COMPREHENSIVE PRODUCT & SERVICES OVERVIEW

Integrated Industrial Solutions. Seamless Implementation.

ENGINEERING • INSPECTION • SPECIALTY MECHANICAL

www.furmanite.com
INTEGRATED INDUSTRIAL SOLUTIONS.
SEAMLESS IMPLEMENTATION.

GET TO KNOW THE COMPANY YOU THOUGHT YOU KNEW.

6 CONTINENTS
85+ FIELD OFFICES

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WHAT WE DO

We provide the value of lean efficiencies through a single-contract, integrated-services approach that yields a comprehensive Asset Life Cycle Solution. Our professional project management assures the seamless implementation of the full range of our services and products portfolio into a single solution — integrating our design, inspection, and specialty mechanical services from concept through construction, commissioning, operation, and decommissioning.

ENGINEERING

- Process Engineering
- Civil / Structural Engineering and Design
- Mechanical / Piping Engineering and Design
- Electrical / Instrument Engineering and Design
- Automation / Controls Engineering
- Architectural Design / Building Services
- PSM Program Management
- Analysis, Design and Repair in accordance with ASME Code Requirements
- Reliability Program Support and Management
- Program Portfolio Management
- Project Management and Execution
- Turnaround Strategy Development & Participation
- In-Plant – Professional Staffing Services
- Custom Design Solutions and Recommendations for the Nuclear, Subsea, Oil and Gas and Petrochemical Sector

INSPECTION

- Non-Destructive Testing (NDT)
  - Traditional & Computed Radiography (RT/CRT)
  - Magnetic Particle Testing (MT)
  - Penetrant Testing (PT)
  - Ultrasonic Thickness and Flaw Detection Testing (UTT/UTF)
- Advanced NDT Methods
  - Tube Inspection (ET/IRIS/RFT/NFT)
  - Phased Array (PAUT)
  - Advanced Ultrasonic Backscatter Testing (AUBT)
  - Time of Flight Diffraction (ToFD)
  - Electromagnetic Acoustic Emissions Testing (EMAT)
  - Alternating Current Field Measurement (ACFM)
  - Long Range Ultrasonic Testing (Guided Wave)
- Visual Inspection
  - API Inspectors (510/570/653)
  - Certified Welding Inspectors (CWI)
- Construction Inspection, QA/QC and Vendor Surveillance
  - Construction Managers
  - Chief Inspectors
  - Environmental Inspectors
  - E&I Inspectors
  - Certified NACE & Coatings Inspectors
  - Utilities Inspectors
  - Safety Management
  - NCCER Assessment Center

SPECIALTY MECHANICAL

- On-Line Leak Sealing
- Composite Repair Systems
- On-Site Machining
- Controlled Bolting & Tensioning
- Line Isolation and Localized Hydrostatic Weld/Nozzle Testing
- Self-Leveling Machine Technologies (SLM)
- Heat Treatment
- Hot Tapping and Line Stopping
- Cryogenic Line Freezing
- Valve Repair – Shop and Field Service
- New Valve Sales
- Trevitest® – On-line PSV Testing
- OEM Product Sales
  - SILK Machining Equipment
  - IPSCO Hot Tap Equipment
  - Wilson-Snyder Coker Switch Valves

Integrated Industrial Solutions. Seamless Implementation. Engineering • Inspection • Specialty Mechanical
Filed in 1927, Furmanite is established as the inventor of the Under-Pressure Leak Sealing Process. Development begins on proprietary compounds addressing differences in temperatures, pressures, and service types.

The Innovation Begins

Eugene Clay Furman envisions a process to seal steam leaks on line and under pressure, after the naval ship he was on lost power due to a boiler leak. By 1924, he would develop a do-it-yourself leak sealing “kit” and form a company to market it.

The First Patent

1929

Furmanite Engineering Company, LTD is formed to license and distribute the technology globally. Through later consolidation this would prove to be the foundation for the Furmanite of the present day—a dynamic company with global reach.

Cutting-edge technology, global reach, a resume of success—these are merely hash marks on a sheet of paper without our most important asset: The people of Furmanite. Nothing happens without them.

Go Global

1920

Integrated Industrial Solutions. Seamless Implementation. Engineering • Inspection • Specialty Mechanical

1927

The First Patent

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One company, one mission, one coordinated solution. We’re here. At the ready.
A LEGACY OF SERVICE INNOVATION

1920. EUGENE CLAY FURMAN INVENTS a process to repair leaks under pressure. Over the following few years, he goes on to create the first leak-sealing kits and market them under the name Furmanite. From the outset we have been innovators, devising engineering fixes for complex leak-sealing applications, previously unsolved. For nearly 100 years, Furmanite has been synonymous with the growth of an industry. Responding to the needs of our customers, we have increased our service diversity, becoming known for our expertise across a wide range of applications — like self-leveling machine technologies, pre-heat and post-weld heat treatment, or Trevtest® our patented method to test safety relief valves on-line and in-service.

Today, Furmanite is able to meet the complete program and project management needs of our customers, minimize downtime, and maximize efficiencies. We can provide a comprehensive solution — tailor made for the budget and schedule demands of today’s owners and operators.

With the capability to design and execute an integrated Asset Life Cycle Solution with seamless implementation, Furmanite is a valued partner from concept to completion.

1966 1988

A MODERN INDUSTRY
Alan Forsyth takes the company in a new direction; moving Furmanite away from simply selling leak-sealing kits towards providing leak-sealing services, while also developing related mechanical service lines. A pioneer of the modern leak-sealing industry, he was also the first to imagine the multi-service, solutions-based company Furmanite is today.

DISCOVERY
Prior to the first shuttle launch following the loss of Challenger, Furmanite sealed a leak in the orbital maneuvering system of the shuttle Discovery. Repairs made on the launch pad saved the orbiter from months of delay — and saved NASA up to $90 million. The mission launched on time, on September 29, 1988.

INSPECTING CUSTOMER NEEDS
After years of providing inspection as an add-on service at the request of our customers, Furmanite makes a strategic acquisition in order to build a comprehensive program. Now a more complete program offering, inspection has become a full service line, with the ability to mobilize crews across the globe.
Responding to customer requests that the company take on projects of larger and more complex scope, Furmanite acquires a large portion of ENGlobal Engineering — a company with engineering service roots dating back to 1975. The added capabilities and expertise (including procurement of subcontracted services), now allow Furmanite to fully handle any job from conception to completion.

“WHERE DO YOU WORK?” It’s a question we often ask when meeting someone for the first time. At Furmanite, with so many field service offices around the world, we would say that we work … everywhere. Wherever our customers are. We’re truly global.

As to the question of our home office, the answer is simple. Anywhere there’s a valve, piping system, tank or pressure vessel. From day to day our home office can be a refinery or chemical plant, a transmission pipeline, a nuclear or fossil power plant. Maybe a mining operation, pulp and paper or water treatment plant — perhaps even an offshore rig or the maintenance area of a commercial office building.

We know our customers. We know the places they work and the challenges they face every day. We’ve been solving problems in these same industries for nearly 100 years. Let Furmanite put our expertise to work for you — we can provide a seamlessly implemented, comprehensive, integrated industrial solution.

We know how to solve your operational challenges. After all, you work at our home office.

“AN ENGINEERED FOUNDATION
Integrated Industrial Solutions. Seamless Implementation. Engineering • Inspection • Specialty Mechanical

At Furmanite safety is above all else. Our first concern is the health and well-being of our employees and our customers. Every Furmanite employee is empowered to stop any operation they believe to be unsafe. We work with our customers to make sure everyone is protected.

STILL LEADING THE WAY
Furmanite continues to be dedicated to keeping customers up and running. Our goal has always been to out pace changes in the industry by staying ahead. To be first with technologies that streamline our services, to leverage our long history, to create new, more efficient processes. We strive for quality relationships that are built on trust, exceptional results, and industry-best safety standards. Today we are the only company in our space offering a truly comprehensive Asset Life Cycle Solution, using lean efficiencies to yield value for our customers. We take pride in knowing that we have built a company that continues to provide the highest level of service, protecting our customers’ assets, and looking towards the future.

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EXPERTISE AND CAPABILITIES, naturally, form a substantial part of why so many corporations and other large entities engage us to provide services worldwide. But for us, this is just one part of the equation.

Furmanite stands by a commitment to providing world-class solutions — always safely — always with standard-setting excellence. We believe in serving every customer responsively, taking care to respond flexibly to local circumstances and requirements. We say, “perfect services and products” — because for us, perfect equals total customer satisfaction.

It all comes down to what we call The Orange Code, which begins simply: “Safety Above All Else.”
A TRUE CONCEPT-TO-COMPLETION APPROACH

TURN-KEY IS NOT A TERM WE TAKE LIGHTLY.

At Furmanite, our comprehensive engineering and technical solutions provide the highest level of quality, service and safety, from front-end planning to project closeout. All bundled with our complete portfolio of service capabilities. One call, total project execution.
ENGINEERING SERVICES

WHO WE ARE

Furmanite Technical Solutions (FTS) offers complete Engineering, Procurement and Construction Maintenance (EPCm) services on a global basis. As a stand-alone solution or as an integrated component to complement the full range of Furmanite’s capabilities, we can deliver the complete spectrum of engineering, design and construction management services, such as: process engineering, mechanical engineering, civil and structural engineering, and electrical engineering. We can also provide an array of related services, like construction and project management, conceptual design, information management, and procurement. Specializing in small- and mid-cap projects, FTS offers everything a customer should expect from an engineering firm.

FROM START TO FINISH

SOMETHING ABOUT US

Our engineering origins go back almost 40 years. That’s when the company that is now Furmanite Technical Solutions first began to provide engineering, design and construction services. As our customers have evolved, so has Furmanite. To meet the challenges of today’s customers and provide innovative value-based solutions, we can draw on decades of expertise.

FTS is a comprehensive life-cycle solution supplier. We can assist customers in the pre-construction phases of a job, working from a blank slate. We can conceptualize, design and oversee building — and we can deliver necessary services at start-up. All of this, along with integrated inspection and maintenance services, is provided throughout construction and plant operation.

OUR PLACE OR YOURS

FTS operates two ways: in-office and in-plant. In-office means we control and execute every aspect of a job from our office — project managing conceptualization, design and engineering, handling budgets and schedules, and overseeing quality of work. Alternatively, the in-plant model places FTS designers and engineers within a customer’s facility, working as a team, side-by-side with the customer’s internal engineering and design groups. This flexibility allows us to adapt easily to accommodate a customer’s preference. We offer the transition from design and construction to full-rate operations — including design-to-run building construction and full-life-cycle operation for an entire plant.

Our in-plant capabilities can assist you in ramp-up for large projects or full-time staff for run-and-maintain scopes. With a vast database of experienced personnel we can provide a wide array of professional in-plant staff from engineers to project managers to maintenance coordinators to procurement specialists. Let us find the fit for all your needs.

THE TURN OF A KEY

We are a single source for design, engineering, automation, construction, procurement and project management services. We serve a diverse range of customers in industries such as downstream, midstream, and upstream oil and gas, chemical and petrochemical, telecommunication, utility, renewable fuels and alternative and fossil power. And, as a part of Furmanite, we bring the intimate, hands-on knowledge that comes with years of providing specialty mechanical services in the plants of our customers.

That’s the definition of turn-key.

1 The early conceptual phase enables customers to envision goals while eliminating cost-prohibitive features. 2 This extends through EPC into long-term steady state operations. 3 FTS blends customer expertise with our own to reach the best overall solutions. 4 We understand lifecycle challenges, striving for solutions focused on cost of ownership, while maximizing return on investment.
Our people make the difference. Nothing happens without them.

Our inspection services provide more than just a second set of eyes. Some problems you know about, while some are lurking and can remain unseen until it’s too late. Regular short- and long-term inspection is an invaluable addition to any facility team.

Peak Efficiency: We’ll get you there and keep you there.

Our inspection services provide more than just a second set of eyes. Some problems you know about, while some are lurking and can remain unseen until it’s too late. Regular short- and long-term inspection is an invaluable addition to any facility team.
Unexpected downtime and repairs during construction can cost time and money. How do you know your systems are running as smoothly and safely as they can from initial build through operational life? The answer is a strong and reliable inspection resource. It is crucial to anticipate problems before they occur and to spot costly damage that otherwise might go unseen for days, weeks, or even years. That’s what Furmanite’s certified inspectors are trained for, with all of the right tools and technologies at their disposal. Are you initiating a construction project? We can provide vendor surveillance and in turn, peace of mind. Regular inspections? Ongoing maintenance? These are all part of an extensive portfolio of services.

At Furmanite, we provide the expertise to locate problem areas and identify potential hazards before they arise. But we can also handle repairs, expertly and without delay. Our inspection teams work hand-in-hand with field engineers and technicians. It’s a seamless, integrated, turn-key approach.

NON-DESTRUCTIVE TESTING

Our expertise in non-destructive testing is extensive. In 2011, Furmanite made several NDT acquisitions in order to develop a more comprehensive life cycle solution. Now a more robust offering, inspection has become a full service line, delivering non-destructive testing services to the petrochemical, power plant, oil, pipeline, and a long list of related industries. We employ traditional NDT inspection techniques, along with in-house resources and technologies that we’ve perfected as an integrated offering.

- Traditional & Computed Radiography (RT/CRT)
- Magnetic Particle Testing (MT)
- Penetrant Testing (PT)
- Ultrasonic Thickness and Flaw Detection Testing (UTT/UTF)
- Positive Material Identification (PMI)

ADVANCED NDT METHODS

Our state-of-the-art inspection technologies help reduce overall maintenance costs, improve production quality, and ensure reliable operating processes. Cutting-edge inspection procedures will get to the heart of the issue, quickly and accurately.

- Tube Inspection (ET/RT/UT/NFT)
- Phased Array (PAUT)
- Advanced Ultrasonic Backscatter Testing (AUBT)
- Time of Flight Diffraction (ToFD)
- Electromagnetic Acoustic Emissions Testing (EMAT)
- Alternating Current Field Measurement (ACFM)
- Long Range Ultrasonic Testing (Guided Wave)

VISUAL INSPECTION

A global network of certified pressure vessel inspectors, piping inspectors, above ground storage tank inspectors, and certified welding inspectors are always on call, ready to check for integrity and efficiency. The oldest type of inspection, (VT) Visual Inspection is the primary basis for all methods of Nondestructive Testing, and is integral in helping to ensure consistent performance over the long term.

- API Inspectors (510/570/653)
- Certified Welding Inspectors (CWI)
- Tank Integrity Program

CONSTRUCTION INSPECTION, QA/QC AND VENDOR SURVEILLANCE

Proper quality control requires careful monitoring of materials certification, weld procedures, and processes — have they been implemented to the correct standards? Furmanite can provide the assurance that all materials and work done meet exact specified requirements.

- Construction Managers
- Chief Inspectors
- Environmental Inspectors
- E&I Inspectors
- Certified NACE & Coatings Inspectors
- Utilities Inspectors
- Safety Management
- NCCER Assessment Centers (CWI)
Our people make the difference. Nothing happens without them. LEAN EFFICIENCIES means we can do more with less. Furmanite cross-trained crews can provide a wide array of mechanical services from a single source. Fewer people, less congestion in work spaces, less standby time — the same crew can move seamlessly from one mechanical operation to the next. The benefit? Lower costs for our customers.

MULTIPLE SKILLS FROM A SINGLE SOURCE—BACKED BY TRAINING

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SPECIALTY MECHANICAL

ON-LINE LEAK SEALING & REPAIR
COMPOSITE REPAIR TECHNOLOGIES
VALVE REPAIR & TESTING
HEAT TREATMENT
ON-SITE MACHINING SOLUTIONS
SELF-LEVELING MACHINES
LOCALIZED ISOLATION AND HYDROSTATIC WELD TESTING
CONTROLLED BOLTING, TENSIONING & TORQUING
PIPELINE INTERVENTION
HOT TAPPING, LINE STOPPING, LINE FREEZING & OEM

www.furmanite.com
Steam, hydrocarbons, gas — including over 300 types of chemical — Furmanite has long set the standard in leak-sealing products and services.

For small, straightforward leaks, or large and complex ones — we have the knowledge, experience and capability.

- Holes in pipes or valves
- Cracked welds
- Packing glands
- Flange leaks
- Valve bonnets
- Threaded fittings
- Exchanger leaks
- Pressure seal valves
- Turbine horizontal joints
- Transformer leaks
- Sub-Sea Leaks
- Leak repair for steam, hydrocarbons, gas, air, chemicals and liquids
- Engineering solutions for leaks from cryogenic to from 1,600°F (870°C)
- Leak repair from vacuum up to 6,000 psi (435 barg/43,440 kPa)

THE FACTS
LEAK SEALING & REPAIR SERVICES

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ON-LINE LEAK SEALING & REPAIR

KEEP PRODUCING WHILE WE SOLVE YOUR PROBLEM

You save time, energy and money — while improving plant and environmental safety. If there’s no immediate solution on the shelf, we’ll build one. Custom engineered, custom manufactured.

Expertise drives everything we do. Our in-house engineers have a global knowledge base. Our manufacturing is focused on response time, with subject matter experts in the field providing service backed by robust training and procedures. Our proprietary leak-sealing compounds are, quite simply, the best in the business. Engineered to handle a vast array of temperatures, pressures, and types of service, they have a 1:1 compression ratio — which allows us to use smaller amounts to seal a leak.

Furmanite subsea and onshore self-sealing repair clamps. Precision-machined to ensure full width face to face contact.

FurnaSeal self-sealing repair clamps can be purchased by customers and fitted by their own staffs. Others prefer to maintain an inventory suited to their plants, using Furmanite technicians for installation.

FurnaSeal clamps are precision-machined to ensure full width face-to-face contact. In combination with near-tangential bolting, structural bending is virtually eliminated, while distortion is minimized in the seal contact zone. Clamps can be provided for very high pressures — standard clamps are rated for 1,000 psi (69 barg/6,895 kPa) and full “Class 600” — 1,480 psi (102 barg/10,200 kPa).

FurnaSeal subsea and onshore self-sealing repair clamps. Precision-machined to ensure full width face to face contact.
LONG-TERM PERFORMANCE
Composite technologies are another excellent solution for managing the integrity of degraded pressurized equipment and Furmanite is at the forefront in the field. Our composite repairs are long-term solutions that can be designed to permanently restore the serviceability of pipes, tanks, vessels and other structures. Every composite repair we install is fully engineered for the specific application before it is applied, ensuring it is a safe and appropriate solution. Repairs can be tailored to provide temporary solutions when needed, maximizing their benefit to the plant.

The entire process from design to installation is controlled by Furmanite in-house, assuring seamless, efficient, and reliable service.

WHY FURMANITE COMPOSITES?
THE RIGHT PRODUCT
We offer a number of different types of composite solutions, each providing specific benefits and advantages. Options range from temporary: your own plant personnel can make short-term repairs, quickly and effectively, while a more permanent solution is worked out — to permanent: carbon fiber composites fully-engineered to ensure integrity up to 5,000 psi (345 barg/34,470 kPa) and temperatures up to 410°F (210°C).

But the crucial common factor with Furmanite composite products is that we, in close consultation with our customer, will establish a series of options, determine the proper course of action, and get to the solution that best suits your plant’s unique requirements.

DESIRABLE ADVANTAGES
Furmanite composite technology is suitable for a wide range of industries and applications, among them: transmission pipelines, flare lines, water systems, vessels, offshore decks and other components.

Our product systems offer highly desirable advantages, such as:
- Lower total project costs
- Close-fitting repairs
- Suitable in confined spaces
- Provides leak sealing capability, chemical, and environmental resistance
- Materials conform to irregular shapes and are formed to shape on-site
- Repair and refurbishment of entire lines
- The opportunity to complete critical work outside of scheduled outages or shut downs

LLOYD’S CERTIFICATION
FurmaGlass, and FurmaCarbon are approved by Lloyd’s Register, demonstrating engineered repairs compliant with ASME PCC-2 and ISO 24817.

THE FACTS
1. Composites are an ideal solution to repair under-lagging corrosion.
2. A repair in the North Sea. Composite repairs can be applied by rope access, eliminating the need for scaffolding and reducing costs.
3. Composites can be used to repair defects such as corrosion and dents on buried, high pressure, transmission pipelines.

FurmaFast
- Plant employees can make short-term repairs pending a long-term solution.

FurmaWrap
- Polyurethane composite for use with pressures of 750 psi (50 barg/5,170 kPa) and above.

FurmaGlass
- Suitable for small diameter holed lines, it can handle both external and internal corrosion.

FurmaCarbon
- A long-term solution capable of restoring full pressure integrity up to 6,000 psi (345 barg/34,470 kPa).
Testing valves at one of Furmanite’s service centers. Steam testing in progress. Repaired and inspected customer valves, inventoried at a Field Service Delivery Center. Furmanite will hold these valves, ready for use, until delivery to the customer at their request.

• Complete shop and field service capabilities
• Repair capabilities for every type of valve, including:
  - Safety / Safety Relief
  - Gate, Globe, Check (Bolted Bonnet and Pressure Seal)
  - Quarter turn, Butterfly, Ball, Plug, Wedge Plug
  - Air-operated (AOV) control valves and Actuators
  - Motor-operated (MOV) isolation Valves and Actuators
• OEM valve parts and new valve sales
• Factory-trained technicians
• Procedure-based repair activities
• Perform in-service set pressure calibrations
• Seat leak and assembled hydrotesting per applicable ANSI standards / API Standards
• Trevitest™ on-line PSV testing
• Manufacturer of Wilson-Snyder 4-port Coker switch valves
• Complete documentation of repairs through ValveOne

A single source for testing, parts, and new valves, Furmanite is one of the largest non-OEM valve repair companies in the world. With a global staff of factory-trained technicians, we can repair and test any type of valve. With a moment’s notice we can mobilize field service capabilities to any location, or you can ship your valves to any of our 28 full-service valve repair shops strategically located across the globe.

THE FACTS

VALVE REPAIR & TESTING

VALVE REPAIR & TESTING

THE RIGHT COMPANY

No one likes malfunctioning valves. Getting replacements (in some cases, even parts) can take months. Faulty valves lead to inefficient plant operations, potential downtime, and in the worst cases, pose a safety risk.

So what makes us the right company to tackle your valve work? Our experience, depth, and expertise. We are an Original Equipment Manufacturer (OEM) of Wilson-Snyder Coker Switch Valves and have more VR certifications for the testing of safety relief valves than any other company in the world. We can repair any type of valve — at your facility or ours. Staffed worldwide with a deep pool of factory trained technicians, we have authorizations, certifications, and channel partnerships with valve manufacturers globally, and — our spare parts inventory is second to none.

We are a single source for repair, testing, parts, and new valves. Plus, the work we do is backed by our long-standing warranty program. All of which is what makes us the right company — and all of which is why you can sometimes hear our name actually being used as a verb, as in: “Relax. It’s been Furmanited.”

MANAGE YOUR ASSETS

It’s often said that information is king. To create preventative maintenance procedures and accurate budget projections requires a detailed and complete repair history as well as the metrics and the Key Performance Indicators (KPIs) that can be derived from it. For that reason we have developed our own Valve Asset Management Program to document every repair we conduct. Furmanite’s ValveOne system doesn’t cost extra, and the information in the system belongs to you — it’s simply an added benefit we provide. ValveOne is an interactive, web-based, and completely customizable database that allows customers to view the status of every one of their valves, both in service and out. All in real-time — providing instant answers and instant access — to repair histories, or notifications of impending statutory repairs. In short, we eliminate the guesswork.

TREVITEST™

Testing on-line and in-service — Furmanite’s patented Trevitest™ is code-accepted as a lift-assist device for in-service testing of safety and pressure relief valves, one inch and greater in size. With the capability to test remotely for safety and without operational interruptions, Trevitest will keep you operational while maintaining your regulatory compliance. It was the first, and still the best. No other system is field-calibrated prior to use, and again after data-acquisition, providing you the confidence you need when it comes to safety-critical valves. And after proving itself for more than 30 years, no other system has its track record.

FURMANITE®

www.furmanite.com
HEAT TREATMENT

Welding can induce thermal stress and create potential failure points if metals are not properly heat treated as required by code. Furmanite’s preheating and post-weld heat treatment can remove thermal and residual stresses, reducing porosity and potential cracking due to diffusible hydrogen.

THE FACTS

- Welding preheat
- Localized electric Post-Weld Heat Treatment (PWHT)
- Combustion gas PWHT
- Induction heating
- Fixed-hearth furnaces
- Temporary furnaces
- Hydrogen bake-outs
- Line thawing
- Coating cures
- Heat shrink/expansions
- Space heating
- Process start-up
- Refractory dry-outs
- Equipment sales
- Equipment rentals
- Equipment calibration
- Turbine warming systems

BRINGING THE HEAT

In any heat treatment process, accuracy is of the utmost importance. Over-temping material or missing a required temperature variance from one material zone to the next can mean lost time, money, or worst of all, result in scrap material. At Furmanite, we understand this. Which is why we essentially reinvented the wheel when we began providing this service in 2006.

COMPUTER-CONTROLLED, COMPACT EQUIPMENT

When Furmanite built this service line from the ground up, we did not rely on 1970s technology, like most of the industry. A proprietary design, our localized electrical resistance console is small at 25” (64 cm) x 24” (61 cm) x 35” (89 cm) and constructed from stainless steel. It is meant for crowded work areas and harsh conditions. No more Universal Display Controllers (UDC), no more Analog Strip Chart Recorders — no longer a need for personnel to physically monitor a heat cycle. We replaced UDCs and Recorders with Programmable Logic Controllers and SCADA (Supervisory Control and Data Acquisition) software. Everything is controlled by an interchangeable system of laptop computers that allow multiple machines to be monitored remotely by a single person, outside of any potential blast zone.

POWER AND FLEXIBILITY

We can offer a targeted solution for every application. Furmanite’s mobile, all-inclusive Heat Treating Rigs — each with a 202 kw standby (185 kw Prime) generator and a reserve of 280 gallons (1,060 liters) of diesel — are capable of running with a full complement of equipment for up to 26 hours. For larger scopes or pipe runs, we can insulate and internally fire, or build a furnace around, almost anything. Our high-velocity combustion gas trains are capable of variable output from 100,000 up to 10,000,000 BTU’s per hour. For bolt heating or specialized applications that require a fast startup, fast heating or high production rates, our induction heating system is a perfect fit.
THE MACHINE SHOP MOBILIZED
In plain language, that’s essentially what you get with Furmanite’s On-Site Machining service (OSM). The service was introduced back in 1979 and we’ve been enhancing and perfecting it for the last four decades.

The benefits are obvious: machine shop tolerances that exceed any standard of quality without the need to move anything off-site. Downtime is minimized, and substantial savings are realized in transportation, logistics, and labor — all of which drive costs down.

And like all projects we execute, you’ll receive our high standards of service — organized, on-schedule work, performed by well-trained, highly skilled people.

ADDITIONAL SERVICES & PRODUCTS

METAL DISINTEGRATION
When old or damaged plant and equipment must be removed, Furmanite offers metal disintegration as an effective option. The targeted metal is subjected to a rapidly vibrating, arc-producing electrode 3,600 times per minute, with temperatures at the contact point reaching nearly 5,400°F (2,982°C). Under a continuous supply of water, thermal shock is induced, causing the metal to break down. The discharged pieces are then flushed away. And unlike drilling, high heat is confined to the point of contact only.

3D MODELING
Furmanite’s investments in computer facilities now make it possible to carry out full three-dimensional modeling of a job. Computer models provide complete analysis of the repair, allowing any alterations to be made until the design engineer is confident of the design’s integrity.

SILK™
A crucial factor underlying our ability to deliver on-site machining consistently, at such a high level, is the precision and the quality of the machines we use. Renowned for their capability, capacity and sound engineering, Furmanite’s SILK™ portable machine tools are recognized worldwide. They are, without question, the state-of-the-art. Designed and engineered by Furmanite, we are the Original Equipment Manufacturer (OEM) of all Silk machines.

Silk portable and lightweight machine tools provide high-tolerance solutions for a wide range of problems. We also offer Silk machines for purchase should plant owners want to give their own personnel the ability to handle onsite machining, with precision, and with minimum disruption to plant operations.

ON-SITE MACHINING SOLUTIONS — OSM

The list is long, but here are some of the machining services you can get with OSM:

- Pneumatic pipe cutting and beveling (weld-prep)
- Flange facing
- Specialty grinding and polishing
- Line boring
- Milling
- Journal turning
- Stud drilling
- Drilling and tapping
- Laser surveys
- Metal Disintegration
Self Leveling Machines

The Mobile Machine Shop, Scaled Up

Some projects are simply too large for machine shops, or standard on-site machining. In such cases, Furmanite has the answer: Self Leveling Machines. We can bring to you, an on-site service specializing in the machining of very large circular or irregular-shaped surfaces on structural components.

Our milling cutters are controlled by a scanning laser plane, which allows them to operate independently from the portable machine frame. Because of this, deflections in the frame itself have absolutely no effect on the accuracy of the operation being performed—which also means that there is virtually no size limit. We can handle diameters of up to 150 feet, or irregular areas up to 52 by 36 feet. Areas of more than 17,000 square feet can be machined in a single set up with accuracies similar to those achieved on major workshop machines.

Furmanite will make detailed measurements prior to any work being done, and together with the customer use them to determine the best machining solution. Our customers are always encouraged to witness the process and review all post-machining data, and will be given an in-depth final report once the project is complete.

Self Leveling Machines: A Very Short Primer

Circular Self Leveling Mill
A relatively compact and fast-to-assemble machine, the CSLM does not require large bearings and housings to support a rigid arm from the center of the work piece. Instead, a milling head, supported on wheels that roll on the surface being machined, is connected by beams to a central pivot post. Once the circular face has been cut flat, the machine can rotate on this face to address other surfaces, such as vertical faces below the horizontal plane on which the machine rolls.

Linear Self Leveling Mill
The LSLM is specifically designed to machine large, irregular areas like steam turbine horizontal half joints. The milling head assembly is laser controlled to ensure it is always machined parallel to the laser plane.

Specialized Machines
Furmanite supplies and uses a range of specialist self-leveling milling machines, designed to address specific requirements or non-standard circumstances.

The LP-CSLM is a compact version of the CSLM, designed to fit into vertical spaces as low as 33 inches. With the circular face cut flat, the milling head can be rotated to machine the underside of an upper face. Typically, such applications are skew ring bearing faces such as a crane pedestal and revolving frame.

Furmanite also has a large range of X/Y mills capable of machining large rectangular areas, horizontal or vertical. Our Symmetrical Mill is built with two of these. Designed to machine wear plate surfaces on steel and alumina rolling mill stands, this machine makes it possible to halve the time required to machine all four faces on a four-high, hot strip mill stand.
Line isolation tools are used when welding pipes with potential hydrocarbon gases present in the line. Testing the internal pressure of a 6-inch nozzle through the use of localized hydrostatic nozzle testing to this branch retrofitted on a reactor column, the vessel does not need to be filled with water, saving time and money. A line isolation tool in place during the welding activity on a pipeline.

### THE FACTS

**LINE ISOLATION & LOCALIZED HYDROSTATIC WELD TESTING**

**LINE ISOLATION**
- Standard tools back-pressure rated to 25 psi (2 barg/172 kPa).
- Custom tools rated to pipe burst pressure.
- Standard tools include locking jaw/lug, and long-stem designs for various sizing requirements.
- Can be used as a pressure-rated back-pressure isolation device.

**LOCALIZED WELD TESTING**
- Standard tooling tests pressures to 1,150 psi (79 bar g/7,929 kPa).
- Custom tooling tests pressures to 5,000 psi (345 bar g/34,474 kPa).
- Uses minimal amounts of water, high degree of accuracy and safety.

**THE BEST TOOLS**

In 2009, Furmanite introduced this service line to broaden our ability to better serve our customers. There is often a need for line isolation and hydrostatic weld testing in conjunction with other on-site operations, such as machining or line stopping, making this service a natural fit for our integrated solutions approach. As with other service lines we have taken on, our goal has been to create the best equipment, and develop the best procedures to accomplish the required task. We utilize industry-leading tool designs and proprietary processes focused on safety and efficiency.

**THE FURMANITE ADVANTAGE**

Our standard designs have the capability of both isolation and testing from a single tool — they range from 1/2” (1.27cm) to 36” (91.44cm). However, one size does not fit all. As is often the case with Furmanite, we can engineer custom solutions for applications as large as 120” (304.80cm). We even have unique designs and custom equipment for complicated applications, such as a method for external pressure testing of nozzles. For line isolation, our standard tools are rated to 25 psi (2 barg/172 kPa), with custom tools able to handle pressures up to the burst pressure of the pipe. For weld testing, standard tooling can test pressures to 1,150 psi (79 bar g/7,929 kPa), with custom capabilities possible all the way up to 5,000 psi (345 bar g/34,474 kPa). With its standard multi-schedule design, our equipment is smaller, lighter, and allows for easy installation and removal. Wider sealing elements make it possible to isolate in adverse conditions — pipes can be pitted, corroded, eroded, or out of round. And our tools and procedures are cost-effective, extremely safe, save preparation time, and create minimal water disposal.
CONTROLLED BOLTING TENSIONING & TORQUING

HYDRAULIC BOLT TORQUING
Modifications and repairs performed on plant assets are only as good as the bolts that hold them together. Furmanite’s bolt torquing service is a reliable, safe method to ensure controlled tightening and loosening of bolts.

BOLT TENSIONING
This service provides accurate tightening of threaded fasteners, inducing load through advanced hydraulic technology. All of this is done without directly turning the nut, so frictional losses are avoided. It will ensure gaskets are compressed precisely as required by the manufacturer.

JOINT SPLITTING
Furmanite’s hydro-mechanical rigs are designed to assist in the separation of joints that have been in operation at high temperatures for long periods of time—sometimes a very difficult operation. After maintenance, the joint is resealed, and hydraulic tensioning and torquing is applied to ensure a measured, uniform and engineered assembly.

PRESSURIZED SYSTEMS INTEGRITY MANAGEMENT (PSIM)

PSIM software is a streamlined management system used for the planning, associated data capture, analysis, and reporting of all activities related to the inspection, maintenance and testing of bolted joints. PSIM guarantees data integrity and provides a fully auditable database of assets, planning, and intervention information for the safety record.

With Furmanite PSIM software, during the Planning phase you can customize the work-pack, add joint and bolting specifications, and add relevant craftsmen and technicians to the database. Each Workflow process is then carefully tracked: disassemble, inspect, machine, assemble, tighten, test. Finally, during Reporting, managers have the ability to generate a wide range of documentation, such as complete histories for any given joint, or a detailed Job Completion Certificate.
HOT TAPPING & LINE STOPPING

THE WORLD LEADER FOR HOT TAPS

For decades, we have been the pioneers. We have developed new technologies. We have designed and manufactured equipment. We understand the challenges, standards, and expectations of each and every industry segment we serve. And most importantly, we know that our customers want to keep their assets online — with no unwanted shutdowns.

Over the years, Furmanite IPSCO (International Piping Service Company) has become known as the premier supplier of isolation and intervention services across the globe — hot taps, cold taps and wet taps. Our customer list, spanning six continents, includes industries from petroleum refinery, petrochemical, nuclear and fossil fuel generation, mining, and gas transmission piping, to water lines, subsea, pharmaceutical, food and beverage, agricultural processing, and more.

Why do all of these companies trust Furmanite for their hot and wet tapping needs? Because of our history, our experience, and our reliability. We have done hot taps on pipes as small as a half-inch and as large as 120 inches, on systems with pressures as high as 2,800 psi (193 barg/19,305 kPa), and at temperatures of up to 950°F. Over decades, faced with countless unique and challenging applications, we have reached temperatures, pressures, and depths that other suppliers can only dream of.

LINE STOPPING

We have been performing line stopping services for longer than anyone else in the industry. Knowledge gained over the years gives us the expertise to deal with almost any application, using pivoting or folding heads, Sure-Stops, FloStops — or any number of other pieces of equipment or techniques required to solve a specific situation.

In fact, Furmanite currently holds the world record for a line stop with the highest combination of temperature and pressure, successfully completing an isolation at 950°F (510°C) and 950 psi (65 barg/6550 kPa).

We have over 40 years of experience providing subsea line stops for the offshore industry, including taps and line stops at depths of more than 3,000 feet of water. We can point to benchmarks such as a double 36”, ANSI 900#, hot taps in 500 feet of saltwater, and engineering to accommodate ROV hot tap operations. And offshore projects have been successfully completed over the last 40 years in the North Sea, the Arabian Gulf, the Red Sea and the Gulf of Mexico — without a single spill or release.
**LINE FREEZING & OEM**

**AN ALTERNATIVE – LINE FREEZING**

Sometimes, standard line stop procedures are not an option, such as with FDA-controlled lines that carry food or beverage ingredients where contamination is an issue. In such cases, Furmanite can offer line-freezing services.

For line freezing, we use a mechanical bolt-on jacket, which is installed onto an existing piping system. Liquid nitrogen is introduced into the jacket to freeze the existing liquid in the pipe, creating a freeze plug. This allows maintenance to be performed or the addition of new equipment downstream.

This technique can be used successfully with pipes that have no flow or air, and contain a liquid that can be frozen, such as water. In appropriate circumstances, line freezing is a safe, reliable, and highly cost-effective method of temporary pipe isolation. Benefits include:

- No need to drain down systems
- No need to arrange transfer or storage of possibly toxic or corrosive fluids
- Cuts losses of expensive liquids like treated water or systems inhibitors
- Hazardous materials need not be handled, and safety is improved when working on lines containing contaminated or volatile liquids.
- Maintenance can often be done without interruption to continuous process systems

**OEM**

Furmanite operates the largest and most diverse inventory of pipeline intervention equipment in the industry. We are an Original Equipment Manufacturer (OEM) of proprietary hot tap and line stop equipment, machines, plugging heads and fittings — backed by a long, distinguished history of expertise in high-pressure and high-temperature applications. We offer solutions for line stops on out-of-round pipe, and specialized designs for unique equipment and fittings. The IPSO 1524 — one of the world’s largest hot tapping machines, and capable of tapping holes in pipe up to 120” in diameter — was designed and built by Furmanite. One of the only companies in the world providing field service with our own line of OEM equipment, we also offer that same equipment for client purchase.
FURMANITE.
ONE INTEGRATED SOLUTION AT THE READY.

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