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PJM Mechanical Contractors Publication
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PJM Pipeline

Plumbing Lic. #6694 | Fire Protection Lic. #P00713 | HVAC Lic. #19HC00113400

PJM CUSTOM FABRICATION HELPS EXPEDITE PROJECTS

A rooftop air handling unit had failed at a central New Jersey hospital, and rapid replacement was urgently needed. A new unit was located and a PJM installation crew was ready for dispatch, but the roof curb posed a problem. A standard factory curb adapter would take at least ten days to arrive, and a rush order would take five days at significant added cost.

PJM's solution: we custom-fabricated a curb adapter in our full state-of-the-art sheet metal shop, and the entire installation was completed within 72 hours, start to finish.

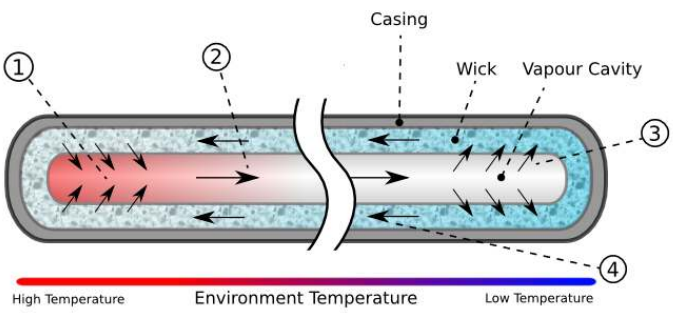
In addition to our sheet metal shop, PJM has an onsite pipe and weld shop, and both are fully-staffed by expert fabrication professionals. We custom-fabricate a variety of HVAC and plumbing components of any size or complexity, including ductwork, curb adapters, transitions, condensate pans, etc., as well as carbon steel piping, fittings, process piping skids, welded fixtures, and more. Our onsite shops help keep projects on schedule and budgets in check, and enable us to expedite fast-track projects and emergency repairs that might otherwise be delayed due to unavailability. PJM's fabrication team can provide on-site measuring and design assistance, or items can be fabricated to customer-provided specifications.

PJM Mechanical Contractors, Inc. has been Certified as a Minority Business Enterprise (MBE) by the State of New Jersey

Also In This Issue...

HEAT PIPE SAVES ENERGY, LOWERS COSTS

Building owners have multiple choices for saving and recapturing energy, each with advantages and disadvantages, including heat recovery wheels, air-to-air heat exchangers, glycol runaround loops, and **heat pipes**. Heat pipes are thermal transfer devices capable of transferring heat and energy several hundred times faster than conventional methods. They are highly efficient, relatively inexpensive, require no energy, have no moving parts, no chance for cross contamination, and little to no maintenance is required. Heat pipes can be installed with new air handling units, or retrofit to existing units. They are frequently used on 100% outside air systems.



Heat pipe thermal cycle
1) Working fluid evaporates to vapour absorbing thermal energy.
2) Vapour migrates along cavity to lower temperature end.
3) Vapour condenses back to fluid and is absorbed by the wick, releasing thermal energy
4) Working fluid flows back to higher temperature end.

A traditional heat pipe is a vacuum-tight hollow cylinder filled with liquid that vaporizes when heat comes in contact with the surface of the pipe in the evaporator section. The vapor then travels along the heat pipe to the condenser section where it condenses and gives up its latent heat. The liquid then returns to the evaporator by capillary action via a wick structure, by centrifugal force in a rotating system, or by gravity, and the process repeats.

PJM recently completed a heat pipe retrofit on multiple air handlers for a New Jersey R&D laboratory as part of an air handler renovation. The client, looking to recoup lost energy on exhaust, wanted a low-maintenance option that eliminated the risk of cross contamination. Installation was accomplished by opening the air handler, sliding in a heat pipe cassette, and enclosing the assembly. Stainless steel drain pans were installed to capture condensate produced when the coil reaches dewpoint.

Upon startup, the new heat pipe coils were tested on a design day with outdoor air under high temperature and humidity conditions. PJM verified flow and static pressure and performed a detailed temperature profile. Almost instantly, the coils were performing to design intent, achieving tons of cooling and providing significant energy savings.

Service Photo Album

A new customer called PJM to look at condensate leaking issues with several year-old package air handling units ranging from 10 to 25 tons. While making the necessary repairs to condensate piping and traps, our technician noticed that **economizers had never been connected properly**. PJM connected, tested and commissioned the economizers, installed new filters, and cleaned the coils. In the end, PJM gained another satisfied customer and a new preventive maintenance contract.

PJM received a call from a surgical center with a **failed compressor**. Now faced with having to replace their third failed compressor in as many years, they had lost confidence in their previous service company. PJM replaced the compressor and quickly dug in to find the root of the problem. Through superheat trending a problem with the TXV thermostatic expansion valve was uncovered and corrected. Problem solved.

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Pressure Testing, Flushing and Cleaning

The goal of any HVAC piping installation is to have a system that is designed properly and with the right materials, installed correctly, functions properly, and is readily accessible for maintenance. Proper pressure testing, flushing and cleaning is important to help ensure problem-free system performance.

Before pressure testing a piping system, inline devices that may not be able to withstand test pressure, such as flow meters, pressure sensors, DPTs, etc., should be isolated or removed. Systems should be pressure tested for 2-4 hours at a minimum of 1.5 times the operating pressure. Most hydronic systems (chilled water, reheat, preheat, etc.) are tested using water. Steam and condensate systems are usually tested using clean compressed air. If the piping is subject to freezing, it is important to make sure test water is removed at the completion of testing, or, alternatively, the system can be tested pneumatically. Otherwise, broken or burst coils or piping can be a costly consequence.

After pressure testing has been completed, pipes must be cleaned and flushed. This important step requires that all valves are open and the system operates as a complete loop. In a new system, clean water and a mild detergent such as TSP (trisodium phosphate) should be circulated for a minimum of 4-12 hours. Existing systems with silt, sludge or debris problems need specialized cleaning at higher velocities to remove foreign matter. These issues must be analyzed on a case-by-case basis to determine the severity of the problem.

Once a system has been cleaned and flushed, it must be filled and chemically treated, as good heat transfer requires piping that is properly cleaned and treated, and remains clean. Specifications may call for a particular brand or product such as a rust inhibitor or other treatment. Fluids should be sampled and tested on a yearly basis by a competent testing company and adjusted accordingly. We also recommend periodically inspecting piping systems so that problems can be detected at an early stage and fixed with little effort at minimal cost. If these procedures and subsequent maintenance are not properly followed, clogged strainers, coils, control valves and heat exchangers can cause costly problems down the line.

UV-C a Low-Cost Solution for Improved IAQ

Damp, humid conditions present in condenser coils, air filters, ductwork, and drain pans tend to attract microbial growth, which, left uncontrolled, can impede airflow and emit contaminants and odors into the conditioned space. One effective way of controlling microbial growth in air handlers to improve indoor air quality, reduce maintenance costs, and increase system efficiency is through UV-C, or ultraviolet light.

There are two basic types of UV-C systems, coil and in-duct, which can be used alone or in tandem for increased benefit. Coil UV-C systems are generally more effective due to continual exposure and can restore as much as 40% of system capacity according to some studies. ASHRAE recognizes the value of UV-C and has published recommendations for effective treatment. Installation is inexpensive, and a UV-C system can pay for itself in as little as six months.