

A large industrial steel tank is shown under renovation. Two workers in full-body protective suits and respirators are visible on a platform inside the tank, working on a section of the interior wall. The tank's interior is dark, and the workers are illuminated by bright work lights. The scene is framed by a large, curved blue graphic element that sweeps across the top and bottom of the image.

CARBONSEAL™
by 

carbonsealrepair.com
STEEL TANKS

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

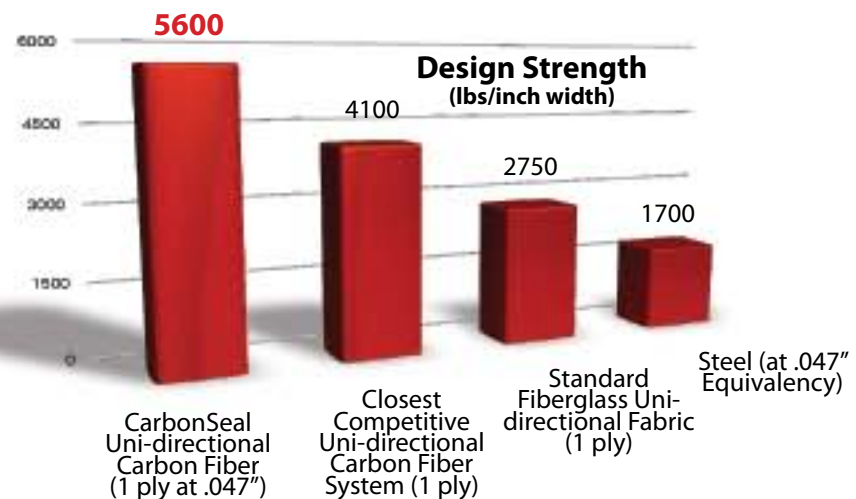
The CarbonSeal Steel Tank Repair System meets the tough demands of your tank applications. Whether it's protecting structures exposed to aggressive environments or strengthening your damaged tank, our systems save you significant money over traditional repairs or replacement.



The CarbonSeal Steel Tank Repair System can be applied to the inside surface of a steel tank and the outside surface

STRENGTH

Higher strength means less material and less labor



STEEL TANKS



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 Steel Tank Repair System is resistant to corrosion and aggressive chemicals, so no future maintenance is needed on the repair

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

" We installed the CarbonSeal Tank Repair System as a 3 year repair. That was 7 years ago and it is still doing great. "

Jim M, Project Manager, Pulp & Paper Plant



CARBONSEAL CASE HISTORIES

● STEEL TANKS

GENERAL CONCRETE
MANHOLES
STEEL PIPE
UNDERGROUND PIPE
UNDERGROUND TANKS

PULP AND PAPER PLANT LEAKING STEEL TANK

TENNESSEE

Pulp and paper plants utilize large, steel, high-density tanks to store pulp. In this particular pulp and paper facility, a steel tank that stood 100 feet tall and 50 feet in diameter experienced significant corrosion resulting in over 900 through-holes.

● PROBLEM

Corrosion to the steel tank walls ranged from 30% to 50% steel loss on the upper 50% of the steel tank. Replacing the existing tank with a new tank would have cost \$2.5 million. However, the company could not afford the interruption to plant processes and the associated downtime costs.

● INSTALLATION

After lowering the volume of the tank to 50% capacity, the steel substrate was abrasive blasted and cleaned to white metal. After surface prep, 900 through-holes were patched to create a consistent surface. Next, the surface of the clean tank was primed. After priming, the CarbonSeal carbon fiber was saturated and bonded to the steel tank walls. Installation was completed in 6 weeks with no downtime.

● CONCLUSION

The CarbonSeal repair system saved the client more than \$2 million dollars over the cost to replace the facility's high-density tank - with no downtime! While the plant required the repair to last 3 years, it has been in service for over 7 years with no problems.

COPPER MINE STEEL TANK REPAIR

NEW MEXICO

Mines utilize large steel tanks to store water that is used in various plant processes. In this particular copper facility, a steel tank that held 2.5 million gallons of water suffered from severe corrosion to its steel shell, resulting in fatigue, cracking and leaks.

● PROBLEM

Corrosion to the steel tank walls ranged from 25% to 60% steel loss on the upper 70% of the steel tank. Welded repairs were attempted but trapped moisture accelerating corrosion at those areas. The storage tank provided the required water for all plant operations and could not be shut down for repair or replacement.

● INSTALLATION

The internal and external steel substrate was abrasive blasted and cleaned to white metal. After surface prep, all through-holes were patched on the inside of the tank prior to installation of the internal coating. Next, the external surface of the clean tank was primed. After priming, the CarbonSeal carbon fiber was saturated and bonded to the steel tank walls.

● CONCLUSION

The CarbonSeal installation was completed in 8 weeks and resulted in over \$5,000,000 in savings compared to the cost of replacement. The plant selected the CarbonSeal system because it could be installed without interrupting plant operations. The tank has been in service for 3 years with no problems.

HJ3 WORKING FOR YOU!

1 GATHER INFORMATION

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

MARKETING
CUSTOMER SERVICE

2

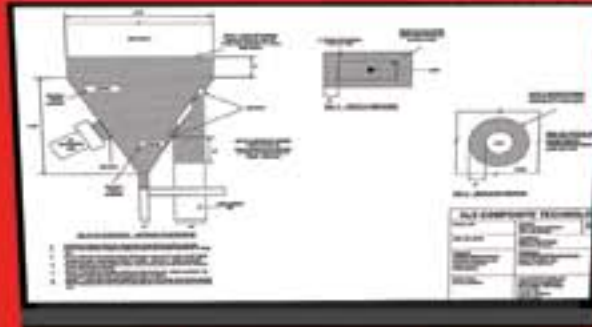
KICK-OFF MEETING

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
PRODU

5

INSTALLATION

HJ3's Field Technician and Certified Contractor install the CarbonSeal Steel Tank 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 Tank 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

HOME WORKSHEETS

CARBONSEAL STEEL TANK PROJECT

NARRATIVE WORKSHEET DIMENSIONS & MATERIALS SKETCHES

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? 2011-11-02

3 Are "As-Built" plans available for review? YES

4 Description of Damage:
Corrosion to the steel pulp storage tank has resulted in 900

5 Are photos or videos available of the areas to be repaired? YES

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

8 Describe any visible damage to the substrate(s):
Corrosion? YES

UT testing shows an 80% steel loss on the steel tank.

PHOTOS & DRAWINGS REFERENCES

TAP TO SELECT A PHOTO OR DRAWING, SLIDE RIGHT OR LEFT TO SCROLL THROUGH THE LIST

Add Photo

SUGGESTED SOLUTION

CARBONSEAL STEEL TANK 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 steel tank repair kits available:

- Internal Applications
- External Applications

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 steel tank 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 Tank 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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STEEL TANK REPAIR SYSTEMS

by



hj3.com

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