



Environmental Performance in Data Centers During the Commissioning Phase

Energy use and cooling efficiency tend to lead the conversation in data center design. But during the commissioning phase, environmental performance includes more than power and cooling.

As data center development continues to grow, more attention needs to be paid to environmental considerations that affect long-term operations, including water use, heat rejection, and the impact of facilities on surrounding infrastructure and site conditions.

Intertek approaches data center performance across three connected phases: design, build, and commissioning. The commissioning phase is when those conditions can be evaluated during operation and when systems must perform as an integrated facility ready for continuous operation.

Looking Past Power Usage Effectiveness

Power usage effectiveness (PUE) remains one of the most widely used metrics in data center design, but it does not reflect how systems perform together in use or how a facility affects its surroundings.

During commissioning, electrical, mechanical, and control systems can be evaluated under load to verify sequencing,

“During commissioning, data centers are evaluated to confirm systems perform as designed under real operating conditions.”

confirm control logic, and identify performance gaps that may not have been visible during design. Intertek supports this work through testing, inspection, commissioning, and certification services across electrical, mechanical, cooling, enclosure, and information and communications technology (ICT) systems.

Water Use Under Operating Conditions

Cooling strategies can involve substantial water use. Systems such as cooling towers and evaporative cooling are often based on modeled assumptions during design.

The commissioning phase is where those assumptions are tested. Flow rates, cycles of concentration, and control strategies can be checked against actual operating



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conditions. This helps identify inefficiencies early and supports better long-term management of water use.

Water handling also affects compliance. Discharge, treatment, and reuse strategies should be reviewed to confirm alignment with local requirements and operating needs.

Envelope Performance and Air Control

The building envelope plays a direct role in environmental performance, even in controlled environments like data centers.

Air leakage can disrupt temperature control, increase energy demand, and introduce moisture into the facility. During commissioning, testing, and inspection help confirm that air barriers are continuous and that penetrations and transitions are properly sealed.

These are often small details, but they can affect system performance and long-term durability. Intertek includes enclosure evaluation in the design phase and enclosure-related verification in later project phases.

Material Performance & Indoor Conditions

While data centers are not typical occupied spaces, interior conditions still affect performance. Materials used within the facility can influence air quality, cleanliness, and long-term equipment reliability.

The commissioning phase gives teams a chance to confirm that ventilation, filtration, and pressurization strategies are functioning as planned. It also allows potential issues related to material emissions or contaminants to be identified before full operation begins.

Site Impact and External Conditions

Environmental performance also includes how the facility affects the surrounding area. Heat rejection systems, backup generators, and mechanical equipment

can introduce noise and thermal impacts beyond the building footprint.

Verification during commissioning helps confirm that these systems are functioning as planned. This is especially relevant for facilities located near residential or mixed-use developments, where external conditions can become operational concerns.

How Intertek Supports Data Center Projects

Commissioning is one part of a larger process. Intertek's data center approach connects three project phases: design, build, and commissioning.

Design: Early review of site conditions, environmental factors, enclosure performance, and system requirements that will affect long-term operation.

Build: Field testing, inspections, and system checks to verify that materials, assemblies, and installations align with the project requirements established earlier.

Commissioning: Functional testing and evaluation under load to confirm that systems operate as intended and are ready for continuous operation.

Looking at all three phases together helps teams identify issues earlier, reduce risk during startup, and better understand how systems will perform over time.

Click [here](#) to learn more about Intertek's data center services and see how its three-phase approach supports projects across design, build, and commissioning.

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