Volt Stick®
SafeTouch™

Bridging the Gap in Accessible Electrical Safety Guidance

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A Practical Method for Verifying That Metal Pipework, Appliances and Equipment Are Safe to Touch

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Executive Summary

Unexpected electrical voltage on metal pipework, appliances and equipment presents a potential safety risk for engineers and installers working in domestic and commercial environments. Electrical faults, damaged wiring, inadequate bonding or nearby electrical infrastructure can cause metal surfaces to become unexpectedly energised. In some circumstances this may lead to electric shock when the surface is touched.

Within major gas utility organisations, engineers are trained to follow “safe-to-touch” procedures designed to identify the presence of voltage on pipework or equipment before making contact. These procedures, supported by specialist tools and training, form an important part of operational safety systems used across the gas utility sector.

However, many professionals working outside these organisations — including independent gas engineers, plumbers, installers, builders and maintenance personnel — may not have access to the same structured procedures or clearly defined guidance.

At the same time, anecdotal evidence from training providers and engineers suggests that electrical shock incidents involving pipework or appliances may be more common than formally reported, highlighting the need for practical and accessible safety guidance.

The SafeTouch™ method has been developed to help address this gap.

SafeTouch is a simple three-step approach designed to help installers and engineers verify that metal pipework, appliances and equipment are safe to touch before beginning work:

CHECK + TEST + CHECK

CHECK – Verify the non-contact voltage detector on a known live source

TEST – Test the pipes, appliances or metalwork for voltage

CHECK – Re-verify the non-contact detector on a known live source

This method builds upon safety practices already used within the gas utility sector and makes them accessible to the wider installation and maintenance industries. By providing a clear, repeatable safety method, SafeTouch™ helps promote safer working practices and encourages greater awareness of electrical hazards when working around metal pipework and appliances.

Scope and Intended Users

This guidance is intended for installers, plumbers, heating engineers, gas engineers, maintenance personnel and others who may need to verify that metal pipework, appliances or metallic surfaces are safe to touch before beginning work.

The Risk of Unexpected Voltage on Metalwork

Installers, engineers and technicians working in domestic and commercial environments frequently

come into contact with metal pipework, appliances and metal equipment housings. Under normal conditions these surfaces are expected to be electrically safe to touch. However, a range of electrical faults and environmental factors can cause metalwork to become unexpectedly energised, presenting a potential electric shock hazard.

Examples include:

- Faulty electrical appliances, where an internal fault allows voltage to appear on the casing
- Damaged or deteriorated wiring, allowing electrical conductors to contact metal components
- Inadequate earthing or bonding, preventing fault currents from being safely conducted to ground
- Buried or concealed electrical cables, which may induce voltage onto nearby metal pipework
- Stray voltage from adjacent electrical circuits

In these situations, metal surfaces that appear safe can in fact carry an electrical potential. While the voltage present may sometimes be low, it can still produce an unexpected electric shock — particularly when the person touching the metalwork is simultaneously in contact with another conductive surface such as pipework, structural metalwork or building fabric.

For engineers working in confined spaces such as plant rooms, kitchens or service cupboards, this type of unexpected shock can present additional risks, including loss of balance, sudden movement while using tools, or contact with other hazardous equipment.

Because these hazards may not be visually obvious, it is important that engineers and installers have a simple and reliable method of checking metalwork before making contact.

Non-contact voltage detectors provide a practical way to identify the presence of AC voltage without requiring direct electrical contact. However, for these devices to be used effectively, engineers must follow a clear and consistent method of verification. This requirement led to the development of the SafeTouch™ method.

Industry Lessons from a Real Incident

In 1998 a fatal accident involving a gas engineer highlighted the risk of unexpected voltage on metal pipework and appliances. During a gas emergency call-out, the engineer attempted to access a gas meter installed beneath a metal kitchen sink. While placing a hand on the sink and the emergency control valve, the engineer received a fatal electric shock caused by a fault within the property's electrical installation.

Following this incident, Transco (now part of National Gas UK) worked with the developers of the original non-contact voltage detector to create a safety tool that would allow engineers to check for stray voltages on pipework and metallic surfaces before making contact. This collaboration led to the development of a detector capable of identifying voltages of 50 V AC or higher and designed for safe use in environments where gas may be present.

Today, such tools form part of the safety systems used by major gas utilities. However, many engineers and tradespeople working outside large organisations may not have access to the same structured procedures used within the utility sector.

Safe-to-Touch Procedures in the Gas Utility Sector

Following this and other incidents, major gas utility organisations introduced procedures to help engineers verify that pipework and equipment were safe before touching them. These procedures typically involve:

1. Verifying that the voltage detector works
2. Testing the metal surface for voltage
Confirming the detector still operates correctly

These steps form the basis of many safe-to-touch safety procedures used within the gas utility sector. However, many trades working outside large organisations do not have access to these structured procedures.

The Evolution of Safe-to-Touch Safety Practices

1998

— Fatal Incident Highlights Hidden Electrical Hazard

The 1998 accident exposed the risk and prompted immediate action.

Late 1990s

— Development of the First Purpose-Designed Detector

The gas utility sector collaborated with the originator of the handheld non-contact voltage detector to create a tool intrinsically safe for use around gas environments and capable of detecting 50 V AC or greater.

2000s–2020s

— Safe-to-Touch Procedures in Gas Utilities

Structured “check-test-check” procedures became standard across major utilities worldwide.

Gas Training Centres — Practical Procedures for Engineers

Ian Palmer, Operations Manager at Cert-ain Certification Ltd (CCL) and a gas safety professional with nearly 20 years’ experience as a Technical Service Engineer with British Gas, oversees a network of approved gas training and assessment centres across the UK.

Through his training programmes, Ian identified a clear gap in the industry: although some existing guidance (such as the Gas Safe Register Technical Bulletin TB118a) refers to a “Safe to Touch” procedure, there is no published, freely available version for smaller companies, sole traders, trainees or the wider installer and engineer community. Existing references often provide only limited detail, are restricted to registered professionals, and can leave engineers without clear, actionable steps.

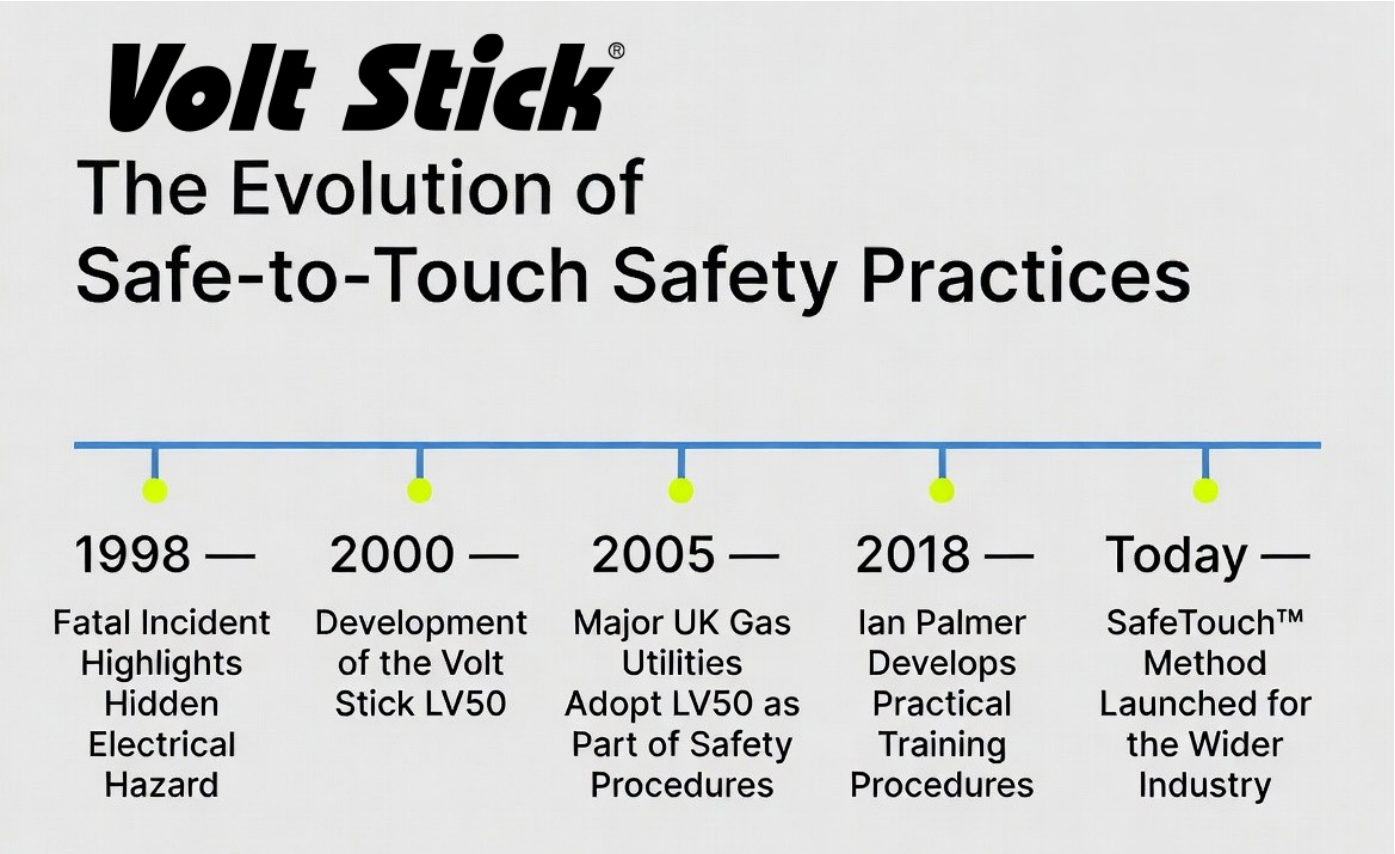
Recognising that current training materials and procedures can be incomplete, difficult to access, and sometimes mix different safety approaches when they should remain separate and simple, Ian developed a practical, repeatable “safe to touch” procedure designed to be easily taught during training and applied consistently on site. As he explains: “When it comes to safety, both CCL and the developers of SafeTouch™ believe we need to be proactive rather than reactive. By taking procedures already used by larger companies, adapting them and making them accessible to everyone, we can save lives.”

Collaboration — Developing SafeTouch™

To refine the procedure and make it available industry-wide, Ian Palmer partnered with the originators of the handheld non-contact voltage detector. Working together, the procedure was structured into the

simple three-step SafeTouch™ method designed for real-world use by every installer and engineer.

Today —
SafeTouch™ is the natural evolution of proven utility-sector practices now made available to every installer and engineer.



Making "Safe to Touch" Guidance Accessible to the Wider Industry

Across the gas utility sector, engineers routinely follow "Safe to Touch" procedures supported by formal systems, guidance and training. In contrast, thousands of independent installers, plumbers, heating engineers, kitchen fitters, builders and maintenance professionals regularly work around the same types of pipework and metallic equipment but often lack clear, consistent and accessible procedures.

Existing electrical awareness guidance can be confusing, incomplete or inconsistently applied. As a result, many professionals who routinely encounter pipework, appliances and metallic equipment may not have a simple, repeatable method for verifying that metalwork is safe to touch.

This highlights the need for clear, practical guidance that can be easily understood and applied across the wider installation and maintenance industries.

The Role of Non-Contact Voltage Detection

Non-contact voltage indicators provide a quick and practical method for detecting the presence of AC voltage without making physical electrical contact. When used correctly, these devices can help engineers and installers identify potentially energised metalwork before making contact.

When selecting a non-contact voltage indicator for safe-to-touch checks, consider the following:

Voltage Detection Range

The device should detect AC voltage from 50 V or lower (many gas-utility procedures are based on this threshold).

Compliance with Electrical Safety Standards

Voltage indicators should comply with BS EN 61010 and carry an appropriate category rating (typically CAT II or higher).

Suitability for Working Environments

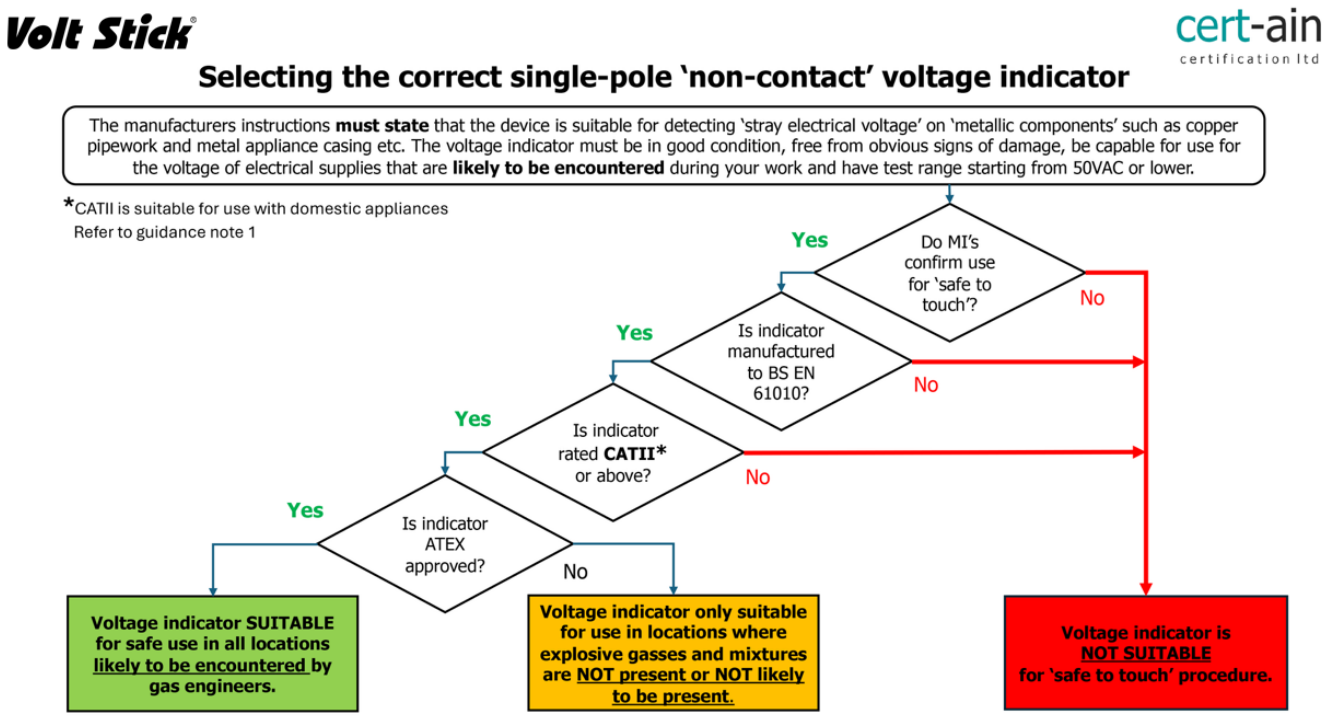
In areas where flammable gases may be present, equipment should be suitable for such conditions and used per manufacturer instructions.

Device Condition and Operation

Always check the device is in good physical condition, free from damage, and verify it is operating correctly before use.

Tools Used in the Gas Utility Sector

Non-contact voltage detectors of this type were originally developed in collaboration with the gas utility sector and are now used by major organisations worldwide.



Safety Thresholds and Voltage Detection

One of the most important considerations when selecting a non-contact voltage detector for safe-to-touch checks is the **voltage threshold** at which the device begins to indicate the presence of electrical energy. This threshold defines the detector's sensitivity and ensures it is appropriate for the regulatory environment and working conditions.

Why Thresholds Exist

Safety organisations set voltage thresholds based on how electrical current affects the human body. The key factor is not voltage alone, but the amount of current that can flow through the body. Standards such as IEC TS 60479-1 (the international guide to the effects of current on human beings) show that:

- Under dry conditions and typical body resistance (around 1,000–2,000 ohms), voltages up to 50 V ACgenerally keep current flow below harmful levels for healthy adults during normal contact.

- Above 50 V AC, the risk of painful shock, muscle contraction, loss of control or — in prolonged contact — ventricular fibrillation increases significantly.

This is why many standards worldwide treat 50 V AC as the dividing line between “extra-low voltage” (generally considered safe to touch) and voltages that require protection measures.

Common Thresholds in Practice

Different regions and organisations use slightly different levels to suit local conditions:

UK and European standards (including HSE HSG85, BS 7671 and IEC 60364-4-41)

- 50 V AC is the recognised safe touch-voltage limit under dry conditions.

- This threshold is widely referenced in gas industry guidance and has shaped the design of detectors used by major utilities.

North American and some international frameworks (OSHA, NFPA 70E, NESC and certain utility practices)

- Many adopt 50 V AC as the base hazardous level.
- However, in environments where skin resistance may be lower (wet conditions, high humidity, or specific stray-voltage scenarios), some utilities and corrosion-control standards lower the detection threshold to as little as 12–15 V AC. This provides an extra margin of safety.

Practical Implications for Installers and Engineers

Non-contact voltage detectors do not measure exact voltage — they simply indicate when voltage exceeds the device’s built-in threshold. Therefore:

- A detector set for 50 V AC is ideal for standard UK and European gas work.
- A more sensitive detector (e.g. capable of indicating from 12 V AC) may be required in regions or situations where lower thresholds apply.

Using a detector with the wrong threshold could either miss a real hazard or produce unnecessary warnings. The SafeTouch™ method therefore emphasises selecting a detector that matches the local safety framework.

The developers of SafeTouch™ have reviewed these varying thresholds across international standards and utility practices. This research has helped ensure the method works reliably whether the required detection level is 50 V AC (common in the UK and Europe) or lower (as used by some North American utilities). The result is a practical, compliant approach that can be applied confidently anywhere in the world.

The Volt Stick SafeTouch™ Method

SafeTouch™ provides a simple, behavioural safety procedure for verifying that metalwork is safe before touching it:

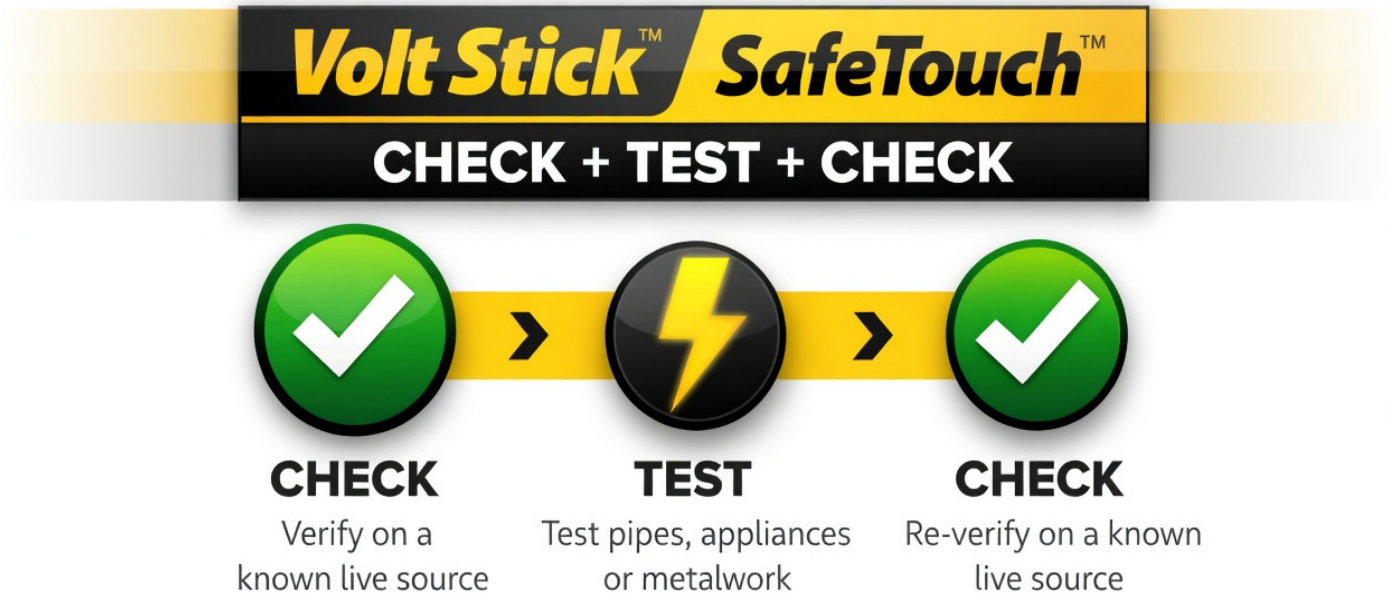
CHECK + TEST + CHECK

CHECK — Verify the detector on a known live source

TEST — Test pipes, appliances or metalwork

CHECK — Re-verify the detector on a known live source

If the detector indicates voltage: STOP — Do not touch the metalwork. Investigate the source before continuing.



Practical Applications

SafeTouch™ can be applied in many real-world situations including:

- Copper pipework near boilers
- Appliance casings
- Kitchen installations
- Service cupboards
- Meter boxes
- Metal trunking and plant rooms

In each case, the method provides a simple way to verify safety before contact.

Real-World Case Examples

Case Example 1 — Energised Appliance Casing

An installer checking pipework connected to a domestic appliance used a non-contact voltage detector and found voltage on the casing. Investigation revealed an internal wiring fault. The fault was corrected before work continued — preventing a potential shock.

Key lesson: Metal appliance casings can become energised due to internal electrical faults.

Case Example 2 — Voltage on Copper Pipework

A heating engineer detected voltage on existing copper pipework before modification. Further investigation showed damage to a nearby electrical cable from previous building work. The pipework was isolated and the fault repaired.

Key lesson: Metal pipework can carry voltage due to faults in nearby wiring.

Case Example 3 — Induced Voltage from Nearby Wiring

An engineer in a service cupboard found voltage indications on metal trunking and pipework caused by induced voltage from adjacent circuits. Although low, the check confirmed the surfaces were not safe to touch without further precautions.

Key lesson: Electrical fields from nearby wiring can create voltage indications on metalwork.

Conclusion

Unexpected voltage on metal pipework, appliances and equipment is a recognised hazard within the gas utility sector and has been the cause of serious incidents in the past. In response, major gas utility organisations developed procedures and safety practices designed to help engineers verify that metalwork is safe before making contact.

However, many professionals working outside these large organisations may not have access to the same structured procedures or clearly defined guidance. The SafeTouch™ method has been developed to help address this need.

By combining established safety practices with a simple and repeatable three-step approach — **CHECK + TEST + CHECK** — SafeTouch™ provides engineers and installers with a practical method for verifying that metalwork is safe to touch before beginning work.

This straightforward method builds on safety practices already used within the gas utility sector and makes them accessible to a much wider range of professionals working across the built environment. By improving awareness of electrical hazards and encouraging the use of consistent safety checks, the SafeTouch™ method has the potential to help reduce the risk of electrical shock incidents when working around metal pipework and appliances.

Improving safety across the industry begins with simple, practical guidance that engineers and installers can apply every day in the field.

Supporting Resources

For the complete detailed flowcharts, voltage indicator selection guide, step-by-step procedures, and full guidance notes, download the **Safe to Touch Flowcharts PDF.**