



CARBONSEAL™
by 

carbonsealrepair.com
STEEL PIPE

CARBONSEAL FEATURES & BENEFITS

- ✓ Stronger Than Steel and Fiberglass
- ✓ No Downtime, No Heavy Equipment, No Hot Work Permits Needed
- ✓ Abrasion Resistant - only 10mg loss per 1000 cycles at 40mils
- ✓ Temperature Resistant - HDT up to 500F
- ✓ Corrosion-Resistant and Chemical-Resistant to Acids, Alkalis and Solvents
- ✓ Tested and Approved by Det Norske Veritas (DNV) for ASME Standard PCC-2, "Repair of Pressure Equipment and Piping"

CARBONSEAL: THE HIGHEST STRENGTH AND RESISTANCE TO HARSH ENVIRONMENTS

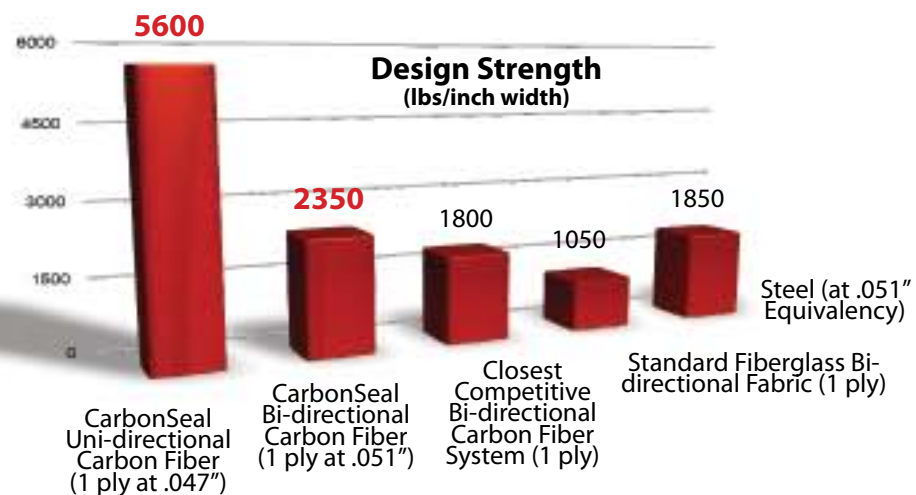
The CarbonSeal Steel Pipe Repair System meets the tough demands of your pipe applications. Whether it's protecting structures exposed to aggressive environments or strengthening your corroded and damaged pipe, our systems save you significant money over traditional repairs or replacement.



CarbonSeal Systems are designed for multiple pipe configurations including tees, elbows, straight runs, 90's, and blind flanges

STRENGTH

Higher strength means less material and less labor



STEEL PIPE

CHEMICAL RESISTANCE

Typical Chemical Resistance of CarbonSeal by Industry Type:*

Metals and Mining	Petrochemical	Pulp & Paper
Sulfuric Acid	Hydrocarbons	White Liquor (Sodium Sulfide)
Copper Sulfate	Gasoline	Green Liquor
Pine Oil	Diesel	Black Liquor
Ammonium Nitrate	JP-4 Jet Fuel	Sodium Hydroxide
Alcohol	Kerosene	Lime (Calcium Oxide)
Petroleum Distillate	Benzene	Bleach (Sodium Hypochlorite)
Sulfosuccinate Surfactant	Hydrochloric Acid	
Food and Agriculture	Power Generation	Wastewater
Citric Acid	Process Water	Hydrogen Sulfide
Anhydrous Ammonia	Flue Gas	Effluent Waste
Lard	Sodium Carbonate	Methanol
Soy Bean Oil	Bromine	Hydrogen Peroxide
Stearic Acid	Muriatic Acid	
Coconut Oil	Lime Slurry	



The CarbonSeal carbon fiber is lightweight, flexible and conforms to the pipe for easy installation

*Please call 520-322-0010 or Toll-Free (US) 877-303-0453 to speak to a Project Manager for additional technical support

" We were able to use less material and less labor to install a system that would give us the equivalent of 3/8-inch steel on the outside of this pipe. We were thrilled when using HJ3's materials. "

Pete K, Industrial Contractor, Northeast USA



CARBONSEAL CASE HISTORIES

● STEEL PIPE

GENERAL CONCRETE
MANHOLES
STEEL TANKS
UNDERGROUND PIPE
UNDERGROUND TANKS

CORRODED STEEL PROCESS VAPOR LINE

ALASKA

The refining process at natural gas plants and oil refineries produces combustible, hydrocarbon vapors that must be disposed of safely. These vapors flow through a process vapor header, where the explosive limit range is very particular.

Incorrect rate of gas and condensate flow could result in an improper mix of gases and possible combustion, or accidental release into the environment if they fail to combust in the incinerator. In this particular case, an ASTM A106 – Grade B steel vapor line header had become corroded both internally and externally, resulting in a decrease in hoop strength throughout the entire structure.

● PROBLEM

Over time, the entire steel header pipe had corroded from the inside due to exposure to condensate, which was a result of moisture mixing with the crude oil vapor. The corrosion led to loss of steel, causing large through holes in the 20" pipe.

The steel header connected to a 42" diameter pipe, which also needed reinforcement. The repair needed to be done while ensuring the internal pipe process did not ingress air (oxygen) in order to avoid possible combustion or hydrocarbon vapor leaking out into the external environment.

● INSTALLATION

The CarbonSeal repair system incorporated a chemical resistant base coat to protect the composite wrap from constant chemical exposure. The pipe was prepared to white metal using mechanical hand tools. After surface prep, the pipe was primed and sealed with CarbonSeal carbon fiber, before being top coated for extra chemical protection.

● CONCLUSION

The CarbonSeal repair system saved the client more than \$300,000 over the alternative cost of replacement. No hot work permits or welding was required, and the repair required no downtime.

● STRAIGHTS

ADDITIONAL STEEL PIPE REPAIR APPLICATIONS

● STEEL RISERS



● BLIND FLANGES



● ELBOWS



● TEES



HJ3 WORKING FOR YOU!

1 GATHER INFORMATION

Send us your "As-Built" drawings, completed CarbonSeal Worksheet and pictures of your application.

MARKETING
PRODUCTION
CUSTOMER SERVICE

2

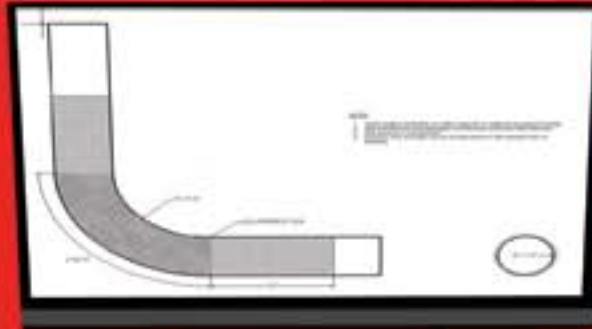
KICK-OFF MEETING

HJ3 Project Managers review the information provided and contact you to obtain additional information.

3

PRELIM DESIGN

HJ3 Engineers diagnose the problem and calculate a preliminary design to strengthen your application. Once completed, HJ3 sends you a final proposal that outlines the CarbonSeal repair system.



4

STAMPED DRAWINGS

After you approve HJ3's proposal, HJ3 completes final engineering calculations and submits full construction drawings stamped by a licensed P.E.

SHIPPING
PRODUCTION

5

INSTALLATION

HJ3's Field Technician and Certified Contractor install the CarbonSeal Pipe Repair Kit per the final drawings. Services include QA, QC, and on-site testing per ASTM standards.

6

TOUCHDOWN MEETING!

HJ3 meets with you to obtain your feedback and answer any remaining questions. Upon request, HJ3 Project Managers submit a final project report documenting the installation.

CARBONSEAL GETTING STARTED

The CarbonSeal products are designed with you in mind. To help you determine which CarbonSeal Steel Pipe Repair System is the best solution for your application, HJ3 provides the following tools:

- ✓ Electronic Worksheets
- ✓ Engineering Drawings
- ✓ On-site Assessment
- ✓ Testing Support
- ✓ Case Histories
- ✓ References

CARBONSEAL STEEL PIPE PROJECT

SECTION 1: NARRATIVE

1 Requesting a Proposal (P), Quote (Q) or Rough Order of Magnitude (ROM)? P Q ROM

2 What date and time is the document desired?

3 Are "As-Built" plans available for review? YES NO

4 Description of Damage: YES NO
22 year old carbon steel pipe showing corrosion due to exposure to acidic condensation.

5 Are photos or videos available of the areas to be repaired? YES NO

6 The purpose of the repair / retrofit is to (select all that apply):
Bring structure back to original design values YES NO
Increase load capacity YES NO
Mitigate corrosion YES NO
Other (please specify):

7 Any temperature / moisture / chemical operating extremes? YES NO

8 Describe any visible damage to the substrate(s): YES NO
Corrosion?
UT testing shows an 80% steel loss on the steel pipe.

SUGGESTED SOLUTION

CARBONSEAL STEEL PIPE REPAIR KIT

BUY NOW!

KIT CONTENTS

- Carbon Fiber, pre-measured and cut to length
- Epoxy Resin Packs, pre-measured and batched
- Tools required to complete the installation

CONTACT US FOR HELP

DEPENDING ON YOUR PROJECT NEEDS
Turnkey pipe repair kits available for:

- Tees
- 90's
- Straight Runs
- Elbows
- Blind Flanges

HJ3 COMPOSITE TECHNOLOGIES, LLC
2440 West Majestic Park Way Tucson, AZ 85705
Ph: 520-302-0453 877-303-0453 Fax: 520-302-0453
hj3.com

If you have a specific pipe application you would like reviewed, please contact an HJ3 Project Manager to schedule an on-site survey.

CONTACT HJ3

Or request and complete the Steel Pipe Repair Worksheet, and HJ3's engineering team will diagnose the problem and send you engineered systems in a matter of days.

Call us toll-free at **877-303-0453** or send our Project Managers an email at **hj3pm@hj3.com**
Visit us any time of the day at **carbonsealrepair.com**



WHO IS HJ3?

the strongest name in carbon fiber

HJ3 Composite Technologies provides the most comprehensive line of strengthening products in the world for fortifying and protecting structures against earthquakes, blasts, and environmental damage, at a fraction of the cost of replacement.

Over the last 10 years, we have become the leading provider of carbon fiber repair systems to heavy industry, supporting Fortune 500 companies operating in pulp and paper, oil, gas, water and wastewater, mining, and power generation.

Not only are our products 40%-50% stronger than competitors per ply, they are designed to withstand high temperatures, abrasion, and aggressive chemical environments.

HJ3 has completed over 20 years of large-scale testing to support the use of our products for concrete, steel, wood and masonry applications.

We are proud to service clients around the globe and look forward to the opportunity to support your infrastructure applications.



WE ARE ON A MISSION

To set the worldwide standard for global infrastructure repair using high-strength composites, through continuous innovation and unwavering customer service, to prevent the loss of lives and resources.

WE ARE HERE FOR YOU

Our certified installer network has installed more than 3,000,000 square feet of HJ3 carbon repair systems worldwide.

Bahrain . Canada . Colombia . DR Congo . El Salvador . Haiti . Indonesia . Iraq . Jordan . Mexico . Qatar . Singapore . South Africa . Thailand . Turkey . UAE . USA



WE ARE COMMUNITY DRIVEN



Community Outreach

The HJ3 team takes a 'hands-on' approach when it comes to community service. Reaching out to those in need is as important to us as building relationships with our clients. Some of the organizations we have worked with include Habitat for Humanity, the Cystic Fibrosis Foundation, Goodwill, and the Salvation Army's "Adopt a Family" program.



Educational Support

HJ3 frequently supports education-based efforts to give back to the next generation, as we appreciate the knowledge and experiences we ourselves have gained over the years. Whether it is speaking at a college or university, volunteering for university events, or hiring and mentoring undergraduate, graduate and high school student interns who are interested in the composites industry, we are dedicated to supporting young, entrepreneurial minds.



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by



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