

COOLING TOWER STEALTH

440-Ton Cooling Tower Goes Urban Inconspicuous!

Application Note



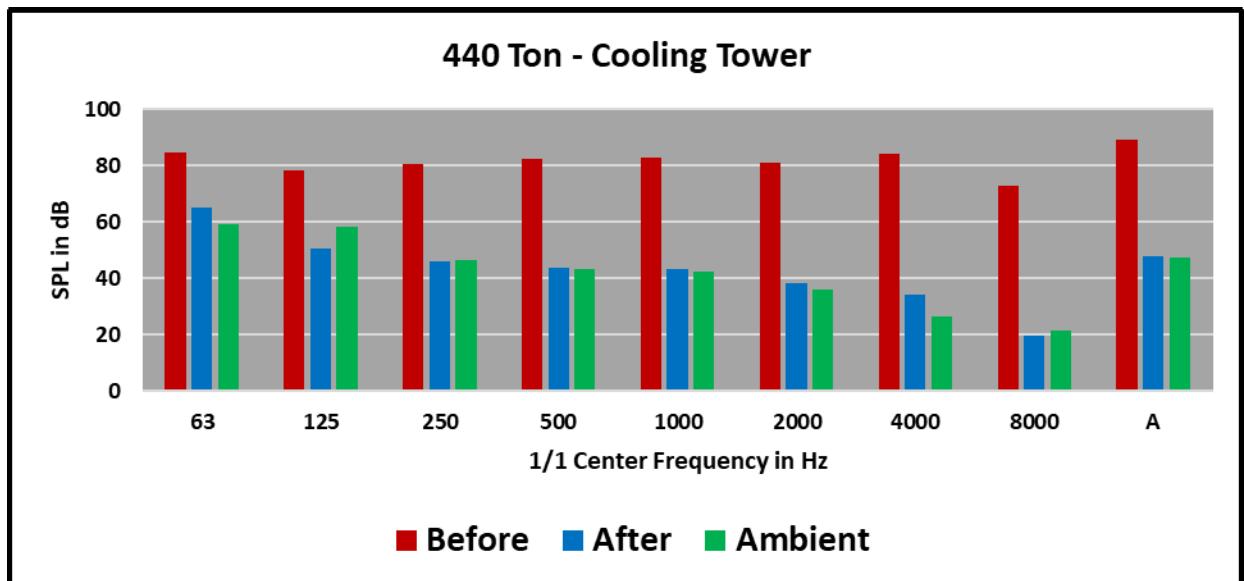
Cooling Tower with Aeroacoustic Enclosure

A 440-ton, multiple centrifugal fans (with variable frequency drives), forced-draft, cooling tower was proposed at a luxury condominium as an energy and cost savings project. The location mandated was within five (5) feet of residential neighbors (Class-1 land use) and the condominium itself. Further, intrinsic site topography intensified cooling tower noise emissions, which exceeded the local noise ordinance and lowered host condominium unit valuation.

A number of noise abatement schemes were considered but were rejected due to aerodynamic concerns, cost projections and subsequent performance degradation. Based project management's previous experience with Aeroacoustic Engineering Consultants, LLC (AEC) on a similarly critical chiller project, AEC was retained to provide a custom engineered "turn-key" solution!



AEC-71401



Due to the critical acoustic and aerodynamic (aeroacoustic) performance parameters projected for the fully loaded cooling tower, AEC was commissioned to expedite an aeroacoustic design that could accommodate additional flow resistance from plume abatement hardware. Within two (2) weeks, AEC had developed conceptual designs for a totally passive (no booster fans nor blowers) acoustic enclosure, accomplished aeroacoustic computer simulations including defacto site topography with all computer modeling under full thermal load and aerodynamic flow of nearly **100,000-SCFM** of air! From the iterative computer simulations, a design configuration was selected that would guarantee the owner a **minimum noise reduction of 40-dBA at 5-foot** distance from any direction from the cooling tower's enclosure, air intake or discharge silencers.

AEC provided the system design, acoustic hardware fabrication, installation supervision and performance warranty for all aeroacoustic operating parameters. Actual installation was accomplished by the owners building contractor. The contractor had estimated a nominal five (5) days on site for installation. Actual installation was accomplished in **just two (2) days** attributable to AEC's modular construction and precision fit up.

System acoustic performance (dynamic insertion loss or noise reduction) was tested at a nominal **41.1-dBA at 5-foot distance** from the chiller enclosure. The resulting sound pressure level with the fully loaded cooling tower was **47.9-dBA at 5-feet** from the intake, thus meeting the site criteria of **50-dBA** at a 5-foot distance! Total aerodynamic system static back pressure was certified at a nominal **0.18-IWG** at full flow, summed through both intake and discharge. AEC aerodynamic design permits future addition of intake filters and/or plume abatement systems should they be needed.