through bituminous and cementitious layers with core barrel diameters of 100mm, 150mm, 200mm and 300mm.

Operatives use tailored mobile data capture systems to record details on site including accurate locational / GPS co-ordinate information and high-quality photographs of the core extraction process.

Ground bearing capacity and the California Bearing Ration (CBR) can be determined by Dynamic Cone Penetrometer (DCP) testing.

We also deliver tar testing in the form of PAK-Marker and PAH testing, which is undertaken in-house to ensure a comprehensive pavement evaluation is undertaken in a timely fashion.



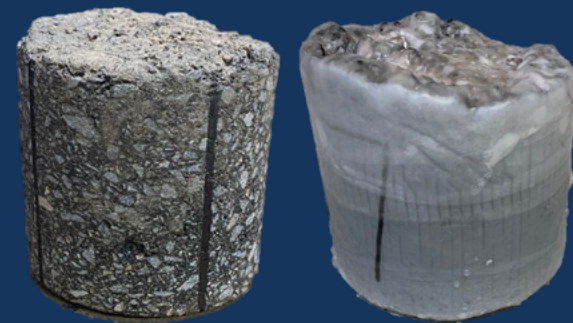
Utility Coring

Utility coring is becoming increasingly important in utility management and contractor performance monitoring, and we deliver utility coring programmes for a variety of clients.

For each batch of cores reported, a summary report will be provided including an overall performance summary and broken down by each utility, setting out the number and percentage of carriageway and footway cores which passed and failed at each testing stage.

Utility testing covers the following:

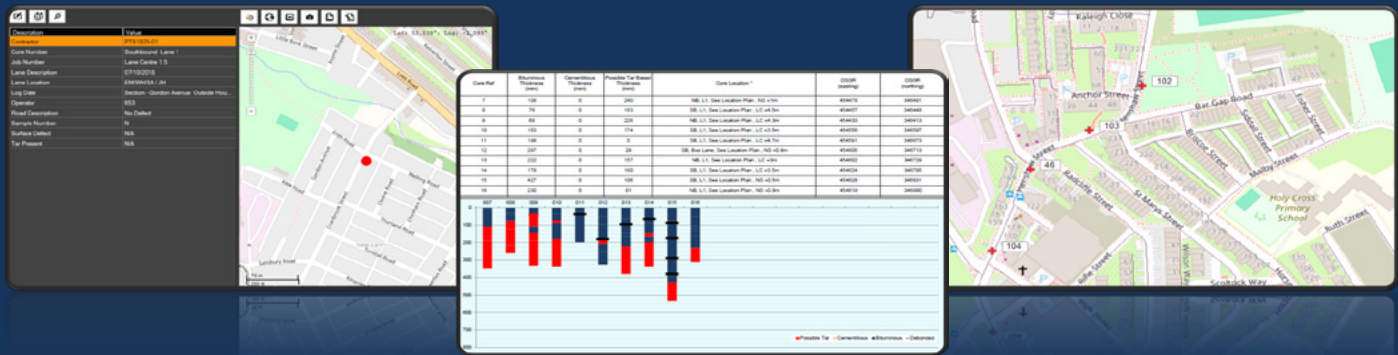
- Visual assessment of the utility reinstatement with photos provided
- Determination of bulk density, maximum density, and air void percentage of samples
- Depth pass / fail
- Air void pass / fail



Delivering Service Enhancements

Core sampling allows engineers and contractors to analyze the physical, chemical, and structural properties of tested pavements and subgrade materials, with core reporting traditionally consisting of site plans, tabular reporting, and photographs.

Through an innovative approach we have implemented an interactive cloud-based system, allowing clients to access road core data results on any licensed device and in any location. Our XA® suite of software is GIS-based, and delivers spatial analysis and mapping of road core results in as near real-time as possible.



Our clients are able to:

- Visualize core sample locations on interactive maps, improving spatial understanding of road conditions
- Identify trends and inconsistencies across the network, e.g. if tar-bound material is found in one location, adjacent road sections can be flagged as areas for further investigation
- Integrate road core data with other infrastructure datasets, providing a holistic view of asset conditions
- Export GIS-compatible reports for further analysis, ensuring compatibility with client systems
- Correlate test results with environmental factors such as weather patterns to understand how flooding is affecting the road pavements
- Apply topographical analysis tools to predict road surface degradation over time.

CONSTRUCTION MONITORING

Can we identify the performance of paved assets with respect to structural condition? Can we determine how many years usage we have left or what maintenance interventions and overlays could be used to prolong the life of flexible pavements? Construction monitoring solutions are key, and we operate several non-intrusive technologies in accordance with CS 229 to ensure these questions can be answered. Designs can be managed in-house or data provided to local engineers to make their own assessment.

Falling Weight Deflectometer (FWD)

FWD is a non-destructive technique used to assess the structural capacity and performance of pavements by measuring their deflection under a load. Data is also vital to determining if the structural capacity of a new pavement is fit for purpose during the design phase. FWD benefits and applications include:

- Assess the remaining life of the pavement and identify pavement rehabilitation and overlay requirements
- Conduct ‘whole of life’ cost benefit analysis of pavement designs options
- Report layer moduli (stiffness), deflection, curvature, and sub-grade CBR
- Quality assure recent works to ensure they meet design life criteria.



Deflectograph (DFG)

DFG is used to assess the structural condition of flexible pavements. It works on the principle that as a loaded wheel passes over the pavement, the pavement deflects, and the size of the deflection is related to the strength of the pavement layers and subgrade. DFG benefits and applications include:

- Assess the remaining life of the pavement and identify pavement rehabilitation and overlay requirements
- Provides an optimum solution for network-level surveys



Ground Penetrating Radar (GPR)

GPR is a non-destructive pavement survey technique for identifying the thickness of the different paving layers, voids, or areas of damage. This method of subsurface profiling uses electromagnetic pulses transmitted into the pavement and when the pulse encounters a change in material properties (e.g. pavement layer, pipe, reinforcement bar, etc.) the energy bounces off the target and returns to a receiving antenna. This returning signal is recorded as single line scans, colour coded, and stacked to create a detailed subsurface profile.

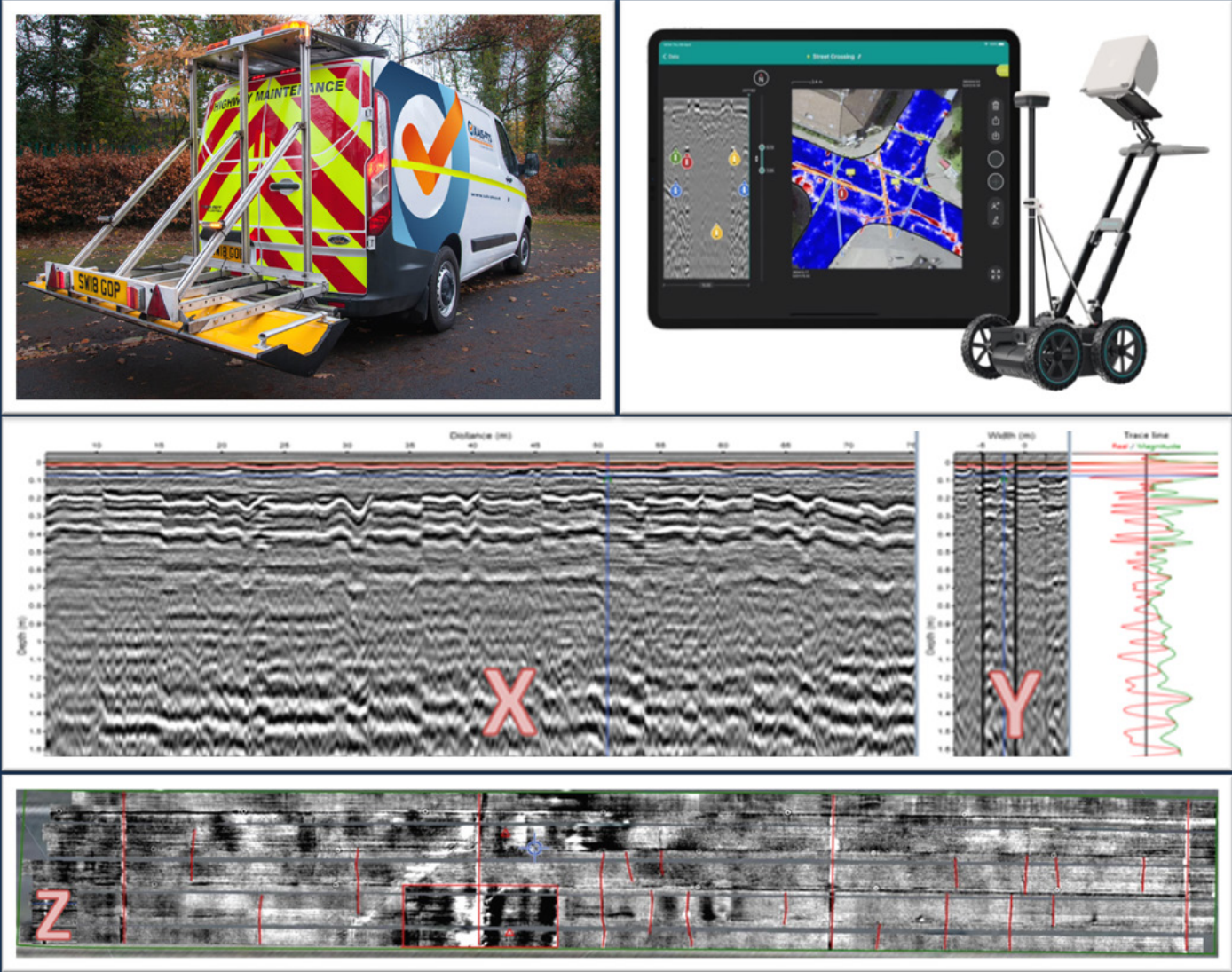
Our 3D GPR multi-channel array, which operates at traffic-speed, overcoming the limitations and expense of more traditional methods, can determine pavement make up, thickness of individual layers, construction changes, services, voids, and high moisture locations.

This survey technique delivers numerous and significant benefits for our clients by providing a greater understanding of the sub-surface make-up and condition of paved network assets, as well as providing a safer survey methodology. We can support you with your projects from small schemes to full network coverage.

We also utilise the latest Proceq GPR Subsurface GS8000, which provides intuitive real-time visualization in 2D and 3D alongside superior data clarity. The GS8000 is a light weight and easy to use GPR device perfect for providing single line scans in remote locations where traffic-speed surveys are not possible.

GPR applications include:

- Pavement thickness measurement
- Subsurface void detection
- Evaluating pavement integrity
- Detection of reinforcement steel (rebar)
- Assessing subgrade conditions
- Locating underground utilities
- Foundation layer evaluation
- Monitoring pavement deterioration over time
- Filter drain assessments
- Bridge deck inspections
- Layer interface mapping
- Detecting water infiltration



MATERIALS TESTING

We operate a modern and well-equipped laboratory testing facility, which provides clients with a vast range of compliance and performance related asphaltic and bituminous tests, ranging from the simple, such as density testing, to the more complex, such as rheological assessment of bituminous products.

Our testing scope extends to providing cementitious, aggregate, and geological testing to fulfil our clients specific needs, and according to our UKAS EN 17025 accreditation. We adhere to the requirements of highway, seaport, and airfield standards and specifications as applicable. In addition to working to industry standards and specifications, our experienced, knowledgeable, and highly qualified laboratory team can assist our clients with bespoke and in-house testing methods and regimes to meet their exacting requirements.

Our full Schedule of Accreditation for materials testing is available through the UKAS website and by clicking [here](#).

We test a variety of materials including:

- Aggregates
- Surface treatments
- Bitumen road emulsions
- Bituminous materials & mixtures
- Asphalt
- Concrete



Aggregates

Aggregates are a crucial component of road surfaces and structural integrity because they provide strength, durability, and resistance to wear and tear under heavy traffic loads and environmental conditions. XAIS-PTS assess aggregate particle size distribution using the sieving method - to BS EN 933-1:2012. This test can be used for mix design and quality control.

We also assess bulk density to determine the compactability and void content of aggregates with testing undertaken in accordance with BS EN 1097-3:2009 (non-UKAS).



Surface Treatments

Surface treatments are crucial for maintaining the safety, durability, and efficiency of pavements. Our team of experienced technicians and engineers are able to perform on-site surveys to assess a variety of surface treatments. Visual assessments of defects include:

- Surface dressed sites to BS EN 12272-2:2003 (non-UKAS)
- Slurry surfacing sites to BS EN 12274-8:2005 (non-UKAS)
- Thin Surfacing to our very own documented in-house method (C171, Issue 4, 11/07/14)

We also assess pavement surface characteristics through:

- Pendulum skid testing to BS EN 13036-4:2011 & BS 7976-2:2013, which can be used on pavements and footways, and provides an indication of slip / skid resistance properties
- Texture depth assessments to BS EN 13036-1:2010 which assess material compliance against Materials Performance Criteria.



Bitumen Road Emulsions

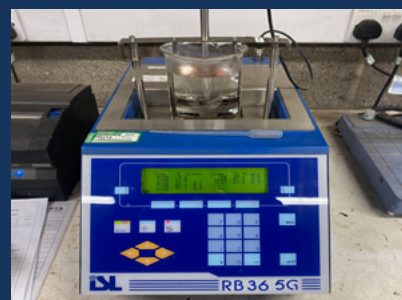
Bitumen road emulsions are made up of three components - water, bitumen, and emulsion, and are used in construction and maintenance, particularly for surface treatments and as a binder in asphalt mixtures. Bitumen road emulsions offer a more flexible, safer, and environmentally friendly alternative to traditional hot bitumen. XAIS-PTS can offer several services to help with bitumen road emulsion testing. These tests include:

- Residual binder and oil distillate from bitumen emulsions, by distillation, to BS EN 1431:2018 (UKAS accredited)
- Binder recovery from bitumen emulsions by evaporation to BS EN 13074-1:2011 (UKAS accredited)
- Binder recovery from bitumen emulsions or cutback or fluxed bituminous binders' stabilisation after recovery by evaporation to BS EN 13074-2:2011 (UKAS accredited)
- Brookfield Viscosity to BS EN 13302 (non-UKAS)
- Breaking Value Mineral Filler Method to BS EN 13075-2:2016 (non-UKAS).

Bituminous Materials

Bitumen is a versatile, durable and waterproof material widely used in road construction. Its strong adhesive and water-resistant properties make it an essential component in modern infrastructure development. Bituminous materials testing includes:

- Needle penetration - 25° to BS EN 1426:2015
- Softening point - ring and ball method to BS EN 1427:2015
- Recovery of bitumen binders by dichloromethane extraction rotary film evaporator method to BS EN 12697-3:2013+A1:2018
- Cohesion of bituminous binders with pendulum test BS EN 13588:2017
- Complex shear modulus and phase angle-dynamic shear rheometer (DSR) to BS EN 14770:2012.

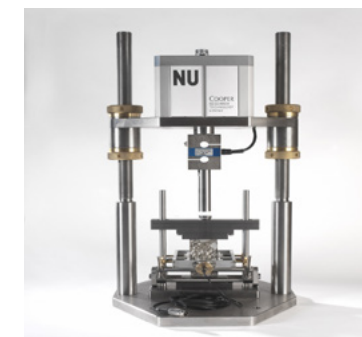


Bituminous Mixtures

Bituminous mixtures are composite materials primarily used in the construction of roads, pavements, and other surfaces, composed mainly of bitumen and aggregates. Bituminous mixture testing we offer at XAIS-PTS includes:

- Preparation of samples for determining binder content, water content and grading to BS EN 12697-28:2020
- Soluble binder content by difference, using bottle rotation machine and pressure filter to BS EN 12697-1:2020
- Soluble binder content by recovery, using bottle rotation machine, bucket centrifuge type 1 and volume calculation to BS EN 12697-1:2020
- Particle size distribution to BS EN 12697-2:2015+A1:2019
- Bulk density BS EN 12697-6:2020 (dry, SSD, sealed or by dimensions) of a core and maximum density to BS EN 12697-5:2009 from which we can find the voids content in accordance with BS EN 12697-8:2018 of a core sample
- Percentage of voids in the mineral aggregate filled with binder (vfb) to BS EN 12697-8:2018
- Voids content in the mineral aggregate (vma) to BS EN 12697-8:2018.

We offer the ability to measure the rut resistance of the asphalt surface course and binder course for R&D purposes and quality control. These tests are in line with BS EN 12697-22:2020 Procedure A and B. We also still provide the old BS wheel tracking rate to BS598-110:1998 for comparison purposes. We have two Coopers small wheel trackers, which means we can turn around samples quickly.



Characteristic Tests

These tests are typically conducted on materials like asphalt, aggregates, and soils, and they assess various properties related to the strength, stability, and longevity of the material. We are equipped with three state-of-the-art Cooper Research Technologies Nottingham Asphalt Testers, capable of performing a comprehensive range of asphalt mixture characteristic tests:

- **Fatigue Testing:**

- Method 1: Indirect tensile test on cylindrical specimens, to BS EN 12697-24:2004
- Method 2: Fatigue characteristics using the Indirect Tensile Fatigue Test (ITFT), as per our documented in-house method C6 ITFT Issue 5, dated 24/08/11, based on BS DD ABF: 1995 (non-UKAS).

- **Stiffness Modulus Testing:**

- Indirect tension applied to cylindrical specimens (IT-CY) to BS EN 12697-26:2004, Annex C
- Determination of the dimensions of bituminous samples to BS EN 12697-29:2020.

- **Resistance to Permanent Deformation:**

- We offer testing to the withdrawn DD226:1996 standard for resistance to permanent deformation through unconfined dynamic loading under vacuum (VRLAT). This is particularly useful when larger cores cannot be taken, as it helps assess rut susceptibility.

- **Cyclic Compression Testing:**

- Method B of the cyclic compression test, as specified in EN 12697-25:2016 (non-UKAS). This test is now requested more frequently and replaces the previously withdrawn VRLAT standard.

Additionally, we have the capability to mix asphalt in one of our three mixers, with sizes ranging from 2kg to 75kg, to BS EN 12697-35:2016. For compaction, we offer several options, including vibratory compaction, gyratory compaction (non-UKAS), and 305mm x 305mm slab compaction (non-UKAS).

Concrete

Concrete testing is performed as part of quality control analysis of concrete structures. Different quality tests on concrete such as compressive strength tests, slump tests and permeability tests are used to ensure the quality of the concrete that is supplied is appropriate for a given specification.

Fresh concrete tests measure factors such as strength, consistency, unit weight, air content, and temperature. By performing such tests consistently, you can detect changes in concrete that could affect its long-term performance.

Our wide scope of sampling and testing methods are based on current British and European Standards, and we are UKAS accredited for concrete core sampling in accordance with BS EN 12504-1:2019.

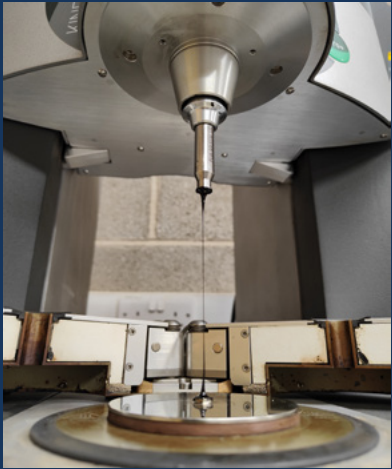
In support of core logging and reporting services, we also test the strength of concrete cores by measuring the compressive strength and density in accordance with BS EN 12390-3:2019, BS EN 12390-1:2021, BS EN 12390-7:2019, and BS EN 12504-1:2019. These results can be tied to FWD data and give a good indication of the pavements load bearing performance.

Dynamic Shear Rheometer (DSR)

DSR is a laboratory instrument used to measure the rheological properties (viscosity, elasticity, and shear modulus) of asphalt and bituminous materials. It applies a controlled shear stress or strain to a sample and measures the material's response over a range of temperatures and frequencies.

The DSR helps assess the performance of asphalt, particularly its resilience under varying traffic loads and temperature conditions, aiding in the design of durable road pavements.

At XAIS-PTS, we use the advanced Kinexus Pro+ DSR and we hold accreditation to BS EN 14770:2012. We also use the DSR for Tvet and Gvet calculations (for CD 227 compliance) and MSCR testing, to evaluate rutting potential in bituminous binders.



PRODUCT CERTIFICATION

XAIS-PTS Ltd are providers of UKAS accredited services in accordance with BS EN 17065 Product Certification Systems, along with assessments and certification of innovative products for road and footway applications through our Product Acceptance Scheme (XAIS-PTSPAS).

Our commitment to impartiality and confidentiality benefits all stakeholders and interested parties. XAIS-PTS certification also demonstrates the certificate holders' dedication to continual improvement through regular process monitoring.

Our product certification services include the following:

- Factory Production Control
- UK Approved Body (2448) provision of UKCA Mark
- Product assessment as part of the Product Acceptance Scheme to MCHW SHW Volume 1 Clause 104.15 and 104.16 (XAIS-PTSPAS)
- UK Technical Assessment Body (TAB) Product Area 23 Road Construction Products - provision of Technical Assessments



Factory Production Control (FPC) Assessment

FPC Assessment is a process used to ensure that manufacturers are consistently producing products that meet specified quality standards and comply with regulatory requirements. This assessment is particularly crucial for construction products where durability and performance are essential.

The key objectives of our FPC assessments are to ensure:



Consistency in Quality - Assessments verify that the manufacturer has the necessary systems, processes, and procedures in place to consistently produce products that meet required quality requirements



Compliance with Standards - Assessments ensure that the manufacturing process aligns with legal and technical requirements, such as those set out by national or international standards



Verification of Processes - Are a factory's production processes under control and followed consistently? The objective is to check that production equipment is maintained properly, personnel are trained, and quality assurance procedures are followed.



Inspection and Testing - The factory must demonstrate it carries out the required inspections and testing on materials, components, or finished products to ensure they meet predefined specifications.



Traceability - This ensures that there is a traceability system in place so that the origin of materials and manufacturing processes can be tracked. This is important for quality control and for identifying issues if a product fails or malfunctions later.

Other key aspects of an FPC Assessment include documentation review, factory audits, and ongoing monitoring.

UK Approved Body (2448) Provision of UKCA Mark

The UKCA (UK Conformity Assessed) marking is a product marking used to show that a product complies with relevant regulations for the UK market.

UKCA marking covers a wide range of product categories including pavement construction products and materials, such as concrete, asphalt, and aggregates, which need to meet certain performance standards.

For most products, to apply the UKCA marking, manufacturers must follow specific conformity assessment procedures, which might include testing, inspection, and certification by a UK-approved body.

XAIS-PTS, as a UK Approved Body (2448), awards UKCA Marking under relevant regulations, ensuring products meet performance standards.



XAIS-PTS Product Acceptance Scheme (XAIS-PTSPAS)

Product assessment as part of the Product Acceptance Scheme under MCHW (Manual of Contract Documents for Highway Works) SHW (Specification for Highway Works) Volume 1, Clauses 104.15 and 104.16 is crucial in the context of materials used for highway construction.

These clauses deal specifically with ensuring that construction products (such as road materials, aggregates, or manufactured items) are tested, assessed, and verified to meet specific performance standards before being used in the construction of highways.

Through our nationally-recognised Product Acceptance Scheme (XAIS-PTSPAS), we assess and certify innovative road and footway products, ensuring they meet MCHW SHW Volume 1, Clauses 104.15 and 104.16 standards.



UK Technical Assessment Body (TAB) - Product Area 23 Road Construction Products

As a TAB, XAIS-PTS assess road construction products, such as asphalt, concrete, and aggregates, ensuring they meet required performance standards and regulatory requirements before they can be used in highway construction projects.

Key stages of our technical assessments include:



Initial Review - The TAB reviews the product documentation submitted by the manufacturer. This documentation may include test results, production control procedures, design specifications, and compliance with relevant standards.



Product Testing - The TAB may carry out or require independent testing to assess the product's performance characteristics. This can include physical testing (e.g., compression strength, durability tests), environmental resistance (e.g., freeze-thaw cycles, moisture resistance), and more.



Factory Production Control (FPC) Review - The TAB may review the manufacturer's factory production control system to ensure it meets the required standards for consistency in manufacturing.



Technical File Evaluation - The TAB examines the technical file, which includes all the necessary data on the product's design, material composition, production processes, and previous performance evaluations.



Ongoing Monitoring - Once the product is approved, the TAB may also conduct periodic reassessments or monitoring to ensure continued compliance with the relevant standards.

Ultimately, through our wide ranging product certification services, we provide our clients with impartial, confidential, and quality assured support.

SYSTEM CERTIFICATION

XAIS-PTS as a Certification Body is committed to operating in certification and assessment systems in line with BS EN ISO/IEC 17021-1 Audit and Certification of Management Systems, for BS EN ISO 9001:2015 Quality Management Systems, and BS EN ISO 14001 Environmental Management Systems.

We also deliver certification for the following National Highway Sector Schemes:

- NHSS13: Particular Requirements for the Application of ISO 9001:2015 for the Supply and Application of Surface Treatments to Road Surfaces
- NHSS16: Particular Requirements for the Application of ISO 9001:2015 for Asphalt Laying
- NHSS23: Particular Requirements for the Application of ISO 9001:2015 for Small Scale Pavement Repairs.



Stage 1 Audit

This comprises of an audit of your management system documentation as required by BS EN ISO 9001:2015 and NHSS requirements, or BS EN ISO 14001. This evaluation may be conducted remotely by submission of your management system documentation or at your premises, and the review will address all requirements of the relevant standards.

XAIS-PTS audit the procedures in place and details of the assessment are provided in a formal report. Any issues raised that require corrective action of your management system will be documented within the report as findings, which must be rectified prior to the stage 2 audit.

Stage 2 Audit

These are undertaken on site, witnessing your installation of materials in accordance with your ISO 9001 management system and NHSS requirements, or BS EN ISO 14001 management system.

The stage 2 audit is a complete audit of your organisations processes including witnessing installations, interviewing personnel, and gathering evidence to demonstrate conformance of all your system controls and procedures with examination of records. Any findings identified and timeframes agreed for action / corrections are provided within a written report.

Certification Decision & Documentation

On completion of stage 1 and stage 2 audits, and through provision of evidence of compliance to the requested standards, the lead auditor provides their recommendation for certification. The overall decision on your approval shall be formally acknowledged by the XAIS-PTS Decision Committee, taking into consideration the lead auditor’s recommendations and the Committees decision following submittal of the lead auditor’s report.

The formal certification documentation shall be issued by XAIS-PTS Ltd. The certificate issued will be subject to the Terms and Conditions of the relevant XAIS-PTS contract, and published on the XAIS-PTS website and UKAS cert check website.

Surveillance & Recertification

Surveillance activities are required by all standards at annual intervals, with a three year recertification process. XAIS-PTS Ltd undertake surveillance audits at the clients premises as well as installation location(s) (where appropriate), to review the system for compliance and to ensure ongoing validity of system requirements as in accordance with relevant standards and normative documents. A 3-year re-certification audit is carried out to review the whole system.



"Through in-house resources we deliver efficient materials testing to our clients covering intrusive, non-intrusive and lab-based assessments, and we will work collaboratively with you to identify the right testing regime."

JAMES ROBERTS
XAIS-PTS LABORATORY MANAGER

"We are committed to delivering independent, impartial and confidential product and system certification and innovative material assessments, proudly providing diverse quality assurance services to the construction industry."

VERA SERMON MIAT & JOHN BULLAS MCIHT MIAT
XAIS-PTS CERTIFICATION TEAM

GET HELP FROM THE EXPERTS

Our experienced and qualified team adhere to structured programmes that meet both national and international standards, as well as incorporating guidelines from government agencies and other industry partners.

So, if you need site or laboratory materials testing, product or management system certification, then contact our team today on **01772 792899** or send an email to: **sales@xais-pts.co.uk**



To learn more about our wider services, scan the QR codes below to see the following brochures:



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