

OUR GUIDE TO NON DESTRUCTIVE TESTING METHODS

Helping make sure our customers
leave nothing to chance



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At Vulcan Inspection Services, we're proud to support our customers with the most sophisticated Non Destructive Testing (NDT) methods. And even better, our team of NDT experts are the very best at what they do, making sure they leave no stone unturned with your testing needs.

Helping make sure our customers leave nothing to chance is our number one priority and our specialist testing department is key to that. Not only do we use the very best tools and techniques when we work with you, but we'll help you choose the right testing methods, doing our bit to keep you safe and legally compliant at all times.

We upgraded our in-house testing facility in 2017, investing in some of the most sophisticated testing equipment and machinery, to help make sure we can always meet the needs of our customers.

Our labs are UKAS accredited and fully manned by the some of the most experienced and qualified people our industry. We know everything there is know about all of the relevant legislation so you don't have to.

Whether you're local and want to come to us or you need one of our experts to visit your site, we can help you with what you need. Simply get in touch by emailing info@vulcaninspect.co.uk to talk to us about your requirements and we'll take it from there.

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ULTRASONIC TESTING



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This is the most commonly used NDT method for detecting internal planar defects on site.

This method detects internal defects and verifies material thickness, including:

- Planar defects, including cracks, lack of fusion and incomplete penetration
- Voids, including porosity, gas pores, wormholes and slag inclusions
- Corrosion or thinning (known as 'thickness gauging')

Often used for:

- Welds in high pressure environments
- Structural steelwork welds
- Pressure vessels (although sometimes specifications require radiography)
- Storage tanks
-

Why use Ultrasonic testing?

- Can penetrate various thicknesses without any damage to the product
- Battery operated and conveniently sized, so portable and can be used on site
- Defects are accurately located

ULTRASONIC TESTING IN PRACTICE:

As an example, we've used ultrasonic testing to accurately size a crack on a boiler. This allowed the crack to be carefully removed and the repair area minimised. As a result, the boiler was back up and running quickly and downtime was kept to a minimum.



RADIOGRAPHY

This is the most commonly used NDT method for detecting volumetric internal defects in welds and castings in radiography bays and site applications

This method is used to detect internal defects including:

- Volumetric defects e.g. globular defects, gas pores, porosity and wormholes
- Planar defects including cracks and lack of fusion
- Root defects including undercut and root suck back, excess penetration and incomplete penetration

Often used for:

- Castings
- Storage tanks
- Pressure vessels
- Small metal components

Why use Radiography?

- Permanent record in form of a radiograph image
- Ability to detect small defects
- Efficient testing method for large circumference items such as butt welds

RADIOGRAPHY IN PRACTICE:

As an example, we've used Radiography on a large vessel. Radiographic film costs were high meaning a digital, innovative solution was the obvious choice. Film and travel costs were eliminated as the images were emailed to the third party inspectors.



PHASED ARRAY

(AN ADVANCED ULTRA SONIC TEST)

This is an alternative to ultrasonic testing and radiography and is most often used for multiple items or items where multiple tests are needed.

This method is used to detect internal defects including:

- Planar defects including cracks, lack of fusion and incomplete penetration
- Voids, including porosity, gas pores, wormholes and slag inclusions
- Corrosion mapping or thinning known as thickness gauging

Often used for:

- Welds in high pressure environments
- Structural steelwork welds
- Pressure vessels, although sometimes specifications require radiography
- Storage tanks

Why use Phased Array?

- Provides a permanent record
- Reduced scanning times, so quicker (once set up)

PHASED ARRAY IN PRACTICE:

As an example, we've used Phased Array solutions for pressure accumulators on some wind turbines. This allows the accumulators to be examined in situ, saving a significant amount of money and time for our customers.



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MAGNETIC PARTICLE EXAMINATION

This is most commonly used for surface/subsurface examinations and detects surface/ near surface defects in ferromagnetic materials

This method is used to detect surface/ near surface defects in ferromagnetic materials:

- Surface cracks
- Toe cracks
- Crater cracks
- Surface porosity

Often used for:

- Castings
- Welds
- Shafts

MAGNETIC PARTICLE EXAMINATION IN PRACTICE:

As an example, we've used Fluorescent Magnetic Particle techniques on an internal tank inspection. This meant that the internal welds didn't have to be painted, saving valuable preparation time and ensuring the tanks were back in service without delay.

Why use Magnetic Particle Examinations?

- Very sensitive
- Gives instant results
- Transportable, so it can be used on-site and in-house
- Simple application

DYE PENETRANT (ALSO KNOWN AS LIQUID PENETRANT EXAMINATION)

This is most commonly used for surface breaking defects in all metallic materials.

This method detects surface defects in non-magnetic material, including:

- Surface cracks
- Toe cracks
- Crater cracks
- Surface porosity

Often used for:

- Castings
- Welds
- Shafts

(Can be used on Stainless and Carbon Steels)

DYE PENETRANT IN PRACTICE:

As an example, we've put a rolling programme in place for a large food manufacturer using Dye Penetrant on the sealing welds of out of service items ready to be rotated with production vessels. This keeps machinery outages to a minimum and the factory producing!

Why use Dye Penetrant Examinations?

- Very sensitive
- Instant results
- Transportable meaning it can easily be used on customer sites for large circumference items such as butt welds

EDDY CURRENT TESTING

This can be used on painted surfaces.

This method detects surface and sub-surface defects on ferromagnetic materials, including:

- Very shallow and tight surface fatigue cracks
- Stress corrosion cracks in pipes and tubes
- Pitting

Often used for:

- Pipes and tubes
- Aircraft fuselage and wings
- Heat exchangers
- Welds

Why use Eddy Current Testing?

- Can be used on painted surfaces
- Advanced sets can provide a permanent record of inspection data
- High inspection speeds possible
- Clean process, with no residue left



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POSITIVE MATERIAL IDENTIFICATION

This is the only testing method to confirm composition of material without a material sample

This method detects the grades and chemical composition of metal and alloys including:

- Nickel and chrome content
- Carbon content (more specialised machines)

Often used for:

- Material verification after purchase
- Verification of suspected rogue material
- Post-purchase material certification
- Pre-purchase verification at steel stockists

Why use material identification?

- Portable
- Instant results
- Can be used in confined spaces

POSTIVE MATERIAL IDENTIFICATION IN PRACTICE:

As an example, we utilised PMI to check supplied material after a welder noticed that the stainless material welded differently during a repair weld procedure. This helped locate rogue Stainless Steel pipes that had been supplied in error. If this had not been identified, there could have been catastrophic failures, putting lives in danger and causing additional financial risk.

LEAVE NOTHING TO CHANCE

For more information, email:
info@vulcaninspect.co.uk



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