

Engineers and Contractors to the Glass Industry



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HENRY F. TEICHMANN, INC.

Engineers and Contractors to the Glass Industry

an affiliate of **dck WORLDWIDE**

Engineers Construction Management

Henry F. Teichmann, Inc., an affiliate of **dck worldwide**, is a world leading Glass Process Engineering Contractor dedicated solely to the glass industry. Since 1947, we have been providing turnkey projects that include engineering, procurement, construction and project management to clients worldwide. Those projects consist of complete float, fiberglass and container plants. HFT also provides those turnkey services for specialty plants such as sodium silicate, borosilicate tubing, tableware and pressware, pattern glass, environmental waste, lead crystal and hand glass.

Henry F. Teichmann, Inc. owns world renowned lehr manufacturer E.W. Bowman's design and technology. Today, HFT is the sole approved supplier of new Bowman Lehrs, parts and service.

For over seven decades, the Henry F. Teichmann, Inc. team of experts has been the industry leader in quality products, engineering and services.



The Founders, Leaders and Their Legacies



Henry F. Teichmann

*For more than seven decades
the Teichmann family and their
team of experts have been the
industry leader in quality products,
engineering and services.*

Since 1947, Henry F. Teichmann, Inc. has grown and progressed on the principle: Satisfied clients are our most important asset.

We take great pride in our reputation and expect to continue to improve and innovate as engineers and contractors to the glass industry. We promise to be worthy of the position we have earned and achieved within the glass industry.

We guarantee you will be completely satisfied because you, the customer, are our most important asset.

"In February, 2020 – An investment group led by Stephen F. D'Angelo, the owner, and chief executive officer of Pittsburgh-based construction company, dck worldwide acquired Henry F. Teichmann, Inc., positioning Teichmann as an affiliate and strategic partner of the construction firm that has completed building projects in 125 countries. The affiliation will elevate Teichmann's turn-key multidiscipline construction capabilities, with enhanced dedication to safety, quality, project cost and schedule."



Our employees are practical, conscientious, ethical and experienced in every phase of the glass industry. As a result of our clients' success, we have become recognized worldwide as one of the largest independent Engineers and Contractors to the Glass Industry.



Stephen F. D'Angelo
Chairman of the Board



Mark F. Piedmonte
President

TURNKEY SERVICES

The key to the success in turnkey projects is to seamlessly integrate

- Engineering
- Procurement
- Construction
- Project Management

Henry F. Teichmann, Inc. has successfully implemented glass projects around the world by using a turnkey project approach. All activities of building a turnkey plant are coordinated and cost, schedule, safety, technical specifications, performance are properly managed and prioritized throughout the project. The clients are placed in the center

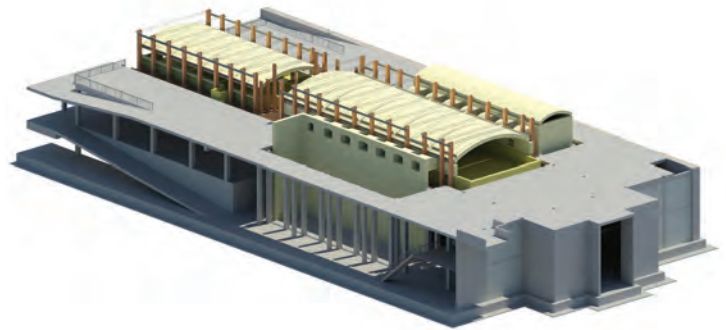
of the process, with regular project review meetings and periodic updates and reports.

With the turnkey services, projects of any size typically see reduced cost, shortened schedules and better coordinated activities. Larger rebuilds and Greenfield projects benefit the most.

Engineering and Technical Services

The Engineering Team of Henry F. Teichmann, Inc. is known as the "Problem Solvers of the Glass Industry." With several hundred years of cumulative engineering experience in the glass industry, by employing state-of-the-art computer software programs, the latest AutoCAD release and 3D design tools and software, as well as high speed internet connections, the HFT Engineering Team provides clients the benefits of the most recent technological and communication advances. Designs can be done in metric or U.S. systems.

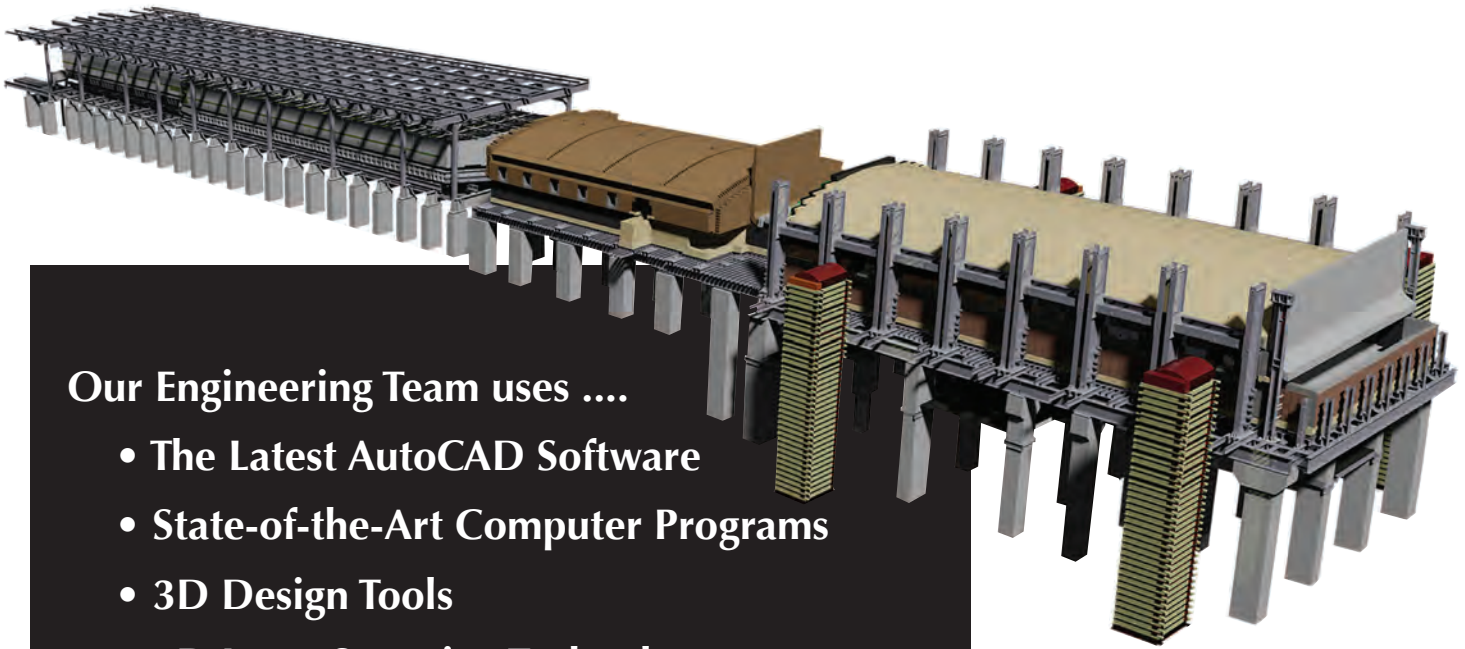
The HFT engineering staff has the most extensive experience in the glass industry. Each engineer specializes in one area of the complete project requirements of our customers.



Part of our Engineering Services is Technical Services. HFT Technical Services are responsible for new technology analysis, operator training, start-up and heat-up assistance and periodic furnace operation analysis. Whether the job involves a 250 lbs/day hand glass furnace or a 1000 MTPD float glass furnace, HFT Technical Services' broad range of experience can solve even the most difficult of problems.

Clients have the option of working under a yearly Technical Service Agreement or on an as needed basis. Our clients who choose to enter into the Technical Service Agreement receive a yearly furnace inspection and full report. This agreement also locks in the travel, onsite and office rates for the year. Either way, experienced Teichmann employees are always available when the client calls.

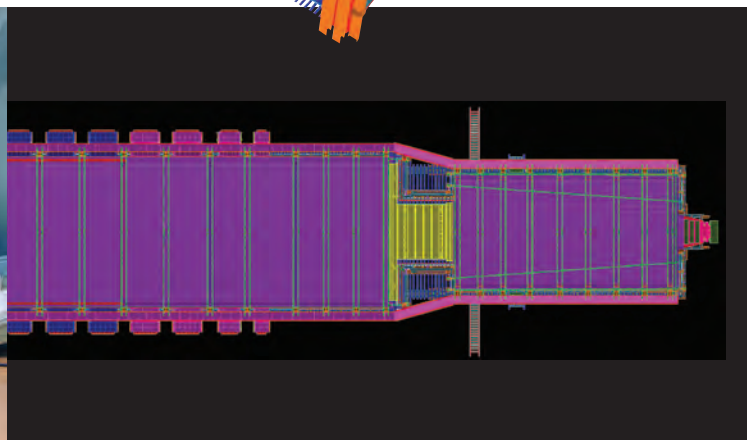
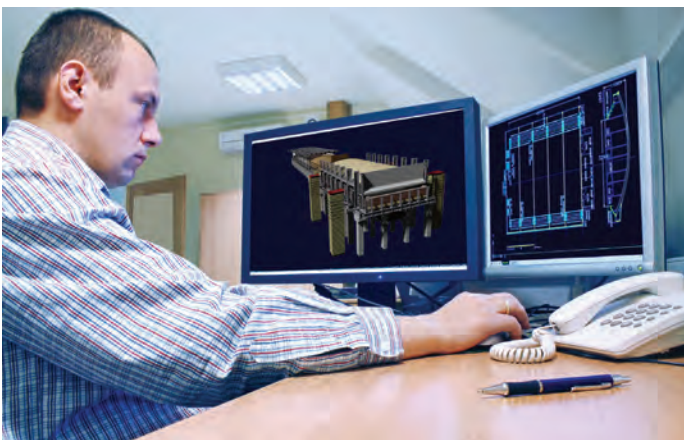
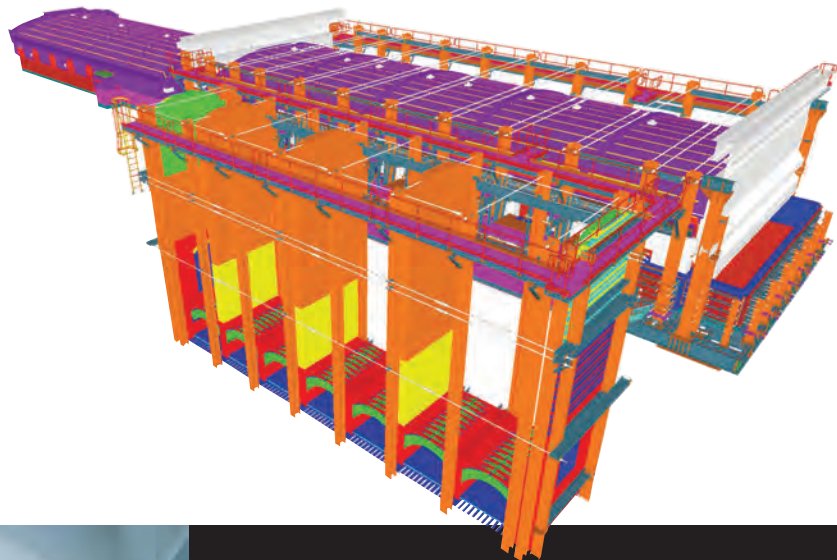




Our Engineering Team uses

- **The Latest AutoCAD Software**
- **State-of-the-Art Computer Programs**
- **3D Design Tools**
- **3D Laser Scanning Technology**

Using HFT's 3D design capabilities, we can walk our clients through the design process better than ever before. 3D design makes visualizing how the whole design comes together easier, and allows for in-depth review and clash detection as well. Areas that are difficult to conceptualize, complex stack-ups of materials, and extremely large designs are all easily visualized using HFT's 3D capabilities.



Construction

The HFT Construction and Field Services Team is recognized throughout the world for its outstanding record of on-time, under budget and safety performance for the construction of glass facilities.



Our highly trained and experienced project managers, supervisors, superintendents and craftsmen are among the most respected in the industry. The leadership, initiative and attention to detail provided by these people, together with thorough planning and engineering practices, have enabled HFT to achieve this reputation in over 40 countries world-wide.

Hot & Cold Repairs and Rebuilds

We design, build, rebuild and repair all types of glass producing facilities, including furnaces, batch plants, forming, annealing, cold-end/finishing and plant utilities. Our rebuild and repair activities cover refractory, electrical, mechanical, steel structure, piping and ductwork, controls, instrumentation, and basically everything inside the glass plants.



Our construction projects range from Greenfield projects to major modification of manufacturing plants to meet the demands and quality requirements of our customers. We provide complete turnkey supervision and skilled tradesmen for all of the disciplines listed here.

- Refractory installation
- Civil and Building Work
- Structural Steel
- Mechanical Installation
- Electrical Installation
- Piping System Installation
- Control and Instrumentation
- Robotic Refractory Demolition





Furnace hot and cold repairs are an integral part of HFT projects. Ranging from small overcoats to complete furnace rebuilds, HFT is able to handle all aspects of the project. We are able to offer services from furnace drain, demolition and material disposal, through to complete installation, hot seal and heat up; covering all areas of civil/structural, refractory, steel, piping, electrical and sheet metal work. HFT has become synonymous with consistently completing projects safely, on schedule and on budget, while meeting client specifications and requirements, without costly change orders; HFT has the experience to offer superior quality standards and reduced project risk.



Project Management

The strength of Henry F. Teichmann, Inc. is its ability to provide a total "Turnkey Systems Approach" to Project Management.

In the United States or overseas, our ability has been proven from greenfield site development through final plant start-up and production. For a plant expansion or totally new plant, HFT has been the general process contractor on plants that range from 30 to 1000 MTPD.



In carrying out a project, HFT deploys its technical resources by forming a project team to handle all necessary activities to complete a project. These tasks include:

- Quality Control
- Schedule Control
- Subcontractors Management
- Pre-Operation Checkout
- Safety Control
- Materials Control
- Labor Management



Procurement

The Henry F. Teichmann, Inc. Purchasing team has many years of unparalleled experience in worldwide sourcing. Our purchasing team knows where to find the best source of qualified supply that fits the budget. We have implemented vigorous programs in quality assurance and vendor price/performance verifications. Over the years HFT has purchased hundreds of millions of dollars of goods for the glass industry, almost half of that being refractories. This gives us tremendous purchasing power since we have positioned ourselves to be a complete turnkey (engineering, procurement and construction) provider in the glass industry.

HFT's Purchasing Team has worked with international freight forwarders for decades and developed excellent contacts. We use only the most cost-effective freight forwarders who deliver the cargoes to the sites on time and safely.

Before placing orders, HFT's procurement personnel makes assessments of equipment and materials for price, quality and lead time to assure the selection of the best vendors. HFT has qualified providers of material, equipment and services and can make the best purchases both at home and abroad.

Equipment ordered undergoes stringent inspection for both quality and safety standards and documentation is recorded for shipping, customs, banking and government regulation requirements. After fabrication, equipment and materials are delivered to the site according to field construction schedule. Detailed studies examine transport limitations and restrictions when large, oversized shipments are involved. For overseas projects, meteorological and transport factors, seaworthy packaging and stowage are given top consideration. HFT shipping team covers planning, packing, customs clearance, import applications for various kinds of formality and on-site deliveries.



- **Basic Procurement Planning**
- **Inquiries**
- **Quotation Analysis**
- **Vendor Selection**
- **Subcontracting and Purchasing**
- **Manufacturing Schedule Control**
- **Packaging and Shipping Control**
- **Documentation**
- **Customs Clearance and Import/Export Formalities**



TYPES OF PLANTS

Henry F. Teichmann, Inc. has successfully implemented glass projects around the world by using a turnkey project approach. All activities of building a turnkey plant are coordinated and cost, schedule, safety, technical specifications, performance are properly managed and prioritized throughout the project. The clients are placed

in the center of the process, with regular project review meetings and periodic updates and reports. With the turnkey services, projects of any size typically see reduced cost, shortened schedules and better coordinated activities. Larger rebuilds and Greenfield projects benefit the most.

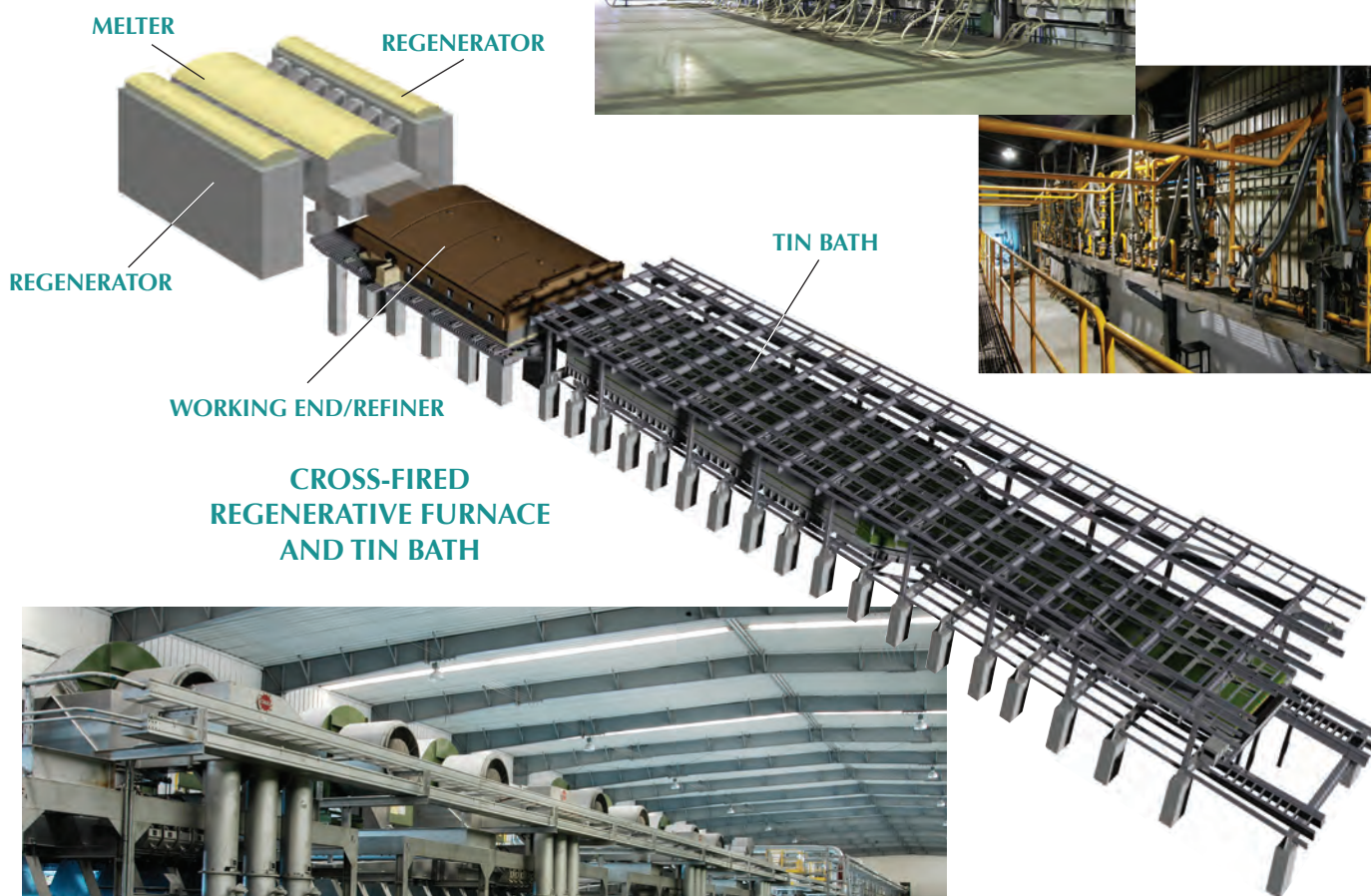
Float Glass Plant

For over a half a century, Henry F. Teichmann, Inc. has participated with many different companies in the transition from the vertical draw to the float process. The continual re-engineering of the float glass process over the years has revolutionized the flat glass industry, achieving a consistently higher quality product. Today we take for granted the design and process requirements that have produced the increase in quality and production rate while decreasing the fuel consumption and environmental emissions.

HFT is capable of designing and building complete production facilities for all type of float glass including architectural, automotive, coating and electronic float glass, ranging from ultra-thin to ultra-thick, low tonnage to high tonnage and ultra-clear to privacy tint.



If your requirement is for the rebuild of an existing furnace or a turnkey project for a new facility, HFT has the resources and technical expertise to help you achieve the next level of quality and environmental improvements that the future will demand.



TYPES OF PLANTS

Fiberglass Plant

Henry F. Teichmann, Inc. continues to meet the needs of the ever-changing fiberglass industry by providing fossil-fuel melters, electric melters, direct fired melters and oxy-fuel technologies. Redesign of existing process technology has become a specialty of HFT as increased production, higher yields and environmental regulations are now the driving force behind the changes in process design.



DOGHOUSE

HFT ha proporcionado hornos que varían de 35 a 250 toneladas por día de producción de aplicaciones de fibra de vidrio para lana de vidrio, filamentos continuos, filamentos troceados y operaciones de otro tipo.

THROAT

MELTER

FIBERGLASS
FURNACE

FOREHEARTHS

CONDITIONING
CHANNEL

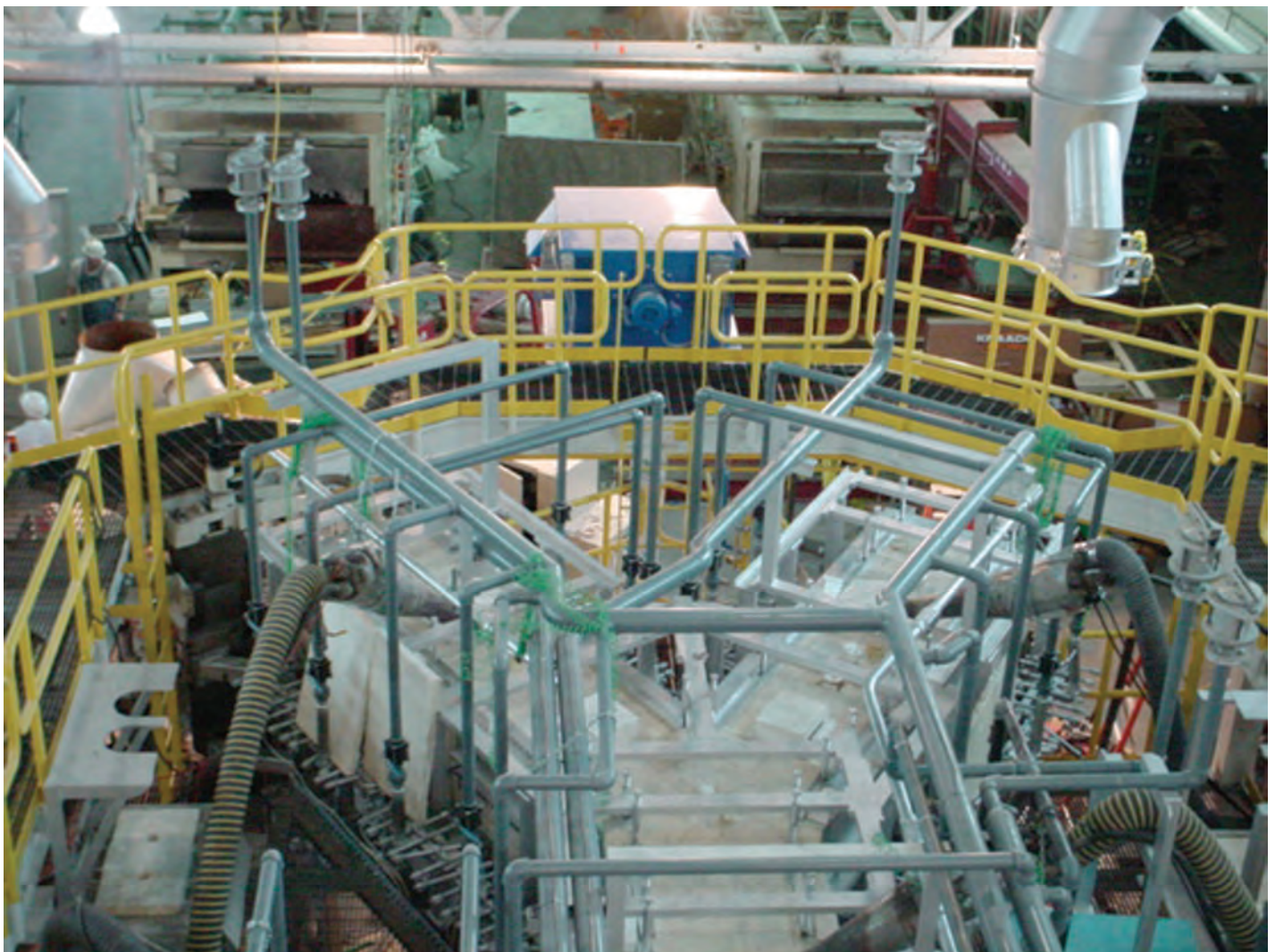


TYPES OF PLANTS

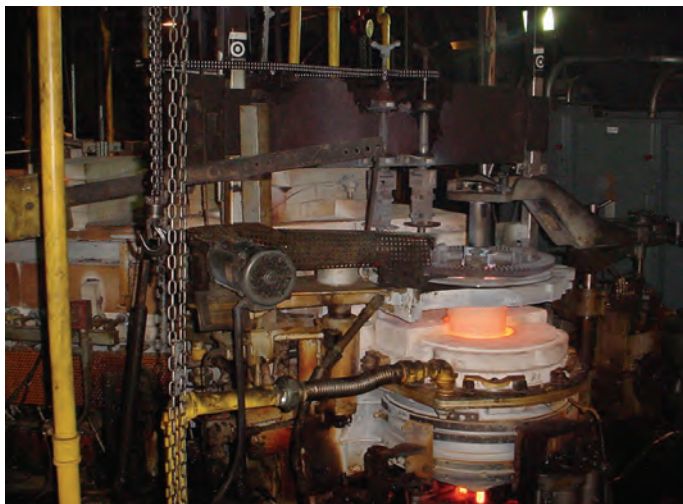
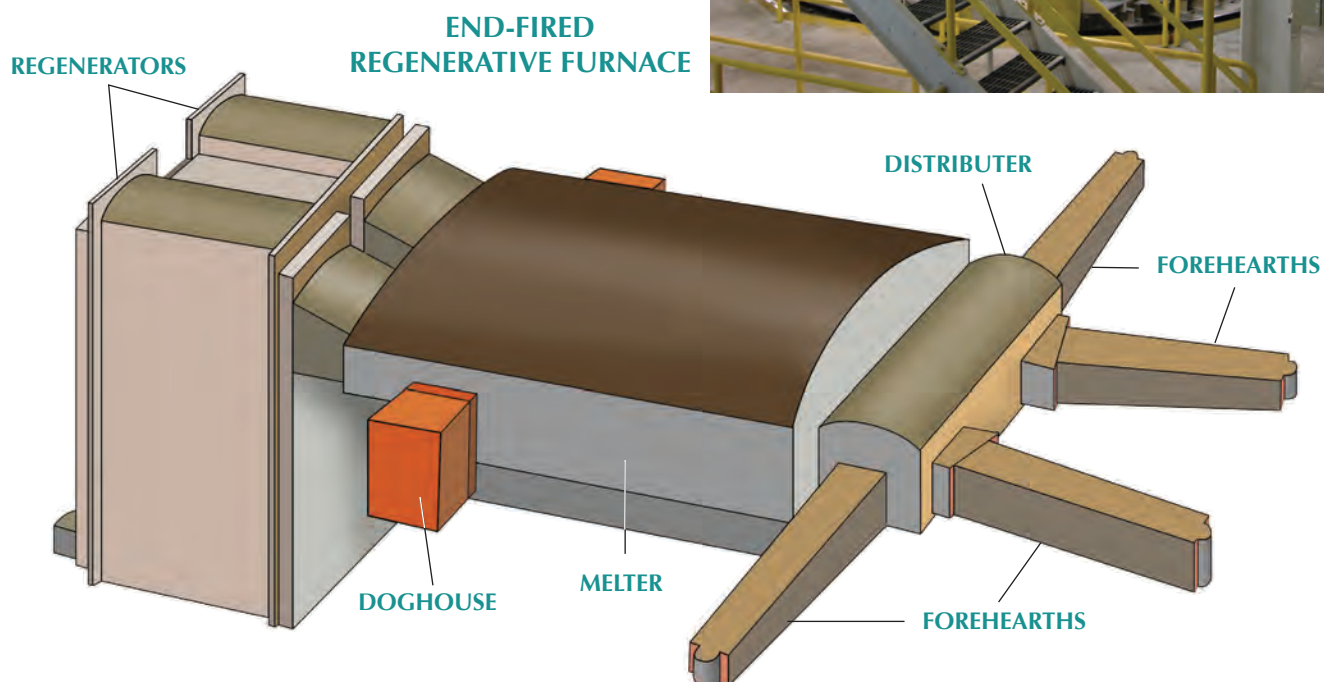
Container Glass Plant

Henry F. Teichmann, Inc. has designed, built and commissioned complete process facilities for high quality container glass operations. In doing so, we have established a worldwide reputation for technical excellence, safety, environmental concern, outstanding customer service and effective cost control.

Our commitment to total quality performance is evidenced in the design and construction of plants and furnaces that meet the individual clients needs in industrialized and developing countries.



HFT has also updated furnaces, supplied complete decorating lines and modernized annealing and quality control operations to help our clients maintain a strong competitive position in the market place. We also provide our clients with replacement parts or equipment for any area of their facility.



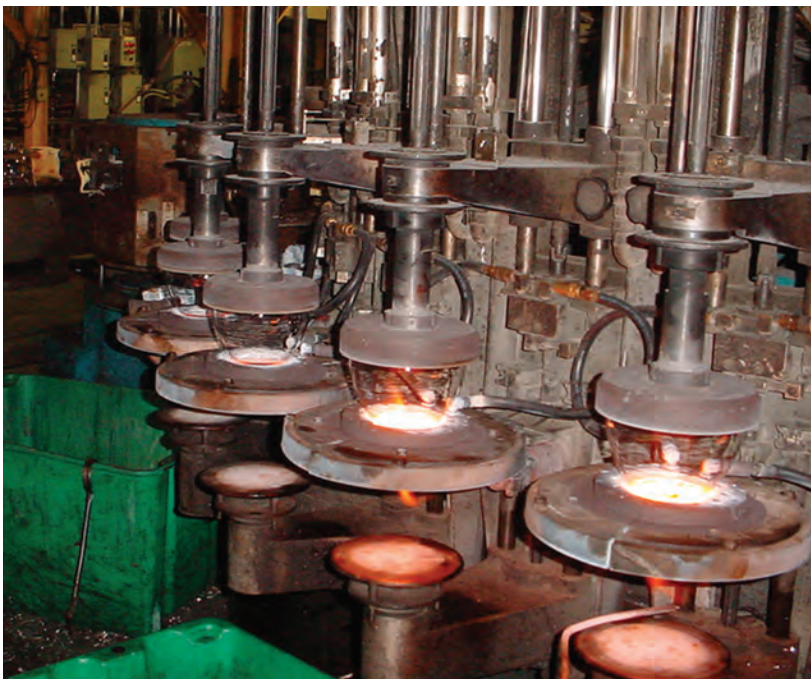
Specialty Glass Plants

Since its inception, Henry F. Teichmann, Inc. has engineered and constructed virtually every type of glass furnace. Our expertise ranges from small day tanks to large float glass melters and from lead crystal to the increasingly more important environmental waste recycling furnaces. HFT personnel have the widest experience in specialty and pressed ware production of any private glass engineering firm.

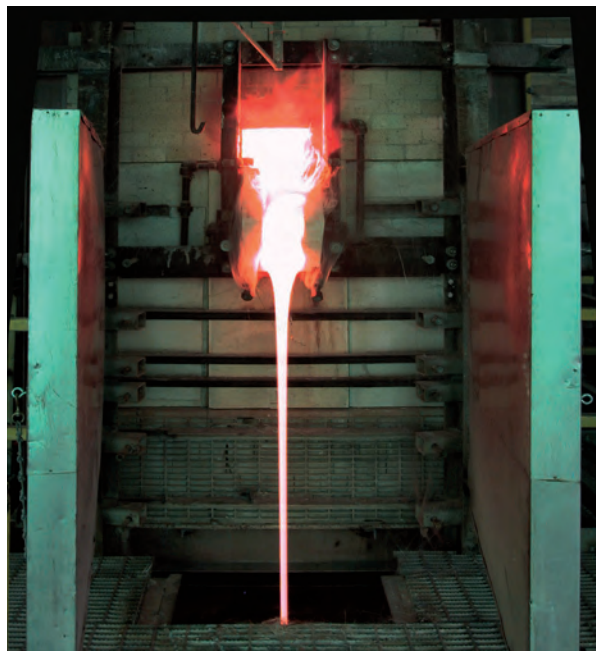


TYPES OF SPECIALTY GLASS

- Sodium Silicate
- Borosilicate Tubing
- Foam Glass
- Lead Crystal
- Television
- Environmental Waste
- Hand Glass
- Pattern Glass
- Tableware
- Pressware



Our employees are experienced professionals who are capable of designing, engineering and constructing any type of glass manufacturing plant that our clients require. We are extremely knowledgeable about plant layout criteria and design concepts that are essential for a fully integrated glass manufacturing facility.



Oxy-Fuel Furnace

Our furnace engineers have provided furnace designs that are now operational producing float glass, container glass, fiberglass as well as other types of glass. Oxy-fuel furnaces are the perfect solution because they significantly reduce or in some cases eliminate emissions from the glass melting process. Its merits also include fuel consumption reduction, glass quality improvement, operation and maintenance convenience, and future repair cost savings.

Henry F. Teichmann, Inc. is the only independent engineering and contracting firm in the world that has successful experience in designing and building Oxy-Fuel float glass furnaces.



Henry F. Teichmann, Inc. has been developing oxy-fuel technology since 1986 with several major float and fiberglass manufacturers. We have designed and built many oxy-fuel furnaces for fiberglass, TV glass, container glass and specialty glass applications. HFT converted the first conventional float furnace to oxy-fuel in 2000. Teichmann's engineers continue to improve the oxy-fuel furnace designs by utilizing the latest advances in technology.

DOGHOUSE

MELTER

FLUE

OXY-FUELED
FURNACE

WORKING END/REFINER



Oxy-fuel firing has many advantages over conventional firing. Here is a list of those advantages.

- Reduces NO_x and CO₂ emissions
- Reduces fuel consumption
- Reduces initial capital investment
- No reversal system
- No checkers or regenerators to maintain
- Improves glass quality
- Facilitates operation
- Stabilizes process

As pollution requirements become more stringent and energy costs rise, oxy-fuel firing is becoming more widely accepted solution.

TYPES OF PLANTS

Batch Plants

Henry F. Teichmann, Inc. has designed and installed all types of batch plants, cullet systems and batch handling systems. The production of quality glass products begins with the selection, processing, storage, blending and delivery of quality raw materials to the glass melting furnace. Our batch plant systems are designed to deliver a batch quality that meets each individual client's specific requirements in an efficient and cost effective manner. These systems range from low volume manual operations to fully automatic high capacity facilities.



We consider the physical and chemical characteristics of all the batch materials when designing each component of the batch system. As an example of the versatility of our firm in this field, our engineers and construction team have on several occasions built completely new automatic glass plants around obsolete batch plants without interrupting glass production.



Annealing Lehrs, Decorating Lehrs & Thermal Solutions



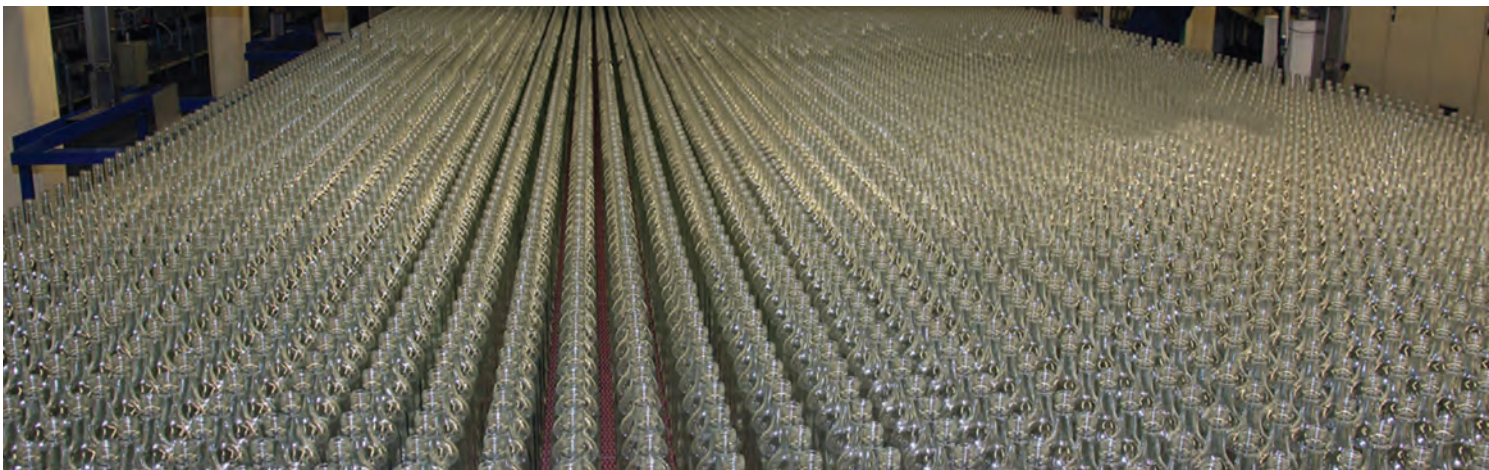
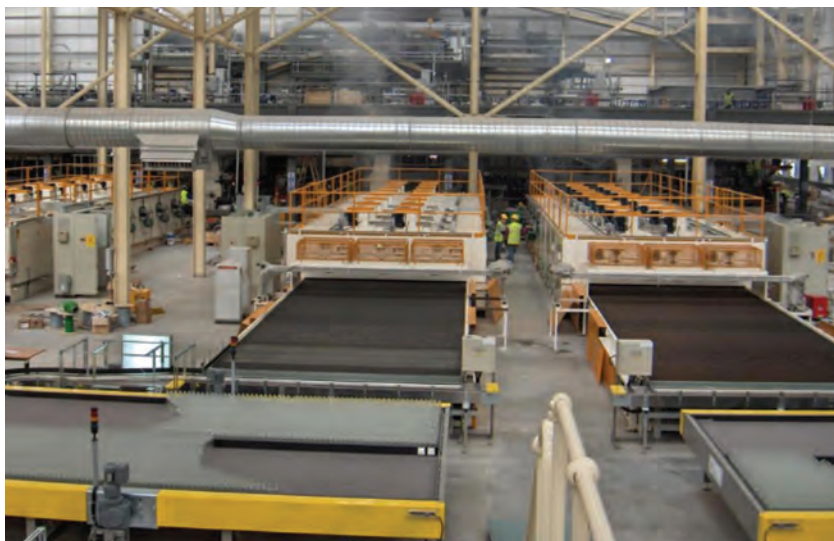
In May 2017 Henry F. Teichmann, Inc. proudly announced the acquisition of E.W. Bowman's design and technology. Today, HFT is the sole approved supplier of new Bowman Lehrs, parts and service, further strengthening its position in the global glass industry.

This began in 1959 when Bowman was established as an engineering and general fabrication company under the ownership and direction of Combustion Engineer, Edward William Bowman. Soon after, Bowman began to manufacture and supply their own design and brand of Annealing Lehrs to the glass container industry. Their very first Lehr, sold that year, is still operational today at a small art glass company located in West Virginia.

E.W. Bowman specializes in supplying highly efficient and robust Annealing Lehrs, Decorating Lehrs & Thermal Solutions for the global glass industry. Further complementing its product line Bowman offers complete turnkey installations, start-up support, training, annealing consultation, overhauls, servicing, upgrades and replacement parts.

Today, more than 1,200 Bowman Lehrs are operating on six continents, in over 56 countries. Bowman is the preferred Lehr for glass containers, tableware and lighting manufacturers worldwide.

Bowman Lehrs modular recirculating Lehr design offers new versatility with belt widths up to 5.6m (18.5 ft) and speeds of up to 5m/min (16 ft/min).



Products and Services

Products

- Annealing Lehrs
- Ceramic (High Temperature) Decorating Lehrs
- Organic (Low Temperature) Decorating Lehrs
- Dual Belted Lehrs
- Glass Block Annealing Lehrs
- Glass Bending Lehrs
- Glass Fiber & Insulation Lehrs
- Hardening Lehrs
- Striking Ovens
- Special Heat Treatment Kilns
- Burn Off Ovens
- Glass Forming Mould Pre-Heating Ovens
- Lehr Belt Cleaning Brushes
- Fire Polishers

Industries

- Container Glass
- Tableware & Pressware
- Fiber Glass
- Lighting Glass
- Pharmaceutical Glass
- Borosilicate & Tubing Glass
- Kitchen Ware
- Specialty Glass

Bowman Lehrs feature high quality stainless steel interiors, belt frames and ducts in all heated modules; direct drive recirculation fans; heating via highly efficient gas package burners or electric heating elements; mineral fiber board and ceramic fiber insulation for maximum heat retention; heavy duty state-of-the-art drive systems; fully automatic digital controller instrumentation or PLC/HMI touchscreen interface; long warranties and exclusive production guarantees.



10 YEAR WARRANTY

No other Lehr supplier offers up to ten (10) year warranties or can rival our exclusive First Bottle Annealed and Set Point Empty Guarantees. Please contact us for more information on how these can add value to your production line.



Annealing and Decorating Lehrs

Our Lehrs use Bowman's almost 60 years of Lehr building experience within the global glass industry, coupled with the latest technology to supply the most robust, maintenance free and energy efficient Lehr available in the market today.



Rebuilds and Repairs

After sales support is a responsibility we take very seriously, supporting our customers with value-added services worldwide. That includes our ability to upgrade Lehrs to increase their productivity and fuel efficiencies. And regardless of the make of the Lehr, Bowman has developed a highly efficient system for Lehr upgrades that ensures fast turnaround to restore production in minimal time.

Parts and Service

Bowman has always been synonymous with quality. However, even the highest quality equipment still requires minimal periodic maintenance to maintain its efficiency and productivity. Our experienced technical staff is on hand to provide efficient, professional and reliable servicing on Lehrs regardless of the make. We also offer a full range of spare parts for both new and existing legacy equipment. Contact lehrparts@hft.com for a quotation.



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