Welcome to Carrier’s Newest Chiller Plant
CHARLOTTE, NC
Customer Satisfaction Equals Success.

It’s only common sense: Customer satisfaction is the root of success. And it’s the very foundation of one of the most advanced chiller plants ever to open its doors. Welcome to Carrier’s new chiller plant in Charlotte, NC — where every action, every policy, every operational detail focuses on keeping Carrier synonymous with “quality.”

Customers worldwide continue to demand Carrier chillers and their exceptional quality. The Charlotte plant represents a direct response to this need — a $30 million investment in chiller excellence, the latest in Carrier’s ongoing technology initiative in chiller manufacturing. Under its roof, state-of-the-art technology combines with innovative production methods and customer-focused operations to produce the Evergreen line of centrifugal and screw chillers — all to meet customers’ specific needs for dependable performance, and timely delivery.

Open since 1999, the plant is reaping the benefits of its customer-first approach with large numbers of orders and high production volume. And behind it all is what we call Charlotte Pride — the attitude of the people who make the plant work, of people who proudly enjoy showing our customers how the world’s best centrifugal and screw chillers are made.

Innovation and Flexibility Equal Customer Satisfaction.

Manufacturing world-class chillers such as Carrier’s Evergreen line requires steady focus on critical objectives like cost-effective production, reduced customer lead times — and most importantly, product quality. To achieve these goals, the plant relies on the power of flexibility and innovation:

• **Flexibility through simplicity:** Any of Carrier’s rotary chiller products, from 150 to 1500 tons, can be built on a single assembly line, giving us the flexibility to meet any customer product need any day of the year.

• **Flexibility through technology:** In an effort to reduce customer lead times, Carrier has employed a new and proven technology for moving key components and assembled units through the chiller production line. The innovative AeroGo lifts eliminate the need for overhead cranes, providing unprecedented flexibility and significantly improving product cycle times.

• **Superior unit integrity:** Cooler and condenser tube support bundles are welded into a superstructure using other functional components of the unit, such as cooler distribution flow assembly, subcooler box, and splash channels, reinforcing overall shell strength of coolers and condensers. This construction method provides added strength to the components, which protects them when they are disassembled into modular forms and rigged in various directions to pass through tight fits into buildings.

• **Stringent quality control:** Stringent quality control checkpoints — 89 checkpoints in all — occur at every step of the manufacturing process from the reception of certified ASME shell stock to final inspection. Each checkpoint is recorded by serial number and retained on file.
You’ll find evidence of our customer-focused, quality-minded approach throughout the Charlotte plant, in every workstation and in every employee.

Compressor Assembly.

Transmission Assembly
Here’s where the quality begins, with preset components that make maintenance easy for our customers. Balanced motor rotors are matched with the main bull gear. The assembly is then rebalanced in a dynamic balancer, after which the rotor and shaft are assembled into the transmission housing with thrust and journal bearings. The assembly’s unique design creates a preassembled transmission that cannot be misaligned during insertion into the compressor and that can later be removed for service without risk of misalignment.

Bolting to Main Compressor Housing
The chiller’s easy-service design, with both ends of housing affording access, eliminates the need for expensive overhead cranes in mechanical rooms. The motor shell is assembled here, along with the front aerodynamic components, oil pump, refrigerant oil cooler, and interface electrical panel. The compressor assembly is now a self-contained package capable of operation when connected to a power source, allowing the full operation of the compressor to be confirmed.

Burst Testing/Compressor Run-In Testing
Here, the compressor undergoes just one of the many test series that ensure rock-solid performance. A proof test of over 232 psig (1600 kPa) confirms that the compressor is leak-free and meets design pressure ratings. The compressor then undergoes rigorous mechanical run-in testing to verify proper operation and record specified vibration levels.

Preparation and Paint Booths
High-pressure cleaning and drying, as well as primer and finish coating, occur in the Preparation and Paint booths. Compressors may be delivered for assembly on the chiller or to the shipping station for shipping to other Carrier plants. The Charlotte facility supplies centrifugal compressors to plants in China, France, and South Korea.

Cooler and Condenser Assembly.

Crib 100 Receiving Area for Cooler and Condenser Shell Stock
The shell stock is ASME Section 8 certified, fully traceable by content, manufacturers’ production codes, and other compliance markings. The stock is cut in the flat on a plasma flame table under water, producing a smooth edge to meet stringent ASME fit-up requirements. The shell is then rolled to a true circle and sent to the shot blast chamber for cleaning and to tack and robotic weld stations for seam welding. This critical seam is then x-rayed to ensure a full penetration joint. This is a critical third-party, quality inspection phase.

Subassembly Stations
Innovation is the operational principle here. Flanges and pipes are welded to make suction and discharge connections, along with heat exchanger internal superstructures, to add strength to the condenser shell. Similarly, a cooler support bundle benefits from welded strength and uses part of the structure for even flow of refrigerant into the bundle. Note that assemblies are now mounted on a unique cart — the AeroGo unit — which moves them from station to station on a bed of air, a more efficient and flexible method than overhead cranes.

Welding
Preassembled water box and tube sheets are welded to shells by full-penetration girth weld with a robotic welder. Then, in tubing stations, patented cooler and condenser tubes are inserted into perfectly aligned tube holes in the tube sheets and support superstructures. A double groove on the tube sheet connection creates a leak-free joint and doubles seal life. The joints are then leak tested.

“People talk about making world-class chillers. In Charlotte, we show them how it’s done.”

Dave Roth
General Manager
Business Unit
Marriage of Heat Exchangers, Mounting of Compressors

At this station, the modular design is aligned and assembled to provide leak-free joints. A prealigned fit-up simplifies field reassembly should the unit need to be disassembled during a tight fit into a building.

Burst Test House

The AeroGo unit moves several thousand pounds of metal to this station, where the unit is connected to pressure connections in a sealed chamber. The unit is then proof tested at 252 psig (1600 kPa) to meet rigorous ASME Section 8 Pressure Vessel Code requirements. This test is the final of several leak tests that enable Carrier to achieve a design leak rate of 0.1% annually.

Hydro Test Stations

The chiller water side is tested at 1.5 times the design pressure rating of the water box to verify the absence of water-side leaks. The Evergreen chiller has optional water box designs up to 400 psig (2757 kPa).

Paint Preparation Booth

The chiller gets a full primer coat and finished acrylic coat — a proven and environmentally safe rust preventative — as well as a finished look that will be the highlight of any facility room.

Final Electrical

The controls are mounted and wired using wire trays and conduit. Electrical panels are prepainted baked enamel to prevent rust. The Evergreen chiller requires only two power connections from the customer’s source, and only one if the chiller has a mounted starter or VFD. This saves expensive electrical work when installed.

Final Packaging

As the Charlotte plant ships chillers throughout the world, each one is carefully labeled with its designation and shipping requirements. These labels include the U.S. Department of Transportation chemical permit, which identifies chillers that are allowed to ship with a full charge of refrigerant. By pre-charging refrigerant at the factory, installation and start-up time is significantly reduced.

Insulation

The chiller receives either no, partial, or full 0.75” thick UL-approved closed foam insulation, with a skin layer that, when painted, is hard to distinguish from painted metal. The Evergreen chiller now has a clean, uncluttered look.

“Building in Quality and Innovation.”

Performance Test Lab

This Air Conditioning Refrigeration Institute (ARI) certified lab can test units from 150 to 1500 tons, 208 volts to 7.2 kV, as well as 50 and 60 Hz power. In the background is the control center, with a customer lobby above — where plant visitors may watch as our technicians perform customer-requested ARI 550/590 Standard testing.

Shipping

The Evergreen chiller is designed to fit into standard containers, for problem-free shipping throughout the world. Its small size allows standard trucks to be used for domestic shipments.

Mechanical Room

See our chillers at work here. The room houses three Evergreen chillers — one 550-ton and two 800-ton units. The system is on a full Carrier Comfort Network (CCN) with Carrier’s 39T-Series Air Handlers, demonstrating that Carrier not only builds world-class chillers but relies on them to maintain its production operations.

“I thought the factory was presented in a very professional way. They also bring the potential client inside the guts of the machine. As a result, we were able to fully appreciate the quality of work that goes into a Carrier chiller from a vantage point we had previously missed.

“The entire staff made our group feel welcome and important to their business. The presentation did a great job of answering our questions and helped us understand the unique features of Carrier chillers. I would recommend the factory visit to any company exploring the purchase of new chillers.”

Allan Burgess
Fluor Daniel Engineering
Progressive production processes are only half the story at Charlotte. Equally important is the flexible workforce culture that’s built upon communication and trust, and emphasizes a team approach. The plant’s layout flows from this outlook, keeping workers and management visible and accessible to one another and promoting efficiency. This partnership between skilled, motivated employees and cutting-edge technology is the key to producing the highest-quality units possible — and to attaining our ultimate goal of exceptional customer satisfaction. And at the very heart of both the approach and its result is Charlotte Pride.

Organizational Efficiency Promotes Innovation and Flexibility.

“My philosophy is to communicate with the workforce early and often. By building and maintaining a culture of trust through visibility and accessibility, we nurture an environment where each employee is dependent on the other to maintain world-class levels of safety, quality, and customer satisfaction.”

Jim Ferguson
Plant Manager
and 20-year manufacturing veteran

Quality in Numbers

Location: Charlotte, NC
Size: 310,000 sq. ft.
Initial Investment: $30 million
Employees: 190
Established: 1999
As a result of our attention to quality control, every unit made at Charlotte not only meets the Pressure Vessel Standards of ASME Section VIII — it exceeds them. Through its Boiler and Pressure Vessel Committee, ASME (American Society of Mechanical Engineers) establishes and maintains rigorous, safety-related design, construction, and inspection standards. To meet them, chillers must perform under conditions up to seven times more demanding than typical operating conditions. Every fit-up, weld, x-ray, and pressure test is verified by a third-party inspection.

No chiller ships from the Charlotte plant without meeting this high standard for excellence. Carrier has registered over 200,000 pressure vessels with the ASME National Board, a record no other manufacturer in the industry can match.

See for Yourself.

For more information, or to arrange a tour, contact your nearest Carrier Representative or visit our Web site at http://www.carrier-commercial.com.

As the world leader in Heating, Ventilation and Air Conditioning, Carrier is committed to continually improving the quality of comfort we provide to our customers.

But our level of responsibility extends well beyond...

Carrier Corporation has identified six specific areas which directly impact how we, as a world manufacturer, balance our customers’ needs for comfort with the environment’s needs for responsible consumption.

These symbols graphically represent our six areas of concentration and will serve as visual reminders of the importance of managing our finite resources.

Each one of us at Carrier Corporation believes that, for generations to come, success will not only be measured by the quality of our products and systems, but also by how we have improved the quality of life.