



AIRSIDE / APPLIED / CONTROLS / SERVICE / SPECIAL SOLUTION / TOTAL SYSTEM / UNITARY

Case Study – Cisco Systems

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICEBUILDING / RETAIL / SPECIAL



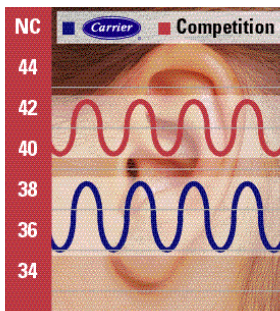
Custom Air Handling Design and Installation Saves Cisco Systems \$1.2 Million

Project Objectives

Cisco Systems, of San Jose, CA, the world leader in networking for the Internet, was rapidly expanding its corporate offices. Their Site 4 location was adding 19 new buildings between January 1998 and May 1999, while Site 5 would add five in 2000. Containing costs, both in construction expenses and building operation, was a major project consideration. Cisco was looking for cost-effective quality HVAC systems that would deliver reliable performance. Quiet system operation was a key requirement, particularly for employees working in close proximity to the buildings' HVAC equipment.

Solution

While early buildings on Cisco's campus used packaged air conditioning units, chilled water systems with air handlers were chosen for the new buildings for more economical operation and flexibility for expansion. Racan-Carrier saved Cisco \$1.2 million in construction costs – \$50,000 per building – by custom designing air handling units so quiet that the need for ductwork sound attenuators was eliminated. Using four air handling units per building instead of one large unit simplified installation, as the larger units would have been shipped in pieces, requiring costly reassembly. It also eliminated the leaks that had plagued other Cisco buildings using a competitor's large rooftop air handling unit.



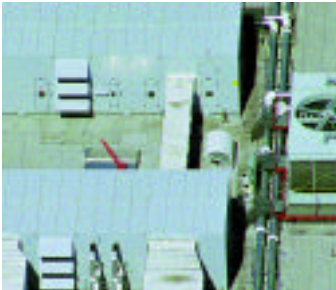
Carrier's solution delivered impressive sound levels of NC=35–38 vs. competitor's estimated levels of NC=40–42.

The superior acoustic design properties of Carrier's air handlers eliminated the need for sound attenuation – saving \$1.2 million dollars in construction costs.



Case Study – Cisco Systems *continued*

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICE BUILDING / RETAIL / SPECIAL



“Cisco does quality work and their offices reflect that. Their facilities have the best of everything, so why not have the best in air conditioning as well?”

Ravi Maharaj,
consulting engineer,
Alfa Tech Consulting
Engineers

Project Synopsis

Cisco Systems' world headquarters is located in San Jose, California. The multi-billion-dollar company has expanded its physical space steadily since the mid-1990s to accommodate its explosive growth. Between January 1998 and April 2000, they added a total of 24 buildings to Sites 4 and 5.

Buildings on the Cisco campus range from three to five stories. Some existing buildings used a single air handling unit on the roof to cool the entire building. These large units had to be shipped and installed in pieces. Not only was the reassembly difficult and costly, but it sometimes resulted in leaky equipment. The leaks cost Cisco in repair charges and also caused the equipment to lose performance, lowering efficiency and wasting energy dollars. With the large number of new buildings being constructed, Cisco engineers wanted cost competitive equipment; streamlined installation; and long-term, reliable performance.

Racan-Carrier emerged with a creative design solution. Instead of using one large air-handling unit for each building, the team proposed using four smaller custom units with the same combined total CFM. This concept provided several benefits. First, units could be shipped and installed in one piece, greatly simplifying the installation process and virtually eliminating the potential for leaks. Second, Racan-Carrier designed the units using internal wall baffles that reduced the sound levels at intake and discharge, making the units significantly quieter than any competitor version. In fact, the systems were so quiet, they eliminated Cisco's need to purchase any sound attenuators for the ductwork. This saved the company an impressive \$50,000 per building – adding up to well over a million dollars in construction cost savings, in addition to the air handler installation savings. Sound levels on the buildings' top floors are NC=35 and on other floors, NC=38 – approximately 15% quieter than the competition.

“Early buildings at the headquarters used packaged units,” said Michael Lavazza, Cisco manager of maintenance operations. “As we expanded, we decided to go to a built-up chilled water system, which created the need for air handlers. It was an economic decision. It's a lot cheaper to cool the buildings using that kind of design. Plus, it's more versatile for expansion. If we want to install additional labs, we have a chilled water header system throughout each building so we can just tap off of that to fan coil units or computer room air handler units. It was a two-fold approach.”

Both the project engineer and Cisco's manager of maintenance operations were extremely happy with the resulting performance of Site 4's new air handling systems. So happy, in fact, that Racan-Carrier was selected to design air handlers for five buildings at Site 5. “[Cisco] facilities have the best of everything,” said Ravi Maharaj, Alfa Tech consulting engineer, “so why not have the best in air conditioning as well?”

Project Summary

Location: San Jose, CA

Project Type:
New construction

Building Type/Size: Glass and Eifs front, steel construction; three to five stories; Site 4: 19 buildings, totaling 3.3 million sq. ft.; Site 5: five buildings, 1.5 million sq. ft.

Building Usage: Offices, conference rooms, computer testing laboratories

Objectives: To install quiet, durable, cost-effective air handling equipment

Major Decision Drivers: Cost; system design; reduced sound level

Design Considerations: Multiple smaller units were used per building so units could be shipped and installed in one piece

HVAC Equipment: 76 air handling units, ranging from 55,000 CFM to 95,000 CFM

Unique Features: Air handlers designed to eliminate need for ductwork sound attenuators

Project Cost Range:
More than \$5 million

Installation Date: 1998 – 2000

Consulting Engineer:
Alfa Tech Consulting Engineers

Contractor: Air Systems, Inc.

For more information, contact your nearest Carrier Representative, call 1.800.CARRIER or visit our web site at www.carrier.com