



**“A neat, snug, well-sealed insulation job...**

**And getting done on time. You have to do both.”**



## **Knauf saves time, energy at R A Y M O N D J A M E S S T A D I U M**

January 1, 1995. At the end of a disappointing 7-9 season, the Tampa Bay Buccaneers had little to celebrate. But their outlook brightened considerably a few weeks later, when Palm Beach investor Malcolm Glazer bought the team for a then-record \$192 million. No sooner had the news been announced than team and local government leaders issued a call for a new stadium, to make sure the franchise stayed in Tampa. Four seasons and \$168 million later, the Bucs were enjoying a better record, capacity crowds and a comfortably cool new home—thanks to the trend-setting new Raymond James Stadium and Fiber Glass Duct Wrap from Knauf.



Six-story walls of glass surrounding the Club area lounges contribute to the dramatic effect, but also add significant cooling load.

## Scoring Points FOR COMFORT

If one thing distinguishes the new stadium, it may be the unique way a traditional sports venue has been transformed into an unparalleled experience in entertainment and guest comfort. Gone are the traditional scoreboards and aluminum benches of the 30-year-old Tampa/Houlihan's Stadium that once stood next door. (It was razed after the new stadium opened.) Longtime fans expecting conventional stadium fare are now treated instead to an \$11 million dual video and scoreboard system that features the most advanced technology in the NFL. A massive 160 feet across, the structures feature 92-foot-wide

high-definition television (HDTV) videoboards that can provide three images simultaneously—and require 30 technicians just to operate.

Even touchdown celebrations now have a distinct Hollywood flair. From Buccaneer's Cove above the north end zone, eight cannons from a \$3 million, authentic circa-1800 pirate ship proudly announce each triumphant score by blasting smoke and catapulting tee shirts and soft footballs into the stands.

Improvements in the comfort level for fans are only slightly less dramatic. Conventional concrete and aluminum

bench seats have given way to spacious armchair seats with ample leg room and individual cup holders, even in the general seating areas. More-upscale Club seating areas offer even greater creature comforts, with deluxe padded seats, waiter service, and access to air-conditioned lounges. Another step up in luxury takes fans to the private suites level, which offers the most pampered environment for game-watching, including retractable glass windows, private bars and restrooms, and five television screens so true sports enthusiasts can monitor the latest developments around the league.

A Smith & Casady installer carefully seals the duct insulation in a private suite. Tight schedules required as many as 900 people working on the job site during the last few months of construction.



## Beating THE HEAT

Out of all the appealing comfort upgrades from the old stadium, the one fans and players may appreciate the most—especially since the average temperature at the start of the season reaches a sweltering 90°F—is probably the most basic: air conditioning. Retreats to beat the heat include locker rooms, Club area lounges and all private suites, as well as kitchen and storage areas and offices for the Tampa Sports Authority, the Tampa Bay Mutiny (the Major League Soccer tenant) and the Tampa Bay Sports Commission.

Cooling the Club area lounges alone presented quite a challenge. The sparkling six-story atriums are surrounded by walls of glass, contributing significantly to the dramatic effect but also to the cooling load. The HVAC design challenge was further complicated by the natural temperature differentials from the floor to the 84-foot ceilings and the combination of high ambient temperatures and high humidity levels.

The mechanical engineers, HOK Tampa and M.E. Engineers, had to specify an HVAC system and appropriate insulation levels to ensure guest comfort and also to prevent condensation on ducts in unconditioned areas and even on supply trunks at higher elevations in conditioned areas.

The HVAC system they designed uses two centrifugal chillers, which produce 45°F chilled water, to provide 2000 tons of total cooling capacity. Electric resistance coils provide heating. Air is distributed to the large east and west Club areas via four variable-air-volume air handling units (AHUs) located on the lower service level, one in each quadrant of the stadium. During cooling mode, the hot, humid outside air is pre-cooled to 55°F before being ducted to the AHUs for distribution.

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Approximately 10 smaller AHUs, located on the service level, are used to cool other areas of the stadium, including the kitchen, commissary, offices and locker rooms. Each private suite (there are approximately 160) is cooled with an individual fan coil unit located within the suite. In total, providing conditioned air to all areas in the stadium required more than eight miles of duct, ranging in size from 8" x 12" rectangular low-pressure ducts all the way up to massive round ducts 68" in diameter.

## Breaking A SWEAT

With the chilled water supply temperature coming off the chillers at a cool 45°F, condensation control was especially challenging on supply ducts and even on the air handling units themselves in unconditioned mechanical rooms. To control condensation and maintain system design temperatures, more than 230,000 square feet of 2", .75 PCF Duct Wrap from Knauf Fiber Glass was used on all supply and return ducts in unconditioned areas.

“The combination of temperatures and humidity here makes it tough to prevent surface condensation,” explains Robert Tintera, project manager for HOK Tampa. “It’s hot and humid outside, and even though it’s cooler inside the building, the humidity is still high. So if the temperatures drop just a couple of degrees, we hit the dew point.” While duct insulation prevented sweating on the ducts and plenums themselves, the only practical solution to condensation on the air handling units was “tempering” some individual mechanical rooms. Small dedicated fan coil units were used to lower humidity levels in those rooms only.

(Cut along this dotted line (at 7/8"), but do NOT print the line itself.)



**Providing conditioned air to all areas of the stadium required more than eight miles of ductwork, some as large as 68" in diameter. More than 230,000 square feet of Knauf Duct Wrap was used on supply and return ducts in unconditioned areas.**

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Each suite (left) features a private bar and five television screens, and is kept cool by a dedicated air handling unit. In the high-humidity environment, 2" Duct Wrap from Knauf (center) was used to prevent sweating on ducts and plenums. A massive 160 feet across, the dual video and score-board systems (right) are the most advanced in the NFL and require 30 technicians to operate.



## Working THE CLOCK

The number of challenges engineers and contractors faced in system design was at least matched by the scheduling demands of fast-track construction. When they broke ground in October 1996, the construction managers, Huber, Hunt & Nichols and Metric Constructors, knew the final deadline would not move: Opening day would be the first home game of the 1998-1999 season. And the stadium had to be ready.

The construction team started driving piles two months later (December 1996), and had the stadium ready for the first game in just over 18 months. But it didn't

happen without extensive planning and intense work schedules. "Long before construction, we worked for months on detailed scheduling," says Charlie Prewitt, construction manager for Huber, Hunt & Nichols. "The tight organization and scheduling allowed for design modifications, if necessary." The job site was open 24 hours a day, with weekend and overtime work the norm. At night, crews worked on different phases of the building to avoid overlap in job completion. During the last few months of the job, as many as 900 people were working on site, with up to 200 there on weekends.



### DUCT WRAP

#### PROJECT PROFILE

- **Facility:**  
Raymond James Stadium  
Tampa, Florida
- **Size:**  
19.2 acres
- **Capacity:**  
66,000 for football;  
Expandable to 75,000
- **Cost:**  
\$168.5 million
- **Tenants:**  
Tampa Bay Buccaneers (NFL)  
Tampa Bay Mutiny (MLS)  
South Florida Bulls (NCAA)
- **Architect:**  
HOK Sports Facilities Group
- **Mechanical Engineers:**  
HOK Tampa  
M.E. Engineers
- **Construction Managers:**  
Huber, Hunt & Nichols  
Metric Constructors
- **Mechanical Contractor:**  
John J. Kirlin,  
Florida Division
- **Insulation Contractor:**  
Smith & Casady
- **Knauf Product:**  
Duct Wrap  
230,000 ft.<sup>2</sup>



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At a cost of \$168.5 million, the new stadium (top) provides an unparalleled experience in entertainment and guest comfort. The dramatic six-story atriums in the Club area lounges (right) contributed to the HVAC system design challenge because of the significant temperature differentials from the floor to the 84-foot ceilings.

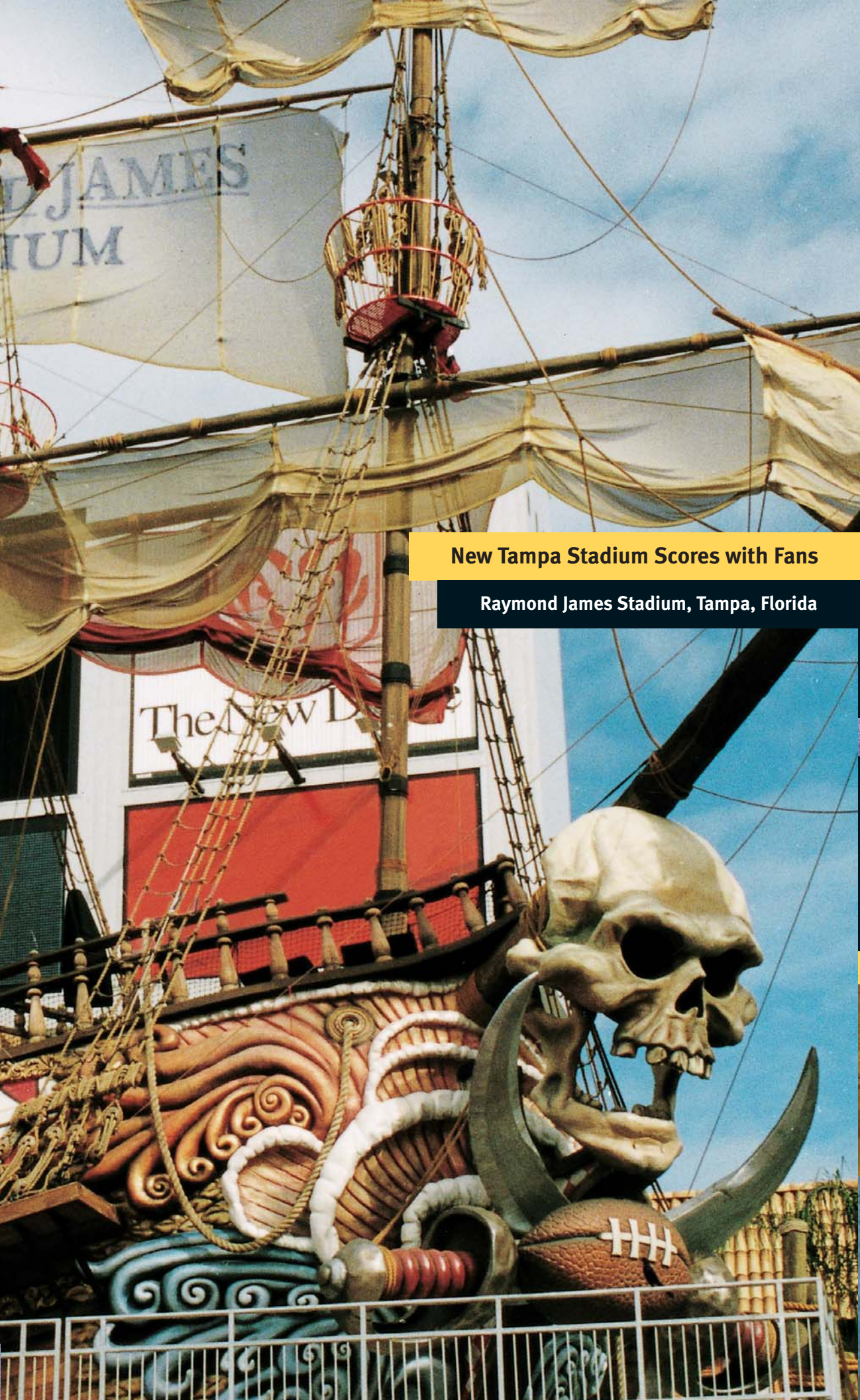


## Fast Cuts TO THE GOAL

The fast-track nature of the project and the precise scheduling required the insulation contractor, Smith & Casady (Tampa), to move quickly and coordinate closely with other trades. Project superintendent Steve Ladd said Smith & Casady had 12 months to insulate the entire stadium, so installers had to pay close attention to detail to ensure a quality job on time. "The quality of our job is really determined by two things," he says. "First, it has to be a neat, snug, well-sealed insulation job. You can tell that just by looking at the finished ducts. The other thing is getting done on schedule. You have to do both."

According to Ladd, meeting both of those demands requires a high commitment to quality by installers and a high level of consistency in the product. "When you're making hundreds of cuts a day, you don't want to mess with dust or chunks of glass that slow you down and dull your knife," he says. "And you need jacketing that stays put. One of the reasons this job went so well was that the duct wrap was so consistent and easy to work with. That makes cutting and installing it easier and faster."

Speed on the part of Smith & Casady and other contractors paid off. The Tampa Bay Buccaneers opened brand-new Raymond James Stadium in grand fashion on September 20, 1998, soundly trouncing the Chicago Bears 27-15. And while the new stadium's upgraded cooling system couldn't provide relief for the Bucs out on the field, it did ensure that the only reason their fans on the Club and Suite levels got heated up was the celebration of another resounding victory.



**New Tampa Stadium Scores with Fans**

**Raymond James Stadium, Tampa, Florida**



**KNAUF**

**Field Bulletin**

Knauf Duct Wrap helps fans and contractors keep their cool.

**This is my insulation.™**

