

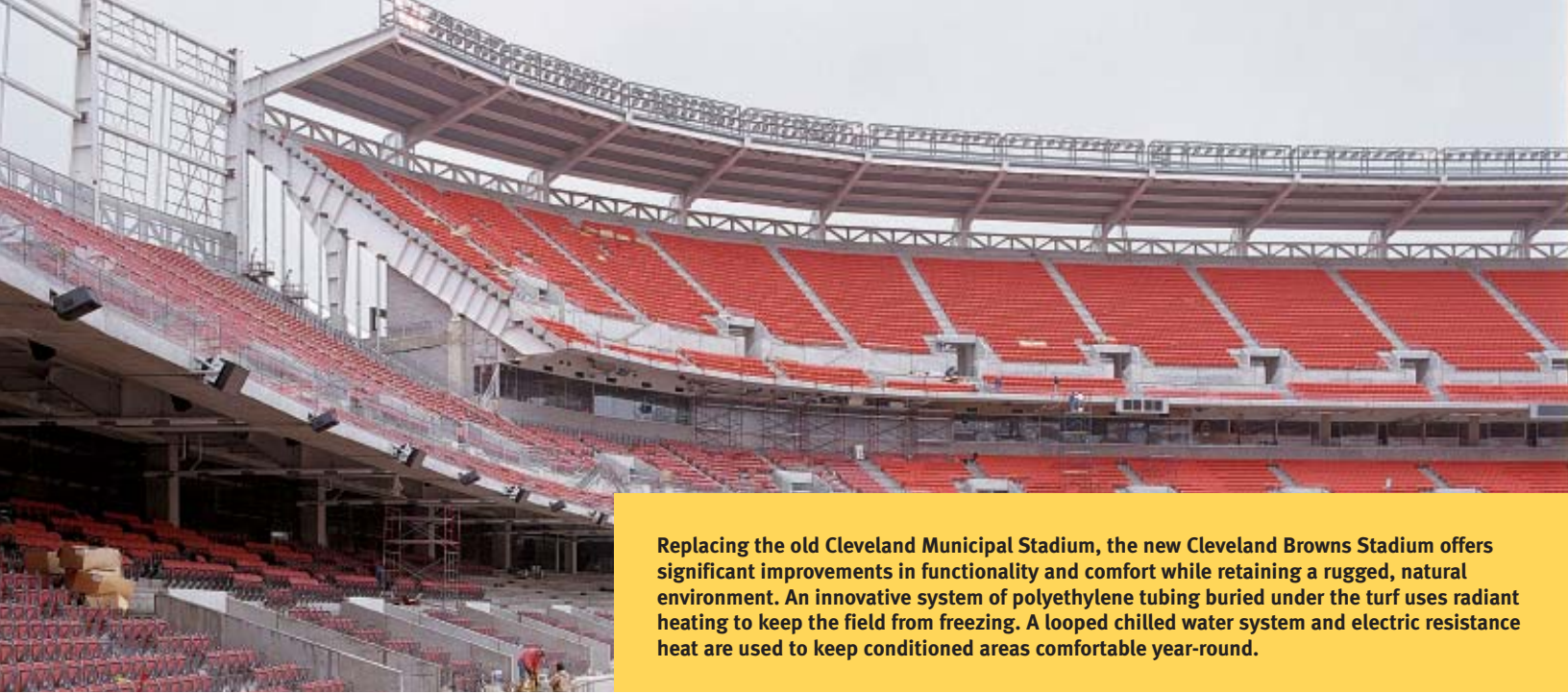
“On a job of this size with this kind of timeline,

there’s no room for error.”

## Fans bid farewell to frozen tundra at C L E V E L A N D B R O W N S S T A D I U M

If Cleveland Browns fans had an official dictionary, it would take an entire page to define *tradition*. When Browns owner Art Modell announced in 1995 that he was moving the team and its 50-year legacy to Baltimore, fans reacted with the fury of a Lake Erie squall. The following year, the city struck an unprecedented deal with the NFL to return the Browns to the field in 1999 and ensure that the original team name, colors and heritage would remain in Cleveland.

So when plans took shape for a new facility which would, naturally, defy corporate sponsorship trends by sporting the simple moniker *Cleveland Browns Stadium*, fans insisted on retaining the open-air, natural turf environment that had become synonymous with blizzard-battling, rough-and-tumble Browns football. Yet fans were willing to make a few small concessions. They bid a fond farewell to the “frozen tundra” immortalized by the legendary voice of NFL Films’ John Facenda. And they even added a few creature comforts to shield themselves from the cold, harsh winters on the Cleveland lakeshore. Both were made possible with the help of fiber glass insulation from Knauf.



Replacing the old Cleveland Municipal Stadium, the new Cleveland Browns Stadium offers significant improvements in functionality and comfort while retaining a rugged, natural environment. An innovative system of polyethylene tubing buried under the turf uses radiant heating to keep the field from freezing. A looped chilled water system and electric resistance heat are used to keep conditioned areas comfortable year-round.

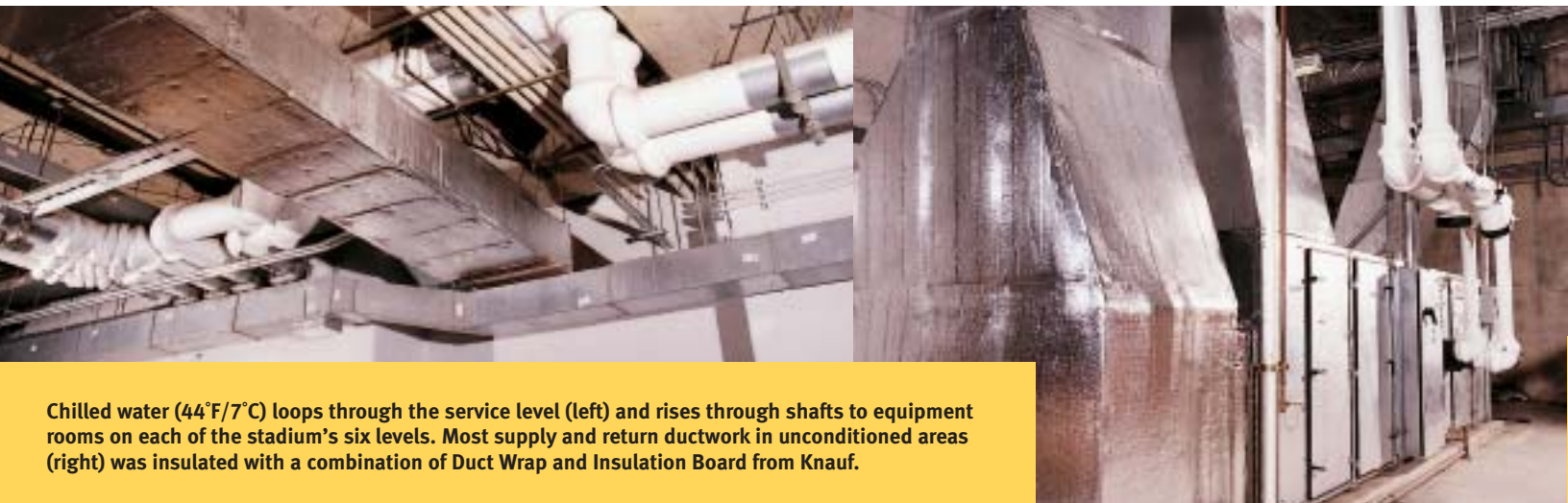
## Creating a Stadium WORTHY OF ITS FANS

One tradition fans were not willing to sacrifice was the preeminent—almost revered—status the Browns hold in the city. So, they created a temple worthy of their idols. At an official cost of \$283 million, the city-owned stadium is impressive by almost any standard, even the NFLs. The massive open-air structure, built with concrete, glass and natural stone accents, occupies a 31-acre site on Cleveland's lakeshore and soars to the equivalent height of a 12-story building. Its 1.64 million square feet of space includes pillar-free seating with unrestricted views from anywhere in the stadium. Designed for football or soccer, it can seat over 72,000 fervent fans (on the rare occasions when they sit down), including those fortunate enough to enjoy one of the 135 luxury suites.

The new stadium replaces the old Cleveland Municipal Stadium, which was built in 1931 and served as the home to the Browns and the Cleveland Indians until a few years ago. Ground was broken for the new stadium early in 1996, and it was completed in August 1999, just in time for the first home game of the 1999-2000 season.

State-of-the-art technology enabled the architectural firm, Hellmuth, Obata & Kassabaum (Kansas City, Mo.), to offer significant improvements in functionality and comfort in the new facility while retaining the rugged, natural environment that is an essential part of the Cleveland football experience.

For example, an innovative system of polyethylene tubing (40 miles worth) buried eight inches under the turf uses radiant heating to keep the field from freezing and extend the growing season—for *natural* grass, of course. An array of high-tech, integrated electronic video, scoring and communications equipment includes two of the largest video screens in the world (30' x 97') and 1,200 television monitors located throughout the stadium. And a special water booster system ensures that suction and system pressures (50 and 80 lbs.) are sufficient to supply an average of 340,000 gallons of domestic water to the 2,200 plumbing fixtures in use on game days.



Chilled water (44°F/7°C) loops through the service level (left) and rises through shafts to equipment rooms on each of the stadium's six levels. Most supply and return ductwork in unconditioned areas (right) was insulated with a combination of Duct Wrap and Insulation Board from Knauf.



Most chilled water supply and return lines (left) were insulated at a 1" thickness; outdoor lines received 2"-thick insulation and were heat-traced. Roof drains (right) were insulated with 1"-thick 1000°F Pipe Insulation from Knauf and covered with white PVC jacketing to provide weather protection and a more attractive finished appearance.

## A new level of comfort IN SEASON AND OUT

To keep indoor areas of the stadium comfortable all year round, HOK designed an HVAC system that uses three 400-ton air-cooled chillers, along with fan-powered VAV boxes with electrical resistance heat. Ceiling-mounted cabinet unit heaters are used in concession areas and public bathrooms. Air-conditioned areas include the luxury boxes/suites, club lounges, locker rooms, security offices and the commissary.

Chilled water loops through the service level and rises by way of four shafts to equipment rooms on each of the stadium's six levels. The system includes 32 full-size air handling units (capacities from 3,000 to 29,000 CFM) and 120 VAV boxes, all with resistance heat. Each of the 135 suites has its own fan coil unit for custom temperature control.

Domestic hot and cold water piping, roof and sanitary drains and interior chilled water supply (44°F/7°C) and return piping were insulated with 1"-thick 1000° Pipe Insulation from Knauf. Chilled water lines located in exterior walls or where they would be exposed to ambient temperatures had 2"-thick insulation and also were heat-traced. Air intake ducts and most supply and return ductwork in unconditioned areas were insulated with a combination of Insulation Board and Duct Wrap from Knauf. Insulation Board was typically selected for exposed areas because its rigid form and smoother facing would provide a more-finished look. In total, more than 120,000 square feet of Duct Wrap and Insulation Board from Knauf was used to insulate the air handling system.

Heat for the radiant field heating system is provided by nine gas-fired boilers, which maintain the

glycol/water solution temperature at 65°F. The supply piping from the boilers was insulated with 1000° Pipe Insulation from Knauf (1") to the point where it drops underground and branches out to the field.

## Staying out of HOT WATER

Despite the technological innovation and comfort orientation in the stadium design, there was one item that was perilously sacrificed (temporarily) during the value engineering process: hot water for public bathrooms. But the thought of washing their hands on bone-chilling Cleveland winter days with no hot water caused the local media and fans to cry foul and the situation was quickly rectified.

Of course, the associated plumbing upgrade required 20,000 feet of extra hot water pipe to be laid—bringing the total length of piping at the stadium to over 11 miles. And while the change made peace with fans, it created additional challenges for subcontractors, who were under pressure to meet Cleveland Mayor Michael White's famous project edict: "On time and on budget."

But subcontractors like Insulation Specialty (Cleveland) still found time to make additional recommendations to improve comfort and save the city money in the long run. "The original specifications were very general, so we upgraded a lot of them once the job



Despite design changes and the communication challenges inherent on a project with seven mechanical contractors, the stadium was completed on schedule. From left: Pat Welch, Knauf Fiber Glass; John Strieter, Bay Insulation of Ohio; Joe Krueger and Bob Blair, Insulation Specialty.

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At an official cost of \$283 million, the new Cleveland Browns Stadium occupies a 31-acre site on the shores of Lake Erie. The concrete, glass and natural stone facility spans 1.64 million square feet.



## PROJECT PROFILE

- **Facility:**  
Cleveland Browns Stadium
- **Size:**  
31 acres, 1.64 million sq.ft.  
12 stories high (equivalent)
- **Capacity:**  
72,500

started,” said Joe Krueger, project manager for Insulation Specialty. “Most of the upgrades we recommended were for better condensation control, appearance and protection from the weather.”

Krueger’s recommendations included upgrading insulation thicknesses on outdoor chilled water pipes from 1” to 2” thicknesses and using white Proto® PVC jacketing on roof drains, even though they weren’t directly exposed to the weather. “The PVC jacketing helps protect the insulation jacket from wind and day-to-day weathering,” he said. “It also gives it a shiny, attractive appearance, which is important in exposed applications. So, even though this was a fast-track job, we thought it was important to

make some recommendations to the engineer because we could provide some clear long-term benefits.”

### A step ahead OF THE CROWD

Insulation Specialty’s willingness to recommend insulation upgrades at the new stadium was based on its 20-year track record and experience with other similar jobs in Cleveland, such as Jacobs Field (the Cleveland Indians’ stadium). The company’s history, expertise and proven ability to get the job done on time and on budget were valuable assets to the mechanical contracting firm, a joint venture between Reliance Mechanical and Gorman-Lavelle. The job was so big from a plumbing and HVAC perspective that

- **Cost:**  
\$283 million
- **Building Owner:**  
City of Cleveland
- **Facts:**  
Open air, natural grass stadium  
40 miles of buried tubing to heat turf  
11.65 miles of plumbing pipe
- **Architect/Engineers:**  
Hellmuth, Obata & Kassebaum  
Kansas City, Mo.  
Robert P. Madison  
Cleveland, Ohio
- **Mechanical Engineers:**  
URS Greiner Corp.  
San Francisco, Calif.
- **Construction Manager:**  
Huber, Hunt & Nichols  
Indianapolis, Ind.
- **Mechanical Contractor:**  
Reliance/Gorman-Lavelle  
Cleveland, Ohio
- **Insulation Contractor:**  
Insulation Specialty  
Cleveland, Ohio
- **Insulation Distributor:**  
Bay Insulation of Ohio  
Cleveland, Ohio
- **Knauf Products:**  
1000°F Pipe Insulation (65,000 ft.)  
Duct Wrap (100,000 sq. ft.)  
Insulation Board (20,000 sq. ft.)

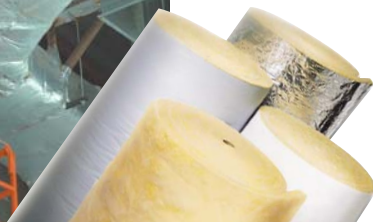
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### 1000°F PIPE INSULATION



### DUCT WRAP



### INSULATION BOARD



## Customer Service

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the two large competitors joined together to bid and manage it; seven mechanical contractors worked on the job in total.

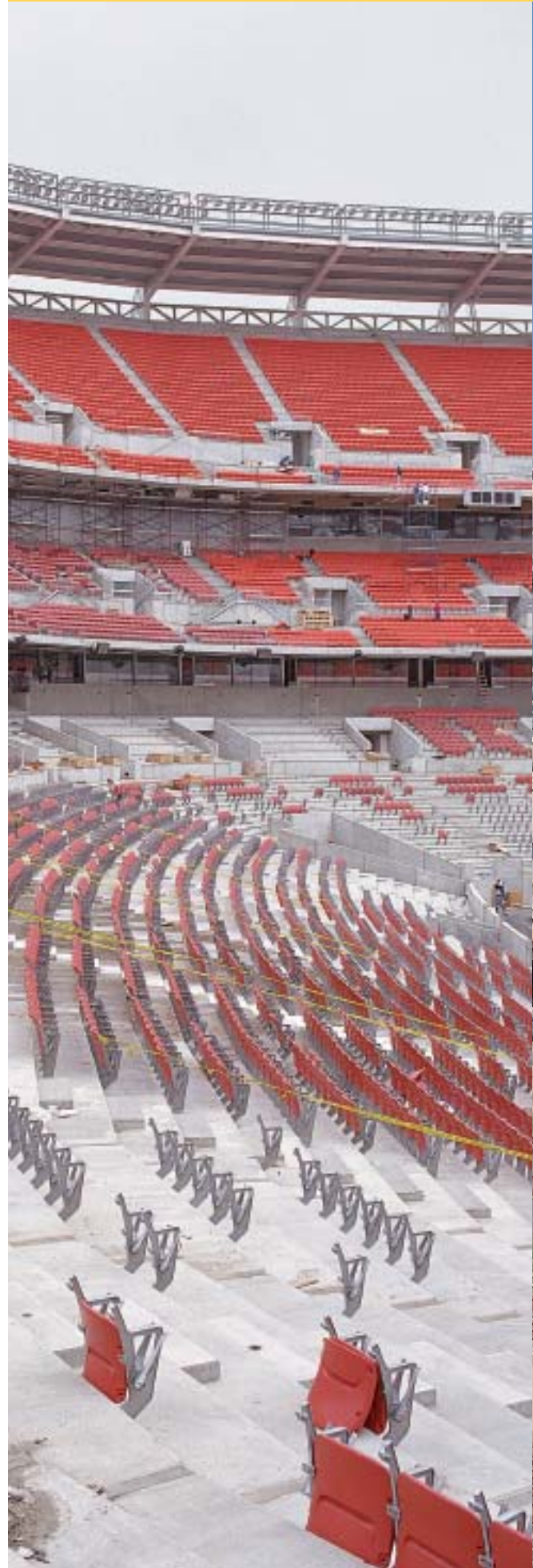
“On a job of this size with this kind of timeline, there’s no room for error,” says Jim Neiheiser, project manager for Reliance/Gorman-Lavelle. “It’s critical that our subcontractors know what they’re doing and keep up with the schedule. I need to be able to count on them. If the insulation crew falls behind, the masons and other subs will literally bury their work.”

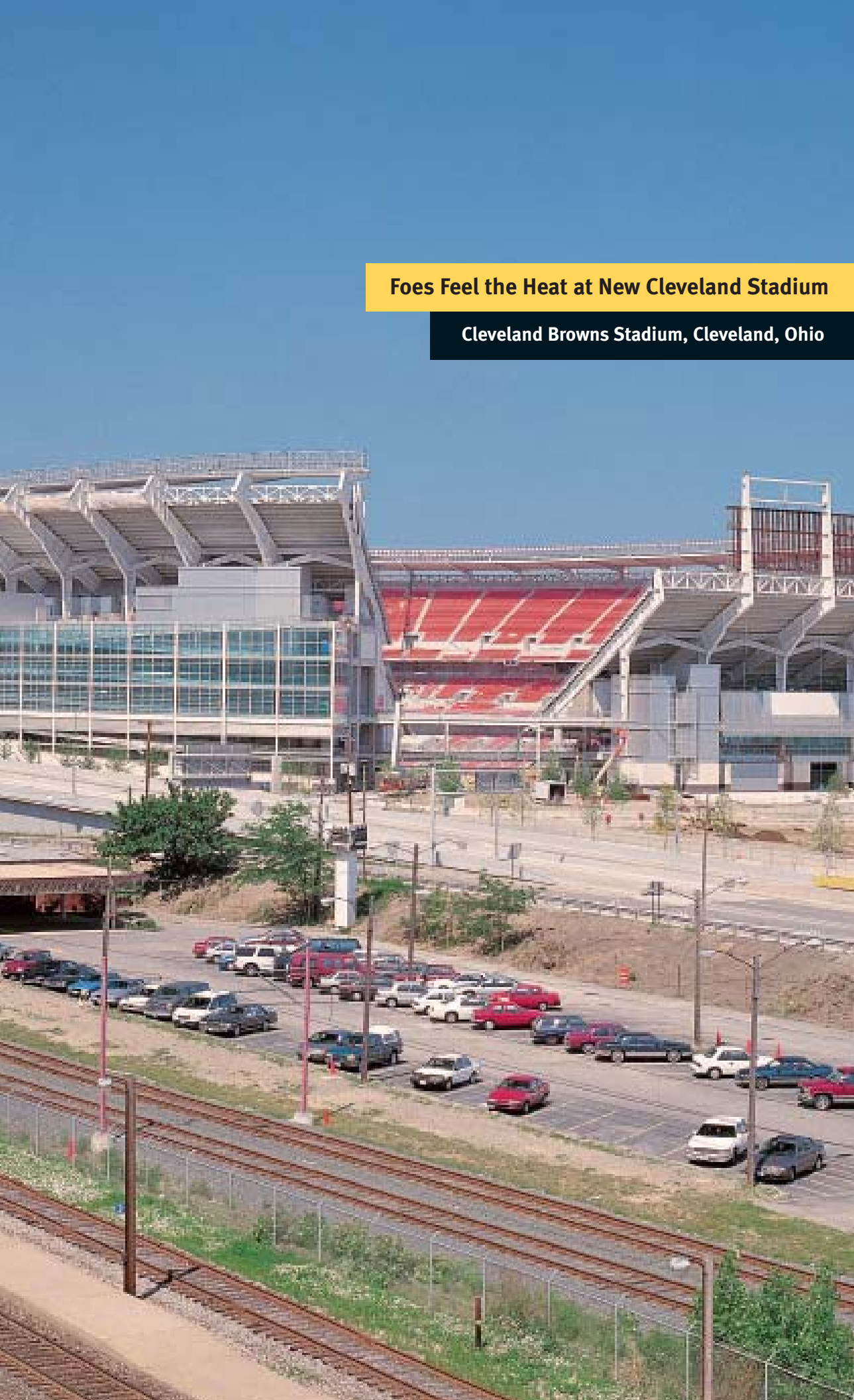
Despite the time pressure, Krueger says his crew didn’t have to cut corners. “All the concealed work looks just as good as the exposed areas, even though no one can see it,” he explains. “These guys did a professional job and they got it done on time.”

**“All the guys straight up and down the line would rather use the Knauf material, whether it’s the pipe insulation, the wrap or the board.”**

Krueger says his crew attributes their ability to meet the project’s grueling schedule in part to the ease of handling the Knauf material. “The Knauf pipe insulation is much more dense, which makes it easier to dig out, and in general just nicer to work with,” he says. “All the guys straight up and down the line would rather use the Knauf material, whether it’s the pipe insulation, the wrap or the board. I don’t really care what material they use, but when it comes to being able to work fast and meet schedules and budgets, it makes a difference whether they like the material or not. Their productivity affects our bottom line.”

The new stadium rises as high as a 12-story building and seats 72,000. Pillar-free seating offers zealous fans unrestricted views from anywhere in the facility.





**Foes Feel the Heat at New Cleveland Stadium**

**Cleveland Browns Stadium, Cleveland, Ohio**



**Field Bulletin**

Knauf insulation helps Browns give a warm welcome.

**“This is my insulation.”™**

