Carrier-Grade Infrastructure Solution Brief: Deploying ZTE ZXCLOUD iDac Data Center Cold Aisle Containment Airflow Specs

MARKET POSITIONING

The ZTE ZXCLOUD iDac Data Center Cold Aisle Containment Airflow Specs represent a foundational subsystem within ZTE's modular data center architecture, engineered to address the critical thermal management challenges of modern high-density compute environments. As rack power densities continue to escalate, the isolation of cold supply air from hot exhaust streams has transitioned from a best-practice recommendation to a mandatory design criterion for carrier-grade facilities. The ZXCLOUD iDac containment framework is purpose-built to maximize cooling efficiency, eliminate localized hotspots, and facilitate a measurable reduction in Power Usage Effectiveness (PUE). By physically segregating the cold aisle, the solution ensures that conditioned air is delivered directly to server intake fans without mixing or bypass, thereby enabling higher supply air temperatures and extended economizer hours .



HIGH-AVAILABILITY REDUNDANCY

The containment airflow architecture is designed with the same redundancy principles that govern the underlying IT and power infrastructure. The structural sealing of the cold aisle is not merely a passive barrier; it is an active component in the facility's thermal redundancy strategy. In the event of a single Cooling Distribution Unit (CDU) or in-row air conditioner failure, the contained aisle acts as a plenum that maintains a positive pressure differential, preventing the immediate ingress of hot exhaust air into the cold zone. This buffering capability provides critical minutes of ride-through time, allowing the redundant cooling units (configured in N+1 topologies) to ramp up and stabilize the thermal environment without triggering server-level thermal throttling or protective shutdowns . The physical framing and panel systems are constructed from rigid, lightweight materials that resist deflection and maintain

seal integrity even under the negative pressure loads generated by high-static-pressure EC fans operating at maximum duty.

PROTOCOL INTEROPERABILITY

While the containment system is a passive mechanical structure, its integration with the broader ZXCLOUD infrastructure is governed by intelligent monitoring and control protocols. The airflow specifications are tightly coupled with the ZXCLOUD iDCIM (Data Center Infrastructure Management) platform, which aggregates telemetry from differential pressure sensors, temperature probes, and airflow meters positioned at strategic points within the cold aisle. This data is utilized to dynamically modulate the speed of the in-row EC fans and the chilled water valve positions, ensuring that the airflow volume precisely matches the IT load. The system supports standard SNMP and Modbus TCP/IP interfaces for integration into third-party Building Management Systems (BMS), ensuring that the containment status — whether sealed, breached, or under maintenance—is reflected in the facility's overall operational dashboard .

DETAILED PARAMETERS

The physical and operational parameters of the ZXCLOUD iDac containment solution are optimized for standard 19-inch rack footprints and typical

raised-floor or slab-floor data center environments. The system accommodates a variety of rack widths and depths, with telescoping frame members that allow for on-site adaptation to irregular room dimensions. The ceiling panels are designed with integrated lighting and cable management pathways to minimize penetrations that could compromise the air seal. Differential pressure across the cold aisle is maintained within a tight tolerance band to prevent both air leakage (which wastes cooling energy) and excessive negative pressure (which can draw in unfiltered ambient air).

Parameter	**Specification**
Cold Aisle Differential Pressure	Maintained at +5 Pa to +15 Pa relative to hot aisle (adjustable via iDCIM damper control)
Containment Seal Class	Class B (EN 1886) for leakage; brush and gasket seals rated for <2% air bypass at design static pressure
Structural Frame Material	Extruded aluminum alloy (6063-T5), anodized finish; zinc-plated steel brackets
Panel Light Transmission (Ceiling)	≥ 85% for polycarbonate panels; integrated LED luminaires optional
Fire Rating (Panels & Seals)	UL 94 V-0 flame class; low smoke zero

	halogen (LSZH) compliant
Operating Temperature Range	5°C to 45°C (continuous); 0°C to 50°C (short-term)
Compatible Rack Dimensions	Width: 600/800 mm; Depth: 1000 – 1200 mm; Height: 42U–48U
Airflow Modulation Range (with EC Fans)	20% – 100% of rated volumetric flow, governed by iDCIM PID loop
Integration Protocol	SNMP v2c/v3, Modbus TCP/IP, dry contact alarms for door status and pressure fault
Design MTBF (Mechanical Assembly)	>250,000 hours (excluding field-replaceable wear items)

LIFECYCLE ASSURANCE (MTBF)

ZTE applies rigorous reliability engineering to all mechanical and structural components of the containment system. The frame extrusions and joining brackets are rated for a static load capacity that far exceeds the weight of the panels and integrated accessories, ensuring structural integrity over the facility's operational life. The sealing gaskets and brush strips are manufactured from fire-retardant, low-smoke materials that resist compression set and

maintain effective sealing performance across a wide thermal envelope. Mean Time Between Failures (MTBF) for the mechanical assembly is calculated to exceed the typical design life of the data center hall, with wear items (such as door sweeps and gaskets) being field-replaceable without the need for specialized tooling or extended downtime.

TARGET NETWORK TOPOLOGIES

The ZXCLOUD iDac cold aisle containment is deployed as a building block within ZTE's broader micro-modular and containerized data center solutions. It is equally suited for greenfield hyperscale halls and brownfield retrofit projects where legacy raised-floor cooling must be upgraded to support higher-density racks. The solution is validated for use in conjunction with ZTE's high-voltage direct current (HVDC) power distribution systems, where the reduction of cooling overhead directly contributes to the overall system efficiency gains of the 240V/336V DC architecture . Whether deployed in a single-row pod of ten racks or a multi-row cluster exceeding fifty racks, the containment framework scales linearly, maintaining consistent airflow dynamics across the entire compute hall.

