

Does Equipment Using MSP Technology Withstand the Test of Time?

A Report from John Petitt, for Nautica Air Systems



The Florida State Regional Service Center in Marathon is located about 40 miles from Key West along the famous island chain in the South of Florida known as the Keys. Driving out into the glare of the sand and the water, with the sea breeze coursing into the open windows of my car, I started picturing what our equipment might look like after 5 years moving salty air through all of the internal components (heat exchangers, cooling coil, fan). After all, our dehumidification equipment- with patented MSP Technology- was floor-mounted in a mechanical room only 50 feet from the ocean! It had to have taken a massive toll on the internal components. This trip's mission is to hopefully prove out the longevity, reliability and ease of maintenance of our patented dehumidification system.

I was a facilities guy in the Semiconductor Industry for 20 years, so I have experience with fancy systems that look great on a blueprint or in a brochure- beautiful shiny boxes of HVAC magic, glistening stainless steel drain pans, sparkling copper and aluminum fins everywhere, hand rubbed powder-coated panels like a '57 chevy. I heard sales pitches for every HVAC technology known to man- saw all the glitzy Power-point and got lots of nice, glossy brochures that I rarely looked at.

I also worked in the trenches. I started as a Mechanics Helper while I was going to Stony Brook University on Long Island. I changed motors, filters, belts, cleaned coils- the usual stuff. I saw the beautiful, custom, "engineered" systems, with "patented technologies" the silver bullets, the "game changing technologies" that will "reduce your electric bill by over 100%!" you know the story. And after the "factory startup" I saw in-house Facilities mechanics gaping at these things aghast at the prospect of maintaining the monster "These 'bleeping' engineers should have to work in the field before they get their degrees!" they would say or "look at this *#?* thing!" The modulating hot gas reheat, the desiccant regeneration, evaporator pressure regulating valves, liquid sub-cooling, run-around coils, APR valves, etc. Overwhelming...

I learned early on that simplicity and ease of maintenance are critical attributes in the Facilities maintenance world. Not because Facilities guys are not bright—on the contrary, the field guys I worked with over the years are some of the most impressive people I ever met, and generally were more interesting and talented than many of the "executives" I worked with. Facilities guys tend to be common sense-oriented, pragmatic, hard working, loyal and honorable. Facilities guys love things that make sense. They want to take ownership of their equipment, take excellent care of it and make it last for 100 years. That is a source of pride for a Facilities guy.

As I cruised down the Overseas Highway past mileage marker 92 I saw a sign on the Caribbean Club "this is the place where Key Largo starring Humphrey Bogart was filmed." I thought about my old Facilities

buddies and how so many of them had the gritty, self-reliance and humbleness of Frank McCloud- Bogart's character in the film. I wondered if the Facilities guys down here would have the same style. I wondered what, if anything they thought of our equipment. In the past, I was always the guy judging other people's equipment. This is the first time that I would be talking to a Facilities guy as the manufacturer. I had to be ready for the jabs and criticisms. After all, this is exactly what I am looking for—feedback.

The facility I am visiting is home to regional Florida state administrative offices as well as an Emergency Evacuation Center. The building was plagued by humidity problems after it opened. The main reason was the classic Temp/Humidity Control Paradox (THCP)—I know I sound like an HVAC geek:

Temp/ Humidity Control Paradox (THCP):

- ▶ Minimum outside air is required at all occupied times.
- ▶ Humidity control is accomplished with the cooling coil and so is cooling.
- ▶ The cooling coil is controlled off space temperature.
- ▶ Therefore, when the space temperature is too high, the thermostat will create a call for cooling (open the chilled water valve for example, or kick on the compressor).
- ▶ Dehumidification will take place as a byproduct of the cooling process (cooling the coil surface to a temperature below the dew-point of the entering air). So in this mode, the hot people and the humid people will both be happy.

- ▶ But when the temperature in the space satisfies the setting on the thermostat, the cooling coil valve closes (or compressor cycles off) and cooling stops.
- ▶ The outside air keeps pumping into the space, but now the chilled water flow has been stopped by the thermostat- no more cold surface available for dehumidification!

After hearing of this 2004 project and its close proximity to the ocean, I decided to take a look and see how our unit held up after 5 years in this environment. After flying to Miami I set out on the 3 hour car ride out the Keys. Now I was finally here. After crossing



a crazy number of bridges and glancing out at glistening, tropical coves that seemed to house the ghost of Blackbeard, I arrived at the Marathon Regional Service Center. I met the Facilities Manager, Terry Graham, who has worked at this site from the time the building opened. Terry was just what I expected. I felt like I was back with one of my old Facilities pals from years back. Humble, dedicated (eating a quick lunch at his desk when I walked into his office) sincere, didn't want to waste too much time on small talk, especially until he could figure out if I was a phony salesman or not (my words- not his). Terry dropped what he was doing to show me around.

The story of this project starts in 2003. The occupants were complaining that the building felt like a swamp- hot and sticky, papers sticking together, HVAC systems never caught up with the load during the day. The state hired Ingemel Engineers out of Ft. Lauderdale to analyze the humidity issue, as well as concerns over excessive energy consumption. The Ingemel team quickly found the root cause of the problem—a clear cut symptom of THCP! The problem was exacerbated by the fact that the ventilation

fans kept running at night filling the building with excessive humidity. When the HVAC systems were scheduled on in the morning, they would do the only thing they knew how to do—cool the building to the temperature set-point. That didn't take long since the evenings usually cooled the building down quite a bit—and once the temperature set-point was achieved, the dehumidification stopped and the untreated air poured in (THCP). The building could never “catch up” because the HVAC system was not designed for this type of loading.

Ingemel turned to Nautica, through conversations with Energy Expert and Professional Engineer Scott Czubkowski of Kerney and Associates of Ft. Lauderdale. Scott had researched all of the available dehumidification technologies and soon realized that Nautica using our patented MSP Technology was the most energy efficient dehumidification systems on the market. Scott worked with Ingemel to design and coordinate the tricky retrofit. One Nautica unit was installed in the 1st floor Mechanical Room and one in the 2nd Floor Mechanical Room. Each of the units takes outside air from stacks that reach high above the facility (to avoid odors from the ground level). The air runs through the MSP coil—the cooling medium is chilled water at 42 F entering temperature—and leaves the



unit at a 50 F dew-point. The dew-point is the control point for the modulating chilled water valve. The outside air design conditions for high humidity are 85 F and 82% RH. The dry air feeds into the outside air intakes of the existing AHU's and mixes with return air. Regardless of the position of the chilled water valve on the AHU's, the building is getting delivery of 50 F dew-point air at all occupied times. Even in unoccupied mode, building dew-point transmitters will activate

the Nautica dehumidifiers if the building gets too humid. This is a great technique to prevent mold growth, furniture damage and other moisture related building problems.

I couldn't believe my eyes when I saw the pristine condition of the equipment. The units are constructed of stainless steel so the outer skins look like brand new. The interior of the equipment is in excellent condition as well. There is some slight rusting on the coil mounts. The heat exchangers—which are constructed of nautical grade aluminum—looked like they just came off the manufacturing line. Condensate was pouring out of the units' drain ports. As I inspected the units and took pictures, I thought about the beauty of our founder—Walter Starks design:

- ▶ Carefully packed super-efficient small plate heat exchangers into a geometrically idealized arrangement. Small plates are the best, and result in much reduced equipment size. Our competitors use large plates, in large equipment
- ▶ Use a vertical airflow pattern to amplify the moisture removal and cleansing process- air horsepower combines with gravity to push all the condensate down and out the condensate drain. All the dirt particles wash away with it!
- ▶ The airflow pattern and manifold arrangement is perfectly configured for easy maintenance and minimal air pressure drop.

I asked Terry how he liked the system. He said that all he has to do is change the filters. “I haven't had to touch the system since it was installed- it just works!” I talked to Terry a little bit about his property nearby- and about what it's like to live out on the islands. Knowing that facilities guys are not big on small talk, I took some pictures with my new friend, excused myself and hit the road back to the mainland. The mission was successful —Nautica Air Systems equipment with MSP Technology withstands the test of time. I can sell this to Facilities guys with a clear conscience...

