

CONCRETE

ROOF

ACRYLIC

Right Roof Solution Can Take The Heat!

BY JENNIFER FRAKES

PHOTOS COURTESY JLK CONSTRUCTORS CO., INC.

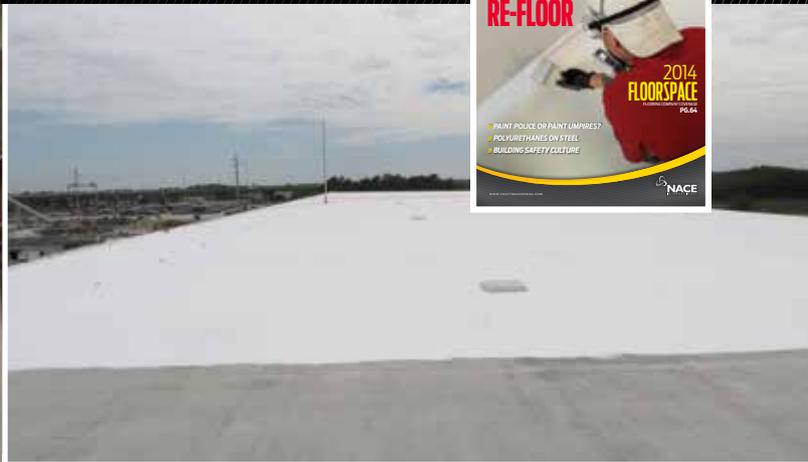
When a building houses high-tech lasers that are sensitive to temperature changes, not having the proper rooftop coating system can wreak havoc, especially in a climate like that of central Florida where temperatures often soar into the high 90s (32° C) during the day and fall significantly once the sun goes down. These types of temperature shifts were causing a major problem for a manufacturing facility owned and operated by FINFROCK, a unique design build firm that utilizes the latest technology to create precast/pre-stressed concrete systems for parking, housing, offices, and mixed-use buildings. In this particular facility, the lasers attached to the ceiling of the building needed constant recalibration due to dramatic temperature swings.

Eager to find a solution that would regulate the rooftop temperature and eliminate the time-consuming task of continuously recalibrating the lasers, FINFROCK turned to J.L.K. Caulking and Coatings for the selection and installation of a coating system that was up to this arduous task. Working with Coastal Construction Products, J.L.K. decided that Mascoat Weatherbloc-IC was the right choice for the job.

According to Justin Kushner, vice president of project management for J.L.K., he and his team have been doing work with FINFROCK since 1995. "We've done the coating, caulking, and waterproofing on at least 150 of FINFROCK's projects, including the original waterproofing of this particular 32,000-square-foot [2,973 m²] facility in Apopka, Florida," Kushner said. "We have a great relationship with them and wanted to help out however we could when they approached us about finding a coating that could control the temperature of the roof."

At the Apopka facility, FINFROCK manufactures its DualDeck Building System, and the lasers that are attached to the ceiling of the building are used for precise measurements during the manufacturing process. "The lack of temperature regulation on the roof of the building was causing the concrete substrate to expand and contract and, therefore, resulting in the repeated recalibration of the laser equipment," explained Kushner. And the constant recalibration of the high-tech lasers was wasting time, money, and resources; FINFROCK wanted a solution to be found as quickly as possible.





Right Roof Solution

At this point, Kushner and the J.L.K. team knew that they needed to call in specialists that could recommend the right product for the job. "As applicators, we don't ever want to assume that we know everything about every coating that's on the market. We like to rely on our resources to help us determine the best product for a particular situation," said Kushner. In this case, their best resource was Coastal Construction Products, one of the southeast's largest independent distributors of sealants, waterproofing, concrete repair, and fire protection.

According to Kushner, Coastal Construction is an authority when it comes to learning about new and innovative products in the coatings industry, so he was confident that they would have a solution for FINFROCK's rooftop temperature differential issue. "Coastal Construction recommended Mascoat's WeatherBloc-IC for the job," said Kushner. Although J.L.K. had not worked with the product before, they were open to trying Mascoat's thermal insulation product.

Trial Run

Mascoat's WeatherBloc-IC is formulated from an advanced system of air-encapsulated ceramic particles suspended in an acrylic binder. It is a water-borne coating that provides protection for substrates requiring thermal insulation. The chemical make-up of the coating and its microscopic particle structure allow it to reduce thermal transfer and stabilize rooftop and building temperatures by reflecting 85 percent of the radiant heat gain back into the environment. "The coating seemed to be the perfect choice for the job, but we wanted to be completely certain before we applied it to the entire rooftop, especially given the size of the facility and the fact that we had never installed the product before," said Kushner.

The J.L.K. team met with representatives from Mascoat, Coastal Construction, and FINFROCK and decided to do a trial run on a section of the building prior to applying the coating to the roof. The crew pressure washed four "double T" concrete panels out of the 40 that exist on the roof. Then they applied the WeatherBloc-IC coating using an airless sprayer at a dry film thickness of 20 mils (508 microns). Once the coating had cured, it was time to measure the temperature on the underside of the panels that received the coating and compare those readings with ones taken on the underside of the non-coated panels. During the time of the testing, it is important to note that the average air temperature was 85° F (29° C).

"Using a temperature gun, we took readings for the 10 percent of the roof area that received the application of Mascoat WeatherBloc-IC. Those areas consistently had readings of 71, 72, or 73° F [21, 22, or 23° C]. These results were amazing, especially when compared to the readings that we got for the uncoated sections of the roof. Those temperature readings were anywhere from 92 to 95° F [33–35° C]," stated Kushner. The Mascoat WeatherBloc-IC had more than proved that it was a product that could regulate the rooftop temperature and eliminate the need for FINFROCK to recalibrate the lasers every time the outside temperature warmed up.



A manufacturing facility in central Florida that houses high-tech lasers was having issues with temperature shifts. Their solution was to hire J.L.K. Caulking and Coating to insulate their 32,000-square-foot (2,973 m²) roof.

Notice to Proceed

After the incredible results from the coated areas of the roof were reported to FINFROCK, J.L.K. was given the go ahead to begin the process of coating the entire rooftop area. The first order of business for the three-man J.L.K. crew was to figure out how to get the equipment, materials, and themselves up to the rooftop that was 50 feet (15 m) off the ground. "There was no stair access, so we needed a safe way to transport everything and everyone up on the roof. We ended up using a Genie S 60X boom lift to gain access to the roof," said Kushner. The crew was outfitted with safety harnesses and were tied off, not only each time they rode in the access lift but throughout the entire duration of the three-week rooftop job.

With the access challenge solved, the crew was ready to clean the concrete surface. They began by cleaning half of the roof area using a Pressure Pro E4040HC Eagle Cold Water

First, the crew ran a trial run of the WeatherBloc-IC on ten percent of the roof. Temperatures between the coated and uncoated areas of the underside of the roof showed a difference of about 20° F (11° C).



JOB AT A GLANCE



The three-person crew members wore safety harnesses and were tied off at all times, including while aboard the high reach access equipment that transported them on and off the rooftop.

Pressure Washer. This aggressive cleaning procedure rids the substrate of dirt, debris, and any other contaminants that could interfere with the adherence of the coating system.

Although many other coating systems require that at least one layer of primer be installed before the body coat application, this extra step is not necessary when using Mascoat's WeatherBloc-IC on concrete substrates. "Once the surface was clean and dry, the crew could start spraying the coating. This enabled the client to save money on materials and labor," said Kushner. Using a Graco GMax II 7900 airless sprayer, the crew put down the coating in two equal passes for an average total dry film thickness of 20 mils (508 microns). During the application process, the crew wore safety glasses, face masks, respirators, hard hats, gloves, and boots.

Once the coating system had been applied to the first half of the 80-foot-by-400-foot (24 m x 122 m) building, the crew repeated the cleaning and coating process on the second half. "It made sense to divide the project this way due to the size of the rooftop and the fact that we didn't yet have all of the coating material that we needed for the job in its entirety. We wanted to get started right away, and dividing the job into two sections allowed us to stay on schedule. By the time we finished coating the first half of the roof, we had received the rest of the material and were ready to complete the job without any delays," explained Kushner.

High-Tech Solution

Overall, Kushner is extremely impressed with the outcome of the FINFROCK rooftop project, as are the rest of the parties involved. "J.L.K., Coastal Construction Products, Mascoat, and FINFROCK all worked together to find a viable solution, and we really did our homework to ensure that the product was the right choice for the job," said Kushner. He is quick to point out that testing an area of the roof was one aspect of the project that stands out as a high point. Not only did the temperature gun test results prove that Mascoat's WeatherBloc-IC would

PROJECT:

Insulate the roof of a facility in central Florida that houses high-tech lasers used in the manufacturing process of precast/pre-stressed concrete systems

COATINGS CONTRACTOR:

J.L.K. Caulking and Coating
900 North Federal Hwy., Suite 208
Hallandale, FL 33009
(954) 493-9797
www.jlkmiami.com

SIZE OF CONTRACTOR:

45 employees

SIZE OF CREW:

3 crew members

PRIME CLIENT:

FINFROCK DMC
2400 Apopka Blvd.
Apopka, FL 32703
(407) 293-4000
www.finfrack.com

SUBSTRATE:

Concrete "double T" roof panels

CONDITION OF SUBSTRATE:

Brand new

SIZE OF JOB:

32,000 sq. ft. (2,973 m²)

DURATION:

3 weeks

UNUSUAL FACTORS/CHALLENGES:

- » The roof had limited access, so the crew used a Genie S 60X boom lift to gain access to the roof

MATERIALS/PROCESSES:

- » Coated ten percent of the roof with the WeatherBloc-IC as a trial run prior to applying the coating system to the entire roof area. The temperature on the underside of the roof was tested in both the coated and uncoated areas on a day with an outside temperature of 85° F (29° C). The coated areas had an average temperature of 72° F (22° C), while the uncoated areas had an average temperature of 92° F (33° C)
- » Pressure-washed the roof prior to the application of the coating to remove all dirt, debris, and contaminants
- » Spray-applied the WeatherBloc-IC at an average dry film thickness of 20 mils (508 microns). The coating was applied in two equal passes

SAFETY CONSIDERATIONS:

- » Wore safety glasses, face masks, respirators, hard hats, gloves, and boots during the application process
- » Wore safety harnesses and were tied off at all times

Right Roof Solution

regulate the rooftop temperature and eliminate the adverse effects of the hot Florida sun on FINFROCK's high-tech lasers, but it also gave the J.L.K. crew an opportunity to work with an unfamiliar coating material before applying it to a huge surface area.

Another highlight of the job for Kushner and his crew was working with a new product. "It is important to be open to trying new products, especially when they are recommended by trusted sources like Coastal Construction Products. It was great to work with Mascoat and see what their products are able to do for our clients," stated Kushner. He is happy to report that J.L.K. will once again be working with Mascoat WeatherBloc-IC in the fall of 2014. "It's a similar type of facility; however, this time the rooftop is 64,000 square feet [5,946 m²]," said Kushner. This will give the J.L.K. crew twice the surface area to demonstrate their application prowess and Mascoat's WeatherBloc-IC double the opportunity to show its thermal insulation ability. **CP**



Over the course of three weeks, the crew members finished the system. They pressure-washed the roof and then spray-applied two passes of the WeatherBloc-IC to achieve an average dry film thickness of 20 mils (508 microns).

VENDOR TEAM

Coastal Construction Products

Coating distributor
3401 Philips Hwy
Jacksonville, FL 32207
(904) 398-7171
www.coastal-fla.com

Genie

Equipment manufacturer
18340 NE 76th St.
Redmond, WA 98052
(800) 536-1800
www.genielift.com

Graco Inc.

Equipment manufacturer
88 11th Ave. NE
Minneapolis, MN 55413
(612) 623-6000
www.graco.com

Mascoat

Coatings manufacturer
4310 Campbell Rd.
Houston, TX 77041
(800) 769-0233
www.mascoat.com

Pressure-Pro

Equipment manufacturer
7300 Commercial Cir.
Fort Pierce, FL 34951
(772) 461-4486
www.pressure-pro.com

Thermal Insulating Coatings and Heat Transfer

By *George More, President and Chairman of the Board at Mascoat*

Imagine walking into an air-conditioned building from the outside summer heat. The rush of cool air escapes past you as the heat forces itself into the interior. In that short time, you are caught in the middle of the heat transfer process and its attempt to have the two environments reach thermal equilibrium. In any area where two different temperatures are in contact, like that brief moment when the doors open into the building, heat will always move from a warmer environment to a colder one to reach that equilibrium. There are three definable methods of heat transfer:

- **Conduction:** transfer of heat by spreading the vibration of molecules through a solid material;
- **Radiation:** transfer of heat by electromagnetic radiation; this energy is transmitted by energy wave, absorbed, and converted to internal energy (heat);
- **Convection:** the transfer of heat due to random molecular motion and bulk motion through a liquid or gas.

To insulate a surface, a material must retard, block, or reflect the heat flow. Typically, most insulation materials insulate by retarding the heat flow via a solid type material, reducing its conductive pathway. Materials such as conventional blanket insulation do this by trapping air within fiberglass/mineral wool/foam style material and mitigate the heat flow over time. Being more specific, this is what is known as the “thermal conductivity” of a material, which then is put into laymen’s terms here in the United States as the R-Value.

The interesting thing is that heat flow can also be blocked by other methods as well. One of these in the marketplace today is Thermal Insulating Coatings (TICs). TICs differ from most conventional types of insulation in a commercial environment. Instead of solely trying to block the conductive form of heat transfer, TICs actually block all three methods of heat transfer described above. To explain how this works, you need to know a little bit more about how they are made.

TICs are usually acrylics or epoxies, and they are filled with insulating materials, which can vary depending on the manufacturer. Most companies use ceramics and silica particulates, along with other proprietary fillers. From a microscopic point of view, the filling particulates of a TIC are the backbone to insulating performance. Many manufacturers use air-filled particles within the binding structure. The air particles

offer anti-conductive features beyond standard coating fillers, similar to trapped air in conventional types of insulation.

Also dependent on the manufacturer is the color of the coating, but the general rule is that the lighter the color, the more effective it is at reflecting the sun’s energy. Along with lighter colors, TICs can use a highly reflective particle composition structure that helps reflect light wave energy (heat) away from the substrate and back to the atmosphere from which it originated. Combined with the light color (such as a reflective rooftop product), this means that the coating returns a great deal of heat instead of absorbing it. A TIC can actually reflect upward of 85 percent of the heat received back to the atmosphere. So while a light or white color helps reflect solar radiation, the interior of the coating is also reflecting heat energy as well. Both of these qualities combined allow the coatings to be extremely effective at blocking the radiation form of heat transfer.

That is how TICs combat heat transfer, thereby producing outstanding thermal efficiency for a very thin material. Their ability to bond to the surface also protects the surface. This helps to mitigate Corrosion Under Insulation (CUI) effects.

In a recent example of a TIC metal building during the summer, the ambient conditions were reaching upward of 45° C (113° F). This brutal heat would help create an oven effect on the building, which caused internal temperatures to reach an astounding 56° C (132° F). By applying only 20 mils (0.5 mm) of a TIC, they were able to bring the temperature down to almost ambient conditions. This is really impressive as the heat transfer is now not entering the insulation where it is really “stored.” In fact, this basically is dealing with the heat before it becomes a problem, rather than absorbing the heat and storing it within the insulation material.

Heat will always travel from hot areas to cold areas, no matter what heat transfer process is used. There are times when one would want to minimize or eliminate this transfer, such as not wanting heat to enter a building, and that is where insulation is needed. By using a Thermal Insulating Coating like the one on the roof of the FINFROCK facility, you have a thin, easily applied protective barrier that fights heat transfer, giving you a versatile solution to many problems building owners have. **CP**