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# How to conduct **thermal inspections** in colocation data centers

BY JUSTIN SHEARD,  
FLUKE THERMAL IMAGING EXPERT

Colocation data centers are the nerve centers of modern digital infrastructure, and any unplanned outage can be financially devastating.

According to Uptime Institute, the average cost of a data center outage is \$8,851 per minute. As high-density compute environments continue to grow, proactive thermal inspections are now critical for maintaining uptime and ensuring safety.

Recent updates to NFPA 70B (2023) have solidified thermal inspections as a required element of preventive maintenance. For colocation engineers, facility managers, and contractors, knowing how to execute these inspections safely and effectively is key to meeting compliance goals and protecting mission-critical assets.

## Step 1: Identify key inspection points

Thermal inspections should focus on high-risk electrical and mechanical components – main power entry points, UPS systems and battery banks, power distribution units (PDUs), switchgear and transfer switches, rack-level breakers, busways and panelboards, and cooling systems and motors. These locations are central to data center reliability and are subject to high loads, making them prone to thermal anomalies.

Creating an efficient map or walking path ensures no asset is missed and valuable time is not wasted traveling between high-risk components.



## Step 2: Properly position for accurate imaging

Using an infrared thermal imaging camera, teams should maintain proper stand-off distances for accurate image framing. Several factors influence the right positioning.

The ideal distance depends on the resolution of the thermal camera. Higher-resolution cameras allow for inspections from further away while still capturing fine detail – when inspecting small anomalies, closer proximity ensures better accuracy. Field of view (FOV) is also a consideration: a wider FOV allows larger areas to be scanned quickly but may reduce detail, while narrower FOVs provide more precision for detecting small temperature variations. An FOV calculator can help determine the best setup for a given camera. Higher resolution sensors, such as 640x480 or 1024x768, provide more detail, making it easier to identify subtle temperature differences, while lower resolutions may require closer inspection to detect issues effectively.

## Step 3: Look for common failure modes

In data centers, inspections should look for loose connections, overloaded circuits, or phase imbalance, depending on the asset being inspected.

## Step 4: Track and compare results

Comparative scans conducted seasonally or under different load conditions build a picture of how systems are changing over time.

## Step 5: Look for trends

Documenting thermal signatures at the rack level helps identify emerging issues.



## Using IR windows for safe, repeatable scans

IR windows enable safe, non-intrusive inspections without removing panel covers, significantly reducing arc flash risk. The Fluke CV401 ClirVu® IR Window (95mm) offers a clear, consistent field of view, arc-rated protection, and easy installation on switchgear and PDU panels.

Pairing the Fluke Ti480 PRO with IR windows allows teams to conduct repeatable inspections with minimal disruption and log inspection data using Fluke Connect for audit trails and analysis.

## Compliance-driven inspections: NFPA 70B and 70E alignment

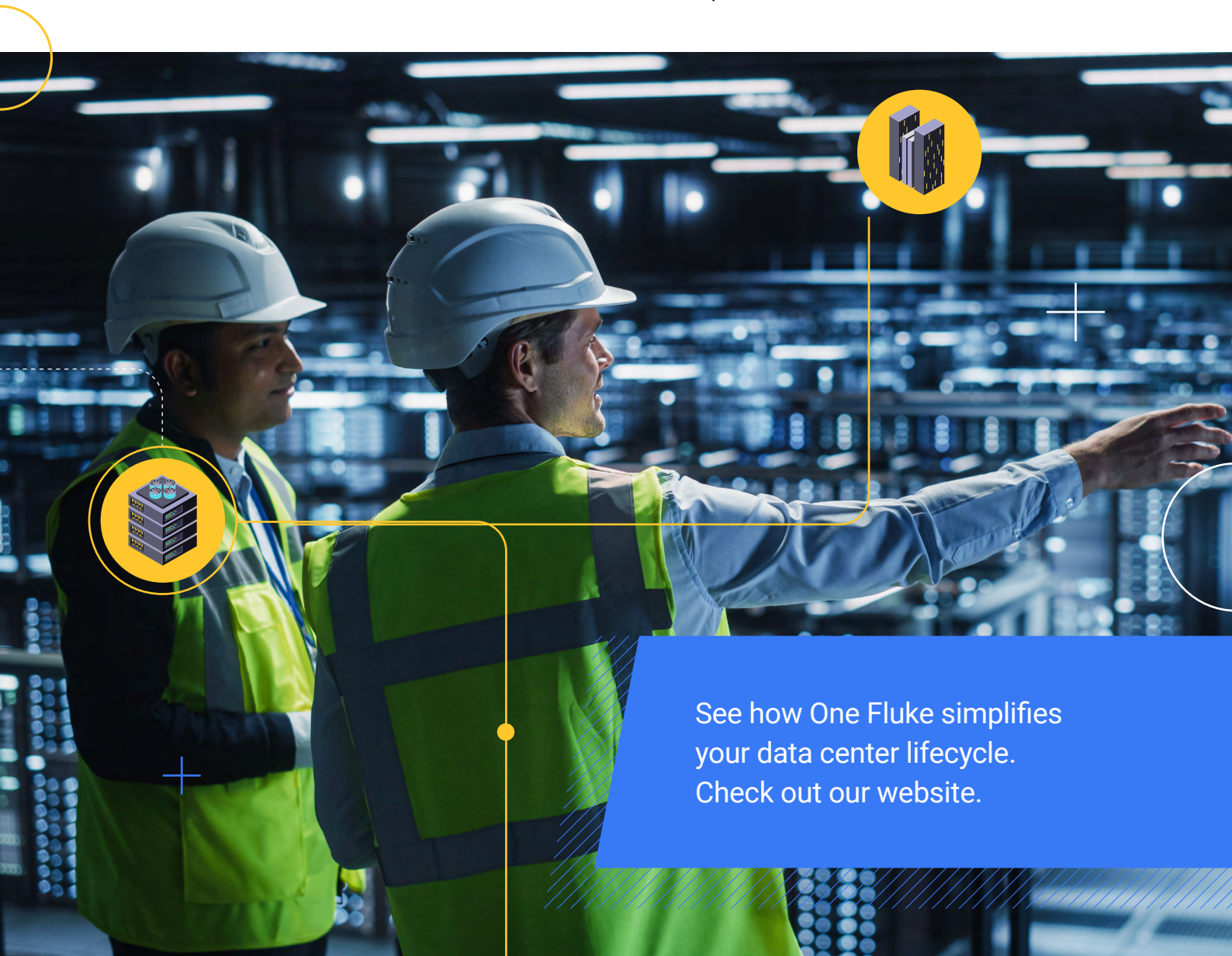
Under NFPA 70B, annual thermal inspections are a maintenance requirement. Using IR windows supports

NFPA 70E by reducing exposure to arc flash zones and minimizing the need for personal protective equipment (PPE).

For colocation operators balancing internal and tenant-owned infrastructure, thermal imaging offers transparency and safety in shared environments. Documenting findings and creating reports satisfies auditors and reassures tenants.

## Putting it all together

The most effective thermal inspection programs combine visible and infrared images to enhance inspection reports, use thermal imaging software to trend hotspots and flag repeat issues, and pair inspections with airflow and environmental sensors for a full-picture cooling analysis. Following these practices improves reliability and safety while aligning with the critical compliance standards that govern data center operations.



See how One Fluke simplifies your data center lifecycle. Check out our website.