



Furmanite on-site engineering services

FURMANITE

24/7 phone numbers:

Sweden +46 (0)303 65 680

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Denmark +45 35 34 60 80

Furmanite Worldwide

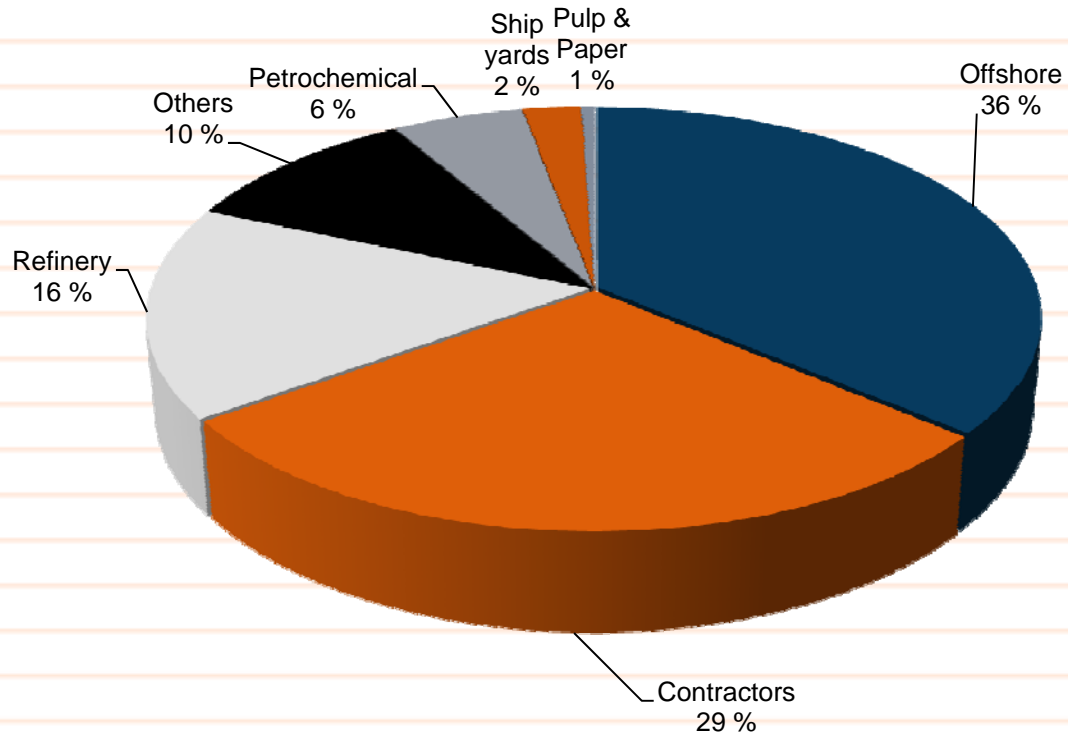
- Founded in 1929
- Group owned by Furmanite Corporation
- Head quarter in Houston, US. Listed at NYSE
- + 1800 Employees on 5 continents
- Engineering centre in UK and US supporting all operations
- Centre of Excellence for each major service supporting operations, engineering centers, and customers.

Furmanite Scandinavia

- Founded in Porsgrunn, Norway in 1979
- Operations in Stenungsund, Sweden in 2010
- Operations in Esbjerg, Denmark in 2010
- Locations in Stavanger and Bergen, Norway
- 24 hours service – 365 days a year
- All technicians are specialists



Market



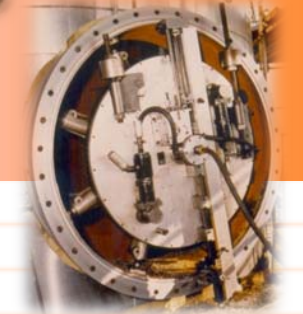
Qualification matrix

Composite Repair Technician Qualification Matrix

Level	Title	Training	Experience	Components	Responsibility	Resins	Fibre/Fabric	Pipe Condition	Record Keeping	Additional Requirements
1	Furmawrap Installer	In-house course	None Required	Straights and bends	2nd man	Water cured PU	Glass	Non-Leaking (Type A repairs)	None	Visual inspection of trial application witnessed by relevant trainer
2	Trained Technician	In-house course	None Required	Straights and bends and other components under supervision	2nd man, fully supervised at all times by Level 3 or higher	Standard Epoxy	Glass and Quad Carbon	Non-Leaking (Type A repairs)	None	Visual inspection of trial application witnessed by Level 4 or 5 Technician
3	Installation Technician	HT & UHT resin (can be completed in field if all other requirements are met)	Minimum of 12 supervised repairs, including 3 complicated components	Straights, bends and other components as directed	Able to work independently as part of a supervised team	Standard, HT and UHT Epoxies	Glass and Quad Bidirectional Carbon	Leaking (Type B Repairs)	Completion of cutting and mixing record sheets. Able to work with Imperial and metric units, volumes and mass	Type B qualification test completed and passed Capability of candidate to be confirmed by assessment by Level 4 or 5 Technician
4	Lead Technician	Lead Tech course	Supervise installation of a minimum of 3 additional repairs (under watch of Level 4 or 5 Technician)	Independent application of materials to any geometry	Able to complete site surveys and supervise installation of repairs by teams of up to three people (which must include at least one Level 3 Technician)	Standard, HT and UHT Epoxies	Glass, Quad and Bidirectional Carbon	Leaking (Type B Repairs)	Completion of quality documentation and hold points related to repairs installed. Preparation of cutting plans. Inspection of repairs	Methods of pipe defect assessment. Capability of candidate to be confirmed by assessment by Level 4 or 5 Technician
5	Advanced Lead Technician	Components may be repaired in workshop if not completed in field	Supervise installation of a minimum of 3 additional repairs on tees, nozzles or similar complicated geometry under watch of Level 5 Technician	Independent application of materials to any geometry	Able to complete site surveys and supervise all repairs	Standard, HT and UHT Epoxies	Glass, Quad and Bidirectional Carbon	Leaking (Type B Repairs)	Completion of quality documentation and hold points related to repairs installed. Preparation of cutting plans. Inspection of repairs	Capability of candidate to be confirmed by assessment by Level 5 Technician

Furmanite Scandinavia - Field Services

- On Site Machining
- Leak Sealing
- Composite Repair
- Pipeline Intervention (Hot tapping / plugging)
- Heat Treatment
- CTI Restoring of Heat Exchangers
- Controlled Bolting
- Trevitest (online valve testing)
- Corrosion Monitoring (CMS)
- Smart Shim



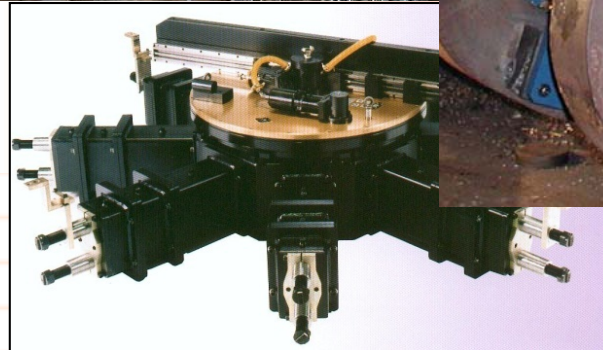
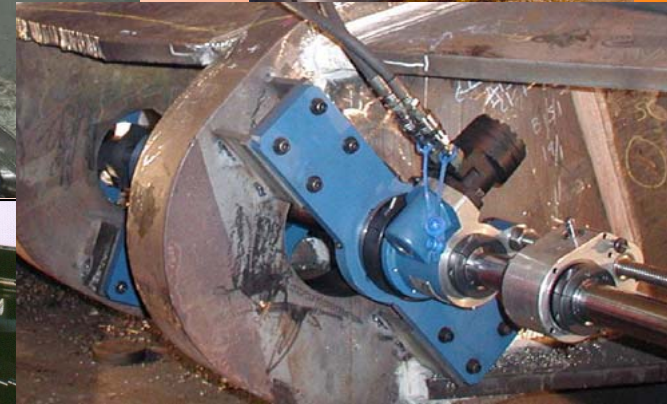
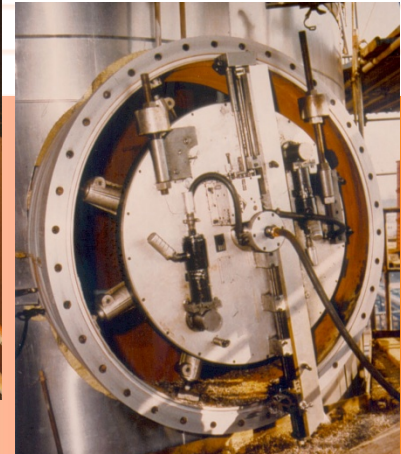


On Site Machining

OSM Includes following services:

- Flange facing
- Milling
- Pipe cutting / Beveling
- Drilling & Boring
- Line boring

Furmanite carry a wide range of mobile machines - available at all locations, and a majority are manufactured under our own brand **SILK**. The mobile equipment, both standard and customized, are designed for multiple tasks.



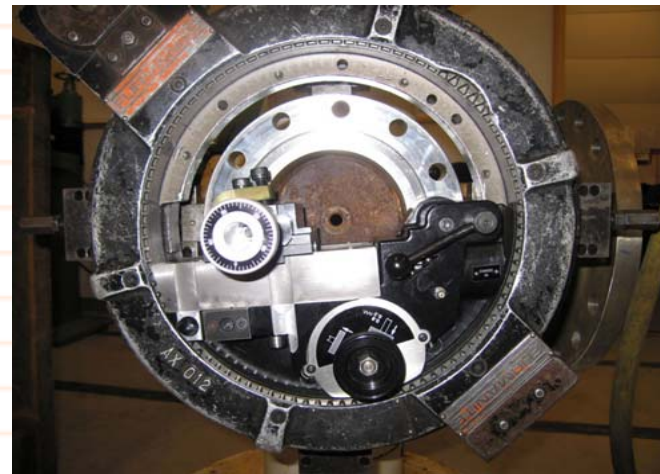
FURMANITE

Facing of Compact Flanges

Furmanite has developed a special kit for machining of compact flanges (SPO flanges). The kit enables accurate and efficient facing up to the highest tolerances, correct angle and surface “as new”.

Compared with traditional flange facing, the time spent per flange is reduced dramatically and the final result is better beyond comparison.

Furmanite Scandinavia executes measuring and machining of Compact Flanges all over the World as sole experts.



On Site Machining - Examples



Flange facing – large diameter



Machining of base plate



Milling of crane beam (30m)



Machining on heat exchanger



Machining inside wellhead



Milling vertical

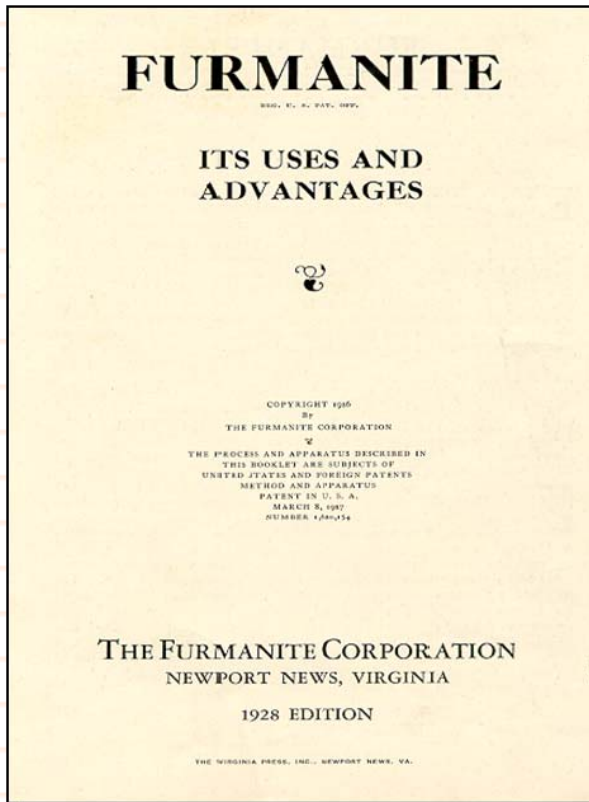


Axial turning with a pipe cutting machine



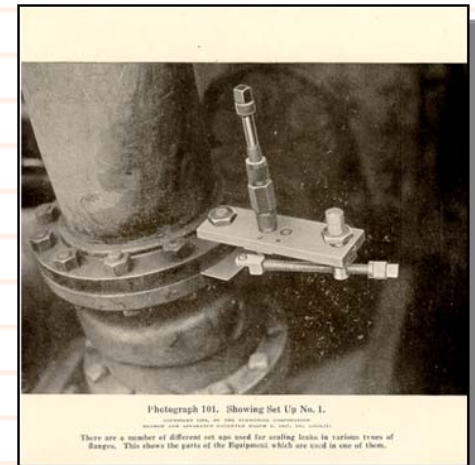
Leak Sealing Industry Leadership

Furmanite is *the* pioneer of the on-line leak sealing process and has been leading the industry since the 1920s



Furmanite Leak Sealing Equipment

COPYRIGHT 1926, BY THE FURMANITE CORPORATION
METHOD AND APPARATUS PATENTED MARCH 8, 1927, DOL. 1,242,624



In many countries, “*Furmaniting*” is synonymous with “*Leak Sealing*”

FURMANITE

®

Leak Sealing Industry Leadership

Furmanite's Leadership in the Leak Sealing Industry is widely recognised:

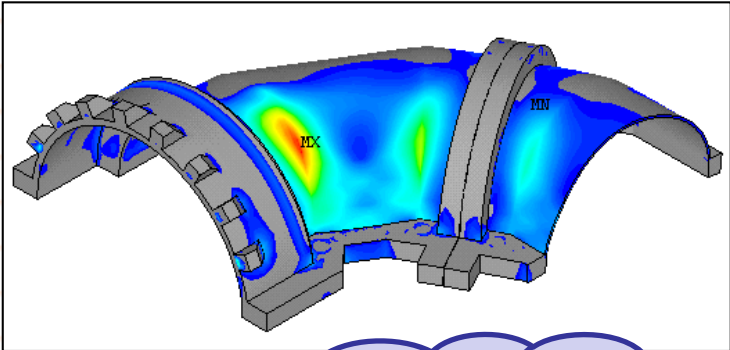
- Key part of ASME Task Group Working on Post Construction Standard for Leak Sealing

Global Support and Experience

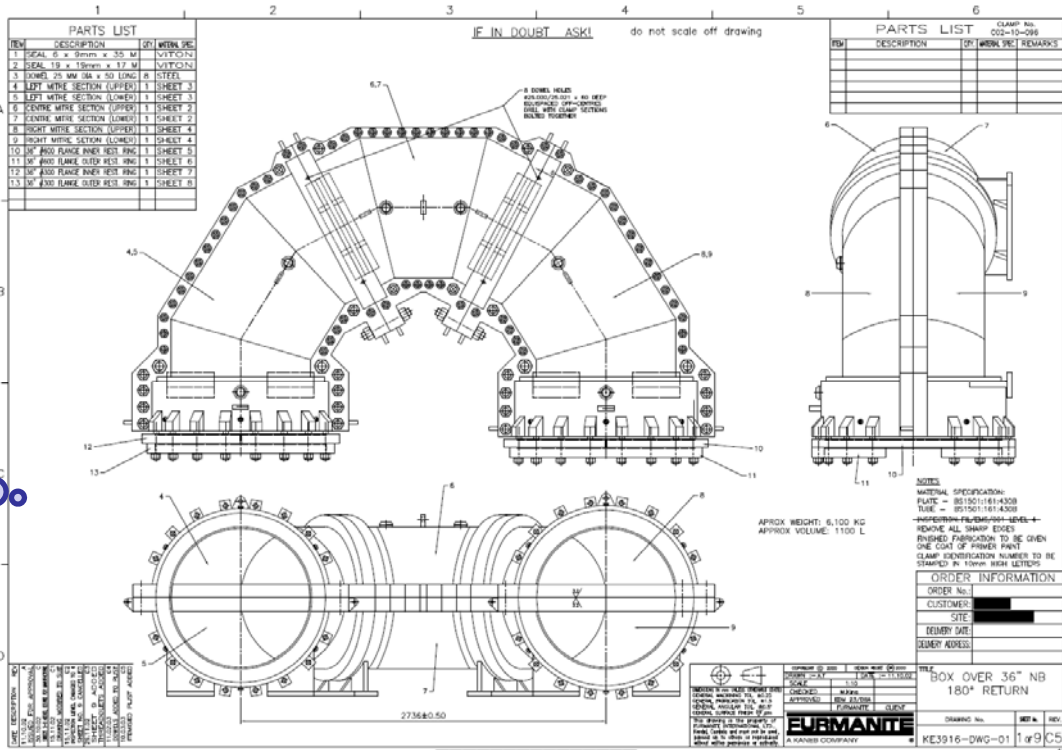
Furmanite employs more than 500 Leak Sealing Technicians and more than 30 Engineers and Designers globally

- Experience is gained on a global basis and disseminated throughout the group

Enclosure Clamp for Flanged 36" 180° Mitred Bend



Clamp Design and Finite Element Analysis

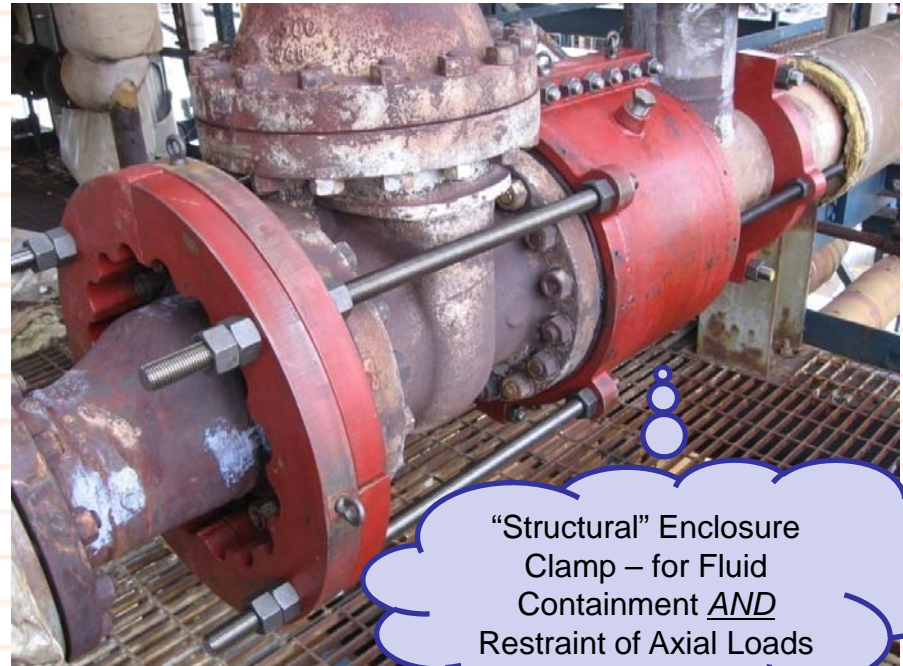


Structural Integrity of Piping

Furmanite operates a Structural Restraint Policy which works on the presumption that a structural clamp will be provided – unless it can be shown that it is safe to do otherwise.



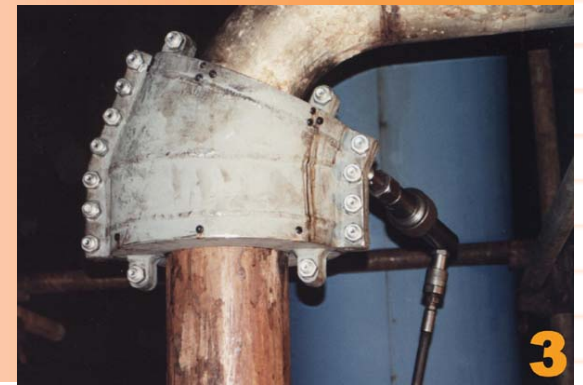
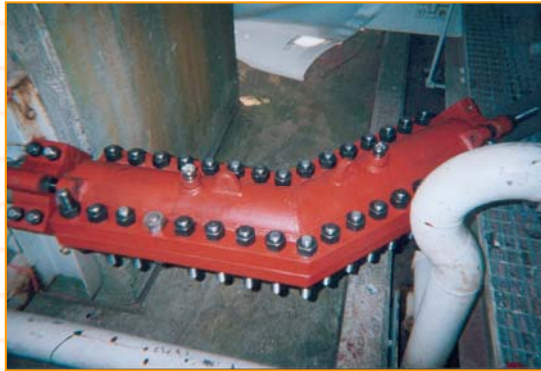
“Structural”
Enclosure Clamps
are intended to
avoid this...



“Structural” Enclosure
Clamp – for Fluid
Containment AND
Restraint of Axial Loads
in Pipe

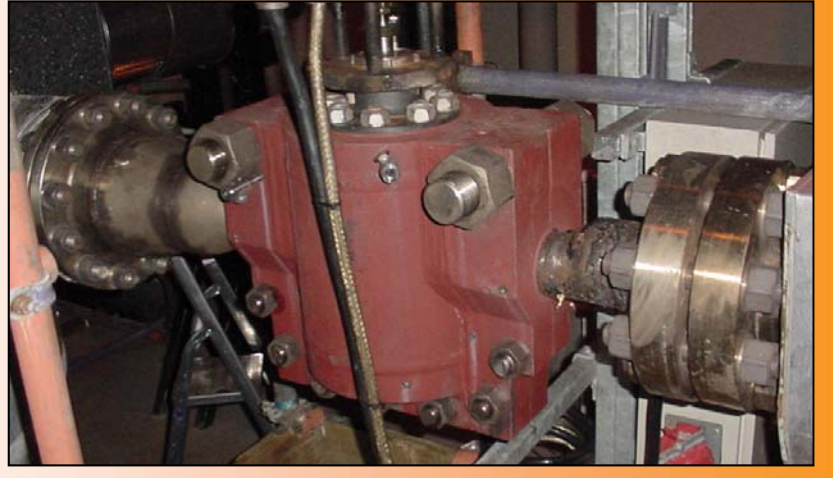
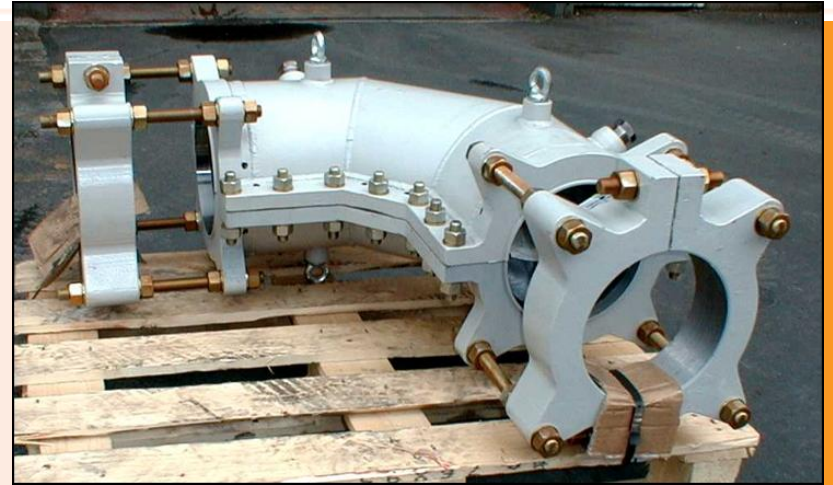
Leak sealing

Examples



Leak sealing

Examples



Composite repairs

FurmaCarbon
HI-PRESSURE COMPOSITE REPAIR

FurmaGlass
LOW PRESSURE COMPOSITE REPAIR

FurmaWrap
COMPOSITE STRENGTHENING

FurmaFast
EMERGENCY REPAIR KIT



Composite Repairs – the USP's

Structural repair provided by fibre

Repairs are close fitting & can be applied in confined spaces

Epoxy bond to steel provides leak sealing capability, chemical & environmental resistance



Flexible materials conform to difficult shapes

Materials formed to shape on site with no pre-fabrication

Lightweight repair kits are easy to transport & handle (can apply via rope access)

Industry guidelines provide confidence in solution

ASME PCC-2 Article 4.1 and ISO TS 24817

No hot work required - No interruption to plant operation - Repairs can last life of plant

FURMANITE

®

Controlled Bolting

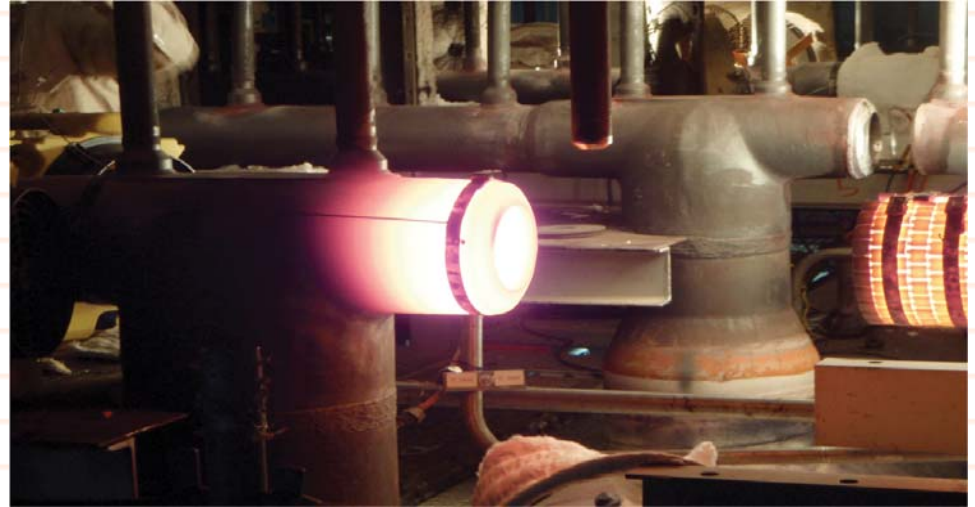
- Controlled bolting of flanges by Hydraulic tensioning tools or Torque tightening tools
- Most Furmanite technicians qualified and certified for bolting assignments



Heat treatment

Various types of heat treatment:

- Welding preheat
- Full annealing
- Post weld heat treatment (pwht)
- Hydrogen Bake Out
- Curing
- Curing of Composite repair
- Tempering
- Inductive heating



Range of use:

- Steel - Aluminium
- Titanium - Composite
- Pipes - Structures

Newly developed system with improved documentation saves time and money.



- 1 laptop
- 5 consolls
- 6 zones

Pipeline Intervention

- Hot Tapping
- Line Plugging
- Pipe Freezing



Hot Tapping

Furmanite utfører Hot Tap prosjekter over hele verden. Standard and spesialtilpasset utstyr er tilgjengelig for å møte de mest komplekse utfordringer, med rør opp til 48" og trykk opp til 100 barg ved 37°C eller 48 barg ved 370°C.

Alle Hot Tap operasjoner utføres av høyt kvalifisert og spesialtrente teknikere og arbeidet utføres i henhold til nasjonale og internasjonale standarder.



20" hot tap på 36" flare line



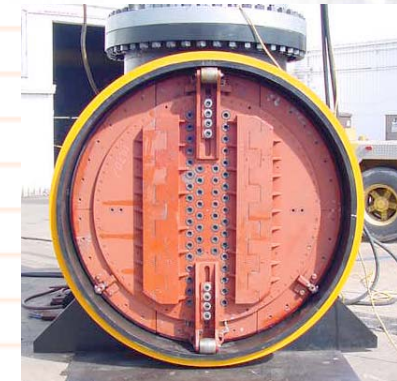
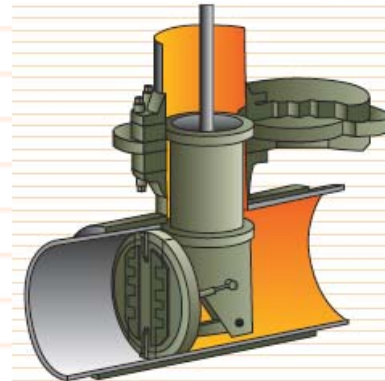
Kupong i kutteverktøy

Line plugging

Line Plugging er en måte å stoppe flow i et system hvor man ikke har andre muligheter til å stoppe systemet. Kan brukes i kombinasjon med en by-pass for å opprettholde drift på systemet.

The Furmanite folding head system

- Lettere utstyr gir enklere transport til site
- Redusert plassbehov i forbindelse med inngrepet
- Dimensjoner opp til 72" (ND 1800 mm)
- Trykk opp til 10 barg



60" folding head

Pipe freezing

Pipe Freezing

Pipe freezing brukes til midlertidig isolasjon av et system ved at man bruker flytende Nitrogen til å forme en solid isplugg inne i røret i kontrollerte former.

Tilgjengelig fra 1" til 36"



Condenser & Heat Exchanger Tube Restoration

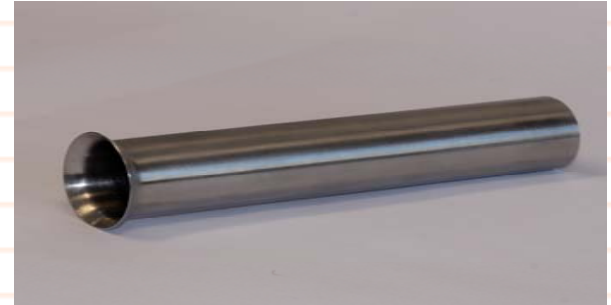
Cost-effective alternative
to re-tubing!

Shield/Seal inserts repair the damage near
the tube end. Typical length is 6" to 12".

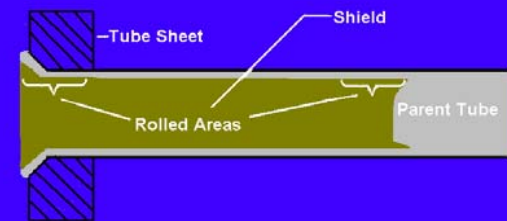
Full length liners are used when tubes suffer
from full-length problems

Once expanded – either mechanically or
hydraulically – the sleeve or insert becomes
integral with the parent tube.

Wide selection of materials is securing
prolonged lifetime and improved operations
efficiency.



INSTALLATION TECHNIQUE



Trevitest

...a certifiable on line valve testing service which won't disrupt system operation

- Reduction in fuel/ plant costs
- Reduction in commissioning time/ costs
- Can replace boiler or system 'float' operations
- Reduction in valve wear and tear over time
- Reduction in vessel pressure excursions leading to longer system life
- In the majority of cases, it can keep the system or plant fully operational throughout testing





Joint Qualification System

for suppliers to the Oil Industry in Norway and Denmark

Certificate of Qualification

Awarded to

FURMANITE A.S

Company Reg.no: 823164912

Achilles Id. 14698

Achilles Information Centre hereby confirms that
FURMANITE A.S
is qualified in the Achilles Joint Qualification System
for suppliers to the Oil Industry in Norway and Denmark.
The qualification concerns the product and service
categories listed in the appendix.



Oddvar Spang
Oddvar Spang
Achilles Information Centre
Interacting Director

Anja Thorsdalen
Anja Thorsdalen
Achilles Information Centre
Operations Manager

Issued Date:
21-Jul-2010

Expiry Date:
07-Aug-2011

The participating Oil Companies and Non-Contractors may use Achilles JQS as the basis for preparation of tender lists directly or together with additional qualification criteria established by the individual utility. Lower qualification stages may be added by the individual utility if more information is found necessary to complete the preparation of tender lists.



Nordic Utility Pre-Qualification System

Certificate of Pre-Qualification

Awarded to

FURMANITE AS

Company Reg.no: 823 164 912

Selliha Id. 110840

Selliha Qualification hereby confirms that
FURMANITE AS
is now fully registered as a supplier in
the Selliha Nordic Utility Pre-Qualification System
for the product/ service categories listed in the appendix.



Morten Minsaas
Morten Minsaas
Chairman, Selliha Steering group

Anja Thorsdalen
Anja Thorsdalen
Operation Manager



The participating utilities may use Selliha as the basis for preparation of bidder lists directly or together with additional qualification criteria established by the individual utility. Lower qualification stages may be added by the individual utility if more information is found necessary to complete the preparation of tender lists.

Date of issue: 31-okt-2011

Expiry date: 28-Oct-2012

