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Very Simple.



# Synavax<sup>TM</sup> Energy Saving & Protective Coatings for Oil & Gas Manufacturing



Protect Your Assets From CUJ,  
Corrosion & Weathering  
And Save Energy Too!







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## About Synavax™ Coatings

**Synavax™ coatings** are based on a patented technology that utilizes a nanomaterial with an extremely low thermal conductivity and hydrophobic (water repellant) nature. This material allows the coatings to effectively **inhibit heat transfer with a thin layer**, while also providing other performance benefits such as:



- ✓ Corrosion prevention
- ✓ Moisture resistance
- ✓ Surface Temperature Reduction
- ✓ Chemical resistance
- ✓ Lead encapsulation
- ✓ Mold resistance
- ✓ Durability in extreme environments

is certified to the ISO 9001:2008 Quality Management System

### **WE MAKE A DIFFERENCE. DAILY!**

We have been providing sustainable solutions around the globe , in over 60+ countries, for well over a decade. Here's why:

These insulating products have helped industrial companies reduce their overall energy costs related to heat producing processes by a reported range of 10%-25% and helped residential and commercial building customers reduce heating and cooling costs by a reported range of 20%-40% or more.

*Note: The information given in this document is deemed to be accurate, however is not guaranteed. No warranty, express or implied is given regarding the accuracy of this information. Each application is unique, and findings may be different due to environmental conditions. In no event is Synavax™ responsible for any damages whatsoever in connection with the use of or reliance on this information.*



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# Put Synavax™ Technology to Work for You



Thermal Insulation  
Energy Savings



Corrosion/CUI  
Prevention



Asset Protection/  
Longevity



Reduce Carbon  
Footprint



Easy, In Service  
Application



Safe Touch  
Solutions



Protects from  
Salt Air & Spray



Mold and Mildew  
Resistant



Resistant to UV  
and Color Fade



Sustainable &  
Eco Friendly



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# Example Projects Gallery



**Insulation & CUI Mitigation**  
**Sinopec - Offshore**  
East China Sea



**Brine Reactor Column Insulation**  
**Chemical Manufacturer**  
Middle East



**Steam System Insulation**  
**Pemex – Offshore**  
Mexico



**Insulation & Corrosion Control**  
**Hot Water Pipeline**  
Indonesia



**Insulation & Corrosion Control**  
**Grupo Modelo (Corona Beer)**  
Guadalajara, Mexico



**Tank Insulation**  
**Weyerhaeuser Pulp/Paper**  
Savannah, Georgia, USA



**Pipeline & Storage Tank Insulation**  
**Galp Energia**  
Portugal



**Metal Building Insulation & Protection**  
**U.S. Navy**  
Portsmouth Naval Shipyard, Maine



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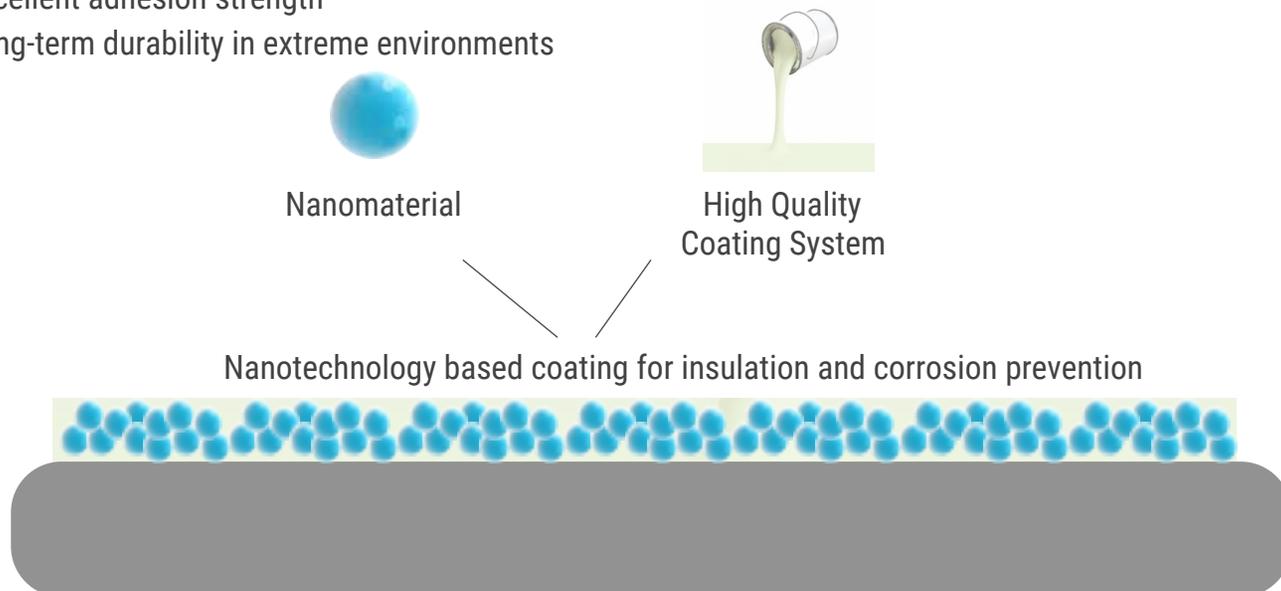


## How it Works

Nanotechnology is the engineering of functional systems at the molecular scale. In its original sense, 'nanotechnology' refers to the projected ability to construct items from the bottom up, using techniques and tools being developed today to make complete, high performance products and materials with new and unique performance qualities.

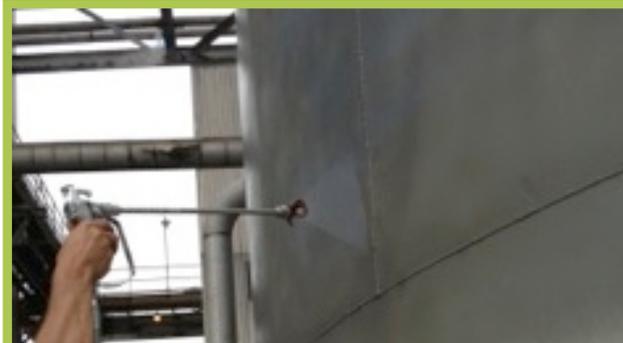
Hydro-NM-Oxide is a nanomaterial that is used in our patented water-based coating that has key qualities that make it perfect for corrosion prevention and eliminating CUI:

- ✓ Hydrophobic (water repelling)
- ✓ Low thermal conductivity
- ✓ Excellent adhesion strength
- ✓ Long-term durability in extreme environments





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Forms tight bond with surface | Prevents corrosion and CUI



Water repellent, moisture does not infiltrate between coating and surface



Additional UV resistance, increases lifespan in outdoor environments



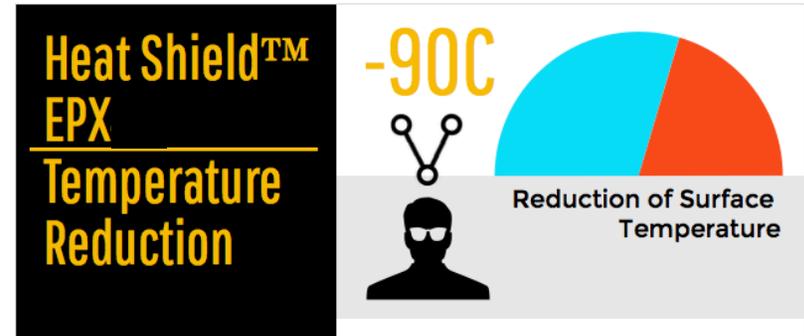
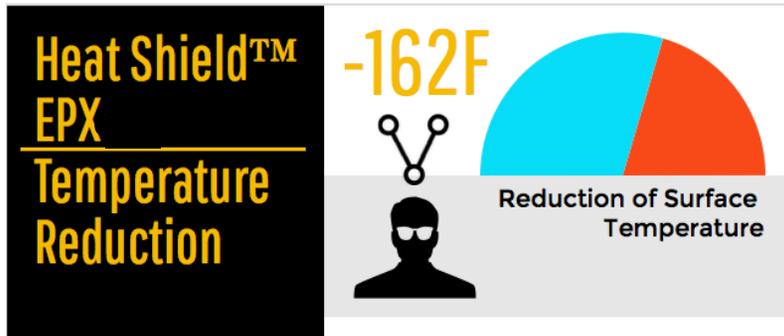
Acts as a thermal barrier, eliminates need for most other types of older insulation



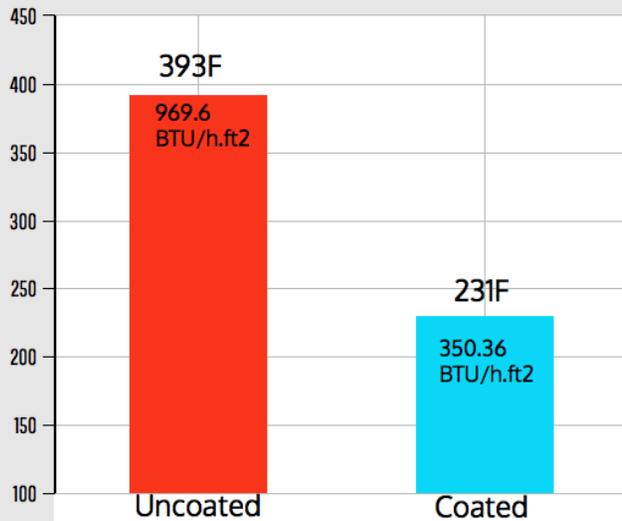
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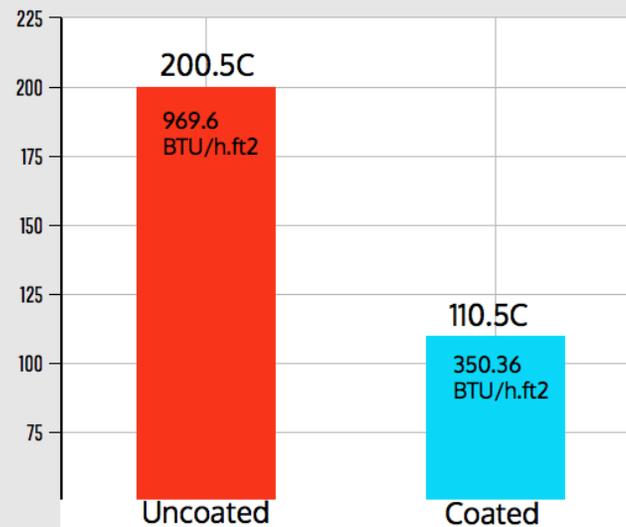
# Temperature Reduction



Temperature Reduction with just 6-coats



Temperature Reduction with just 6-coats





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# Product Comparison

*Insulate with Synavax™ - a product that lasts!*

<b>Standard Fibrous System</b> (20 <sup>th</sup> Century Technology)	<b>Synavax™ Heat Shield™ High Heat Coating</b> (21 <sup>st</sup> Century Technology)
1. Corrosion Control Coating 2. Rockwool or Fiberglass 3. Aluminum Cladding	1. Heat Shield™ High Heat Insulation & Corrosion Control Coating
Average Cost per S.F. - \$3.06	Average Cost per S.F. - \$3.87
Rust-Free warranty: 2 years  Typical Insulation lifespan in severe environment 1-2 years	Insulation & Corrosion warranty: 5 years  Typical Insulation lifespan in severe environment 5-10 years
<b>Product Cost for Typical Application over Fuel Oil Tank (labor not included)</b> (197'60m Dia. x 59'18m H; 75,347 S.F./7000 m2surface area )	
Year 1: \$230,562 Year 6: x 3 applications: \$691,686	Year 1: \$291,593 Year 6: x 1 application: \$291,593 <b>6-year Savings of \$400,093! (\$5.31/S.F.)</b>

Application of 1-coat rust control coating, 1 ½" Rockwool, aluminum cladding.

Application of 12-coats Heat Shield™ High Heat coating



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## Old Way versus New Way

### Old method used to Insulate Pipes/Tanks/Equipment:

Fiberglass, Rockwool or other fibrous material wrapped around pipe with a protective sleeve or cladding added to top as a protective cover.

The temperature differential created at the interface between the insulation and the pipe or equipment, causes condensation. This moisture is trapped between the insulation and the pipe and causes corrosion. Additionally, as the fibrous insulation gets wet, the water conducts heat and the insulation becomes less effective.



Photo credit: Demm Engineering & Manufacturing magazine, April 2010



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## Old Way versus New Way

### **New method used to Insulate Pipes/Tanks/Equipment:**

Synavax™ insulation coating is sprayed over the pipe or equipment surface at the appropriate number of layers according to insulation needs (usually 4-10 layers), or 2-layers if corrosion resistance only is desired. No exterior cladding or cover needed .

The coating forms a tight bond with the surface that doesn't allow water penetration between the layers. Corrosion prevention and insulation are provided by the same product with visual inspection and in some cases, ultrasound inspection, possible without need for removal.



Photo credit: Synavax™



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# Synavax<sup>TM</sup> Coating Benefits

## 20% Average Energy Savings

Customers who insulate their equipment with Synavax<sup>TM</sup> liquid insulation coatings report savings on average of 20%.

## Proven In Industry

Synavax<sup>TM</sup> coating technology has been used in multiple industries since 2004 for innovative insulation, energy savings and protective surface solutions.

## Short Return on Investment

Industrial customers typically report ROI in 6-18 months.

Building customers typically report ROI in 3-5 years

## Easy, Versatile Application

Spray, roll, or brush applied, the coatings can also be applied in-service. Direct to metal, and no cladding is required.

## Extended Lifespan

Synavax<sup>TM</sup> coatings have a lifespan of approximately 5-10 years or more in industrial and outdoor environments, and of 10+ years in interior building environments.

## Multiple Benefits

In addition to thermal insulation, Synavax<sup>TM</sup> coatings are used for rust prevention, mold resistance, UV resistance, lead encapsulation, and surface protection.



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# Oil & Gas Equipment Applications



## Pipes and Tanks

- ✓ Oil & Gas Pipeline
- ✓ Water Pipelines
- ✓ Hot Water Pipelines
- ✓ Methanol Tanks
- ✓ Biofuel Tanks
- ✓ Oil Storage Tanks
- ✓ Pipeline Supports
- ✓ Oil & Gas Vessels
- ✓ Hot Water Tanks
- ✓ and more...

## Short Return on Investment

- ✓ More efficient product delivery
- ✓ Reduce loss due to evaporation
- ✓ Prevent corrosion under insulation (CUI)
- ✓ Reduce energy consumption
- ✓ Reduce heat loss or gain
- ✓ Moisture and UV resistant
- ✓ Non-toxic, low VOC
- ✓ Long-term, consistent performance
- ✓ No exterior cladding needed
- ✓ 5-10 year lifespan
- ✓ Chemical Resistant (EPX)
- ✓ Fast curing, fast results (EPX)



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## Industrial Products Overview

### Heat Shield™ EPX-H2O | 2-part Insulation & Corrosion Prevention Coating

Our #1 Industrial Coating – Up to 400F/204C

Uses: Steam pipes, boilers, valves, processing tanks, both heat and cold process applications. Fast cure. White or Grey, pebbled finish



### Heat Shield™ High Heat | 1-part Insulation & Corrosion Prevention Coating

When a smooth finish is needed – Up to 400F/204C

Uses: Steam pipes, boilers, valves, processing tanks, and other heat process applications. Opaque if applied 170F and above, clear if applied less than 170F, smooth finish



### Heat Shield™ PT | 1-part Insulation & Corrosion Prevention Coating

Lower Temperature Solution – Up to 256F/125C

Uses: Hot water pipes, storage tanks, bottle washers, railings, metal buildings, and other metal surface applications. Opaque if applied 170F and above, clear if applied less than 170F, smooth finish





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## Customer Case Studies

*"Because of global warming, our duty is to make use of energy as efficiently as possible; wasted energy is wasted national wealth. This is why I highly recommend this Synavax<sup>TM</sup> technology to all of textile industry and other heat using industries."*

*-Eyüp Sözdinler, General Manager, Henateks A.S.  
(manufacturer for Nike, Adidas, and Tommy Hilfiger)*





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# Customer Case Studies

## Client

Sinopec (China's oil & gas co.)  
East China Sea

## Project

High Heat coating was used as a significantly better replacement for their older rock wool with cladding system.

## Details

Sinopec successfully completed a winter study trial from October 2012 to March 2013. Heat Shield™ High Heat provided them a better solution than the formerly used rock wool with cladding over their fuel oil storage tank on an offshore platform.

Their final analysis showed that Synavax's™ High Heat coating at a 12-layer coverage insulated within 3 deg. C of the 8cm rock wool with cladding, plus it prevented corrosion, which the rock wool was causing. Additionally, the coating lasts much longer, which greatly reduced replacement/maintenance costs.

## Effective Offshore Environment Insulation And Corrosion Prevention



罐体整体外观

拆除岩棉下的锈蚀



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# Customer Case Studies

## Client

Galp Energia  
Matosinhos Refinery, Portugal

## Project

2010 – Insulation & corrosion control of oil pipeline  
2011 – Insulation & corrosion control of fuel storage tanks

## Details

Heat Shield™ Translucent PT was used in 2010 for insulation and corrosion control of an oil pipeline.

2011/2012 – Heat Shield™ Translucent PT was used to insulate and prevent corrosion for four large fuel oil storage tanks.

## Insulate & Prevent CUI For Pipelines and Storage Tanks





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# Customer Case Studies

## Client

Enap Sipetrol  
AM6 offshore Platform, Argentina

## Project

Heat Shield™ Translucent PT used for insulation and corrosion control of offshore platform pipeline.

## Details

Heat Shield™ PT was applied in three coats for a total average thickness of 350 microns to exterior of the pipeline. Surface temperature of pipeline was measured to determine reduction of heat loss from petroleum products.

Prior to application, the average temperature of the pipeline exterior was 140F (60C). With Translucent PT, the average temperature of the pipeline exterior was 107.6F (42C) resulting in significant energy savings.

## Average Surface Temperature Reduction of 32F (18C)





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# Customer Case Studies

## Client

Yang Ming Marine  
(3,725 TEU Container Vessel)

## Project

Heat Shield™ High Heat was applied to the tubular system and tanks of the HFO (Heavy Fuel Oil) system for insulation and corrosion prevention

## Details

The coating reduced the diesel fuel used to heat the HFO system by 30%, reducing the daily diesel fuel use by 360 liters per 24 hours, which equates to more than 7,500 liters of diesel fuel saved during a typical 21 day round trip Asia/US/Asia journey, equivalent to approximately \$3,525 USD in cost savings. The High Heat insulating and anti-corrosion coating was applied at a coverage of 6-coats, totaling a 200 micron dry film thickness. The cost of application and materials used to insulate the HFO tanks and tubular systems was \$16,100 USD. Payback was achieved after 95 days of sailing.

**30% Fuel Savings | Payback In 95 Sailing Days**





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# Customer Case Studies

## Client

Large Textile Manufacturer  
Mexico

## Project

The manufacturer had an issue with heat from 6 process ovens transferring through a large metal wall into a mezzanine area.

## Details

Heat Shield<sup>TM</sup> Translucent PT was applied at a 3-coat coverage to a 3x3 meter section of the wall to illustrate the insulation performance. Even before the coating was fully cured measurements showed a reduction of wall surface temperature from 39.9C (103.8F) to 24.8C (76.6F).

A reduction of 15.1C / 27.2F.

With further reduction expected after the coating cures fully.

## Surface Temperature Reduction Of 27.2F/15.1C





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# Customer Case Studies

## Client

Large U.S. Hospital

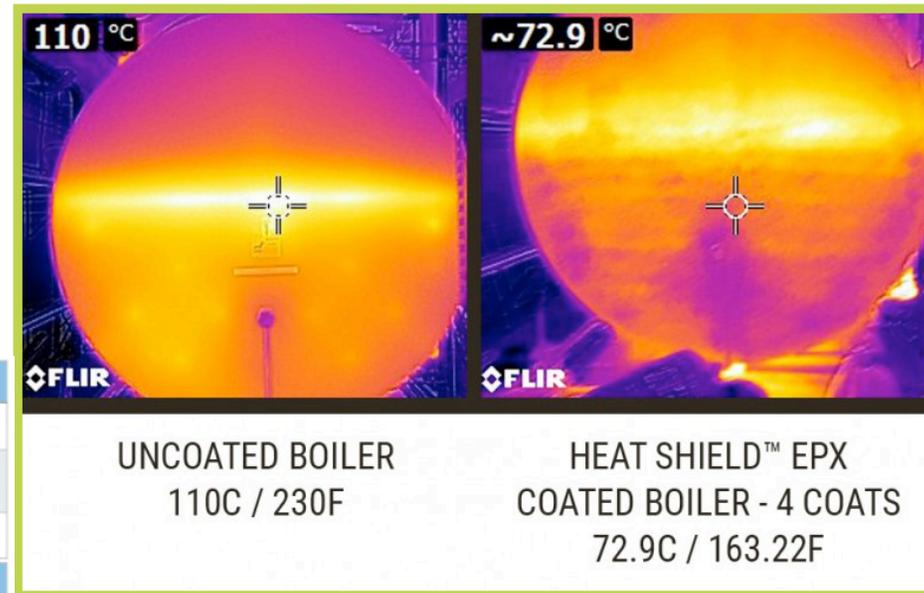
## Project

The application on the boiler was performed in two steps, Day 1: 4-coats of the Heat Shield™ EPX-H20; and Day 2: 2 more coats of EPX-H20 were added for a total of 6-coats. Just hours after each application the results were as follows:

## Details

	BEFORE COATING	AFTER 4-COATS	DIFFERENCE
Celsius Temperature	110C	72.9C	-37.1C
Fahrenheit Temperature	230F	163.22F	-66.78F
Heat Loss in BTU/h.ft2	347.36 BTU/hr.ft2	167.72 BTU/hr.ft2	-179.64 BTU/hr.ft2
	BEFORE COATING	AFTER 6-COATS	DIFFERENCE
Celsius Temperature	110C	57.8C	-52.2C
Fahrenheit Temperature	230F	136F	-94F
Heat Loss in BTU/h.ft2	347.36 BTU/hr.ft2	106.30 BTU/hr.ft2	-241.06 BTU/hr.ft2

Lowered surface temperature by 94F (52.2C), estimated calculated energy savings of 241.06 BTU/hr.ft2.





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# Customer Case Studies

## Client

Henateks Textile  
Manufacturer for Nike, Adidas, and  
Tommy Hilfiger

## Project

Insulation of dye machines, steam boiler,  
steam pipes, heat exchangers with 13-15  
coats Heat Shield™ High Heat coating.

## Details

ENERGY USE REDUCTION: 20%  
Project cost: \$300,000  
(\$200,000 materials, \$100,00 installation)  
LNG Consumption Reduction:  
2007: 1,114,152 Sm3  
2008: 1,097,144 Sm3  
Energy Cost Savings:  
2007: \$392,275  
2008: \$460,162  
Project Payback: 7 months

**Energy Use Reduced by 20%**  
**Project Payback: 7 months**





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## Customer Case Studies

### Client

Elasteks Textile  
Istanbul, Turkey

### Project

Heat Shield™ EPX-H20 coating used  
to insulate dyeing machines and  
associated heat process equipment

### Details

Following application and cure time, they used a hot water meter to measure condensed steam to measure energy use, and their data showed a reduction in energy consumption of 51% as compared to before using EPX.

The steam consumption in kg per dyeing process cycle was measured over a period of 3 months, comparing before and after application steam consumption per each process cycle:

**Before EPX-H20: 1,326 kg steam**

**After EPX-H20: 651 kg steam**

### Reduction Of Energy Use By 51%



Reduction of energy use of 51%



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# Customer Case Studies

## Client

Weyerhaeuser Paper Mill  
Savannah, GA

## Project

Black liquor tank insulation and  
corrosion prevention

## Details

Heat Shield™ Translucent PT was applied at a 6-coat coverage to insulate and reduce the exterior temperature from 200F to approximately 138F.

Two PT tank projects have been completed to date at their Savannah, Georgia facility.

## Effective Outdoor Insulation And Corrosion Prevention





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# Testing Data | Resistance To CUI

The 100 day cyclical temperature and salt spray test showed that there were no visible signs of cracking, flaking or disbondment, and the coating maintained a consistent insulating ability.

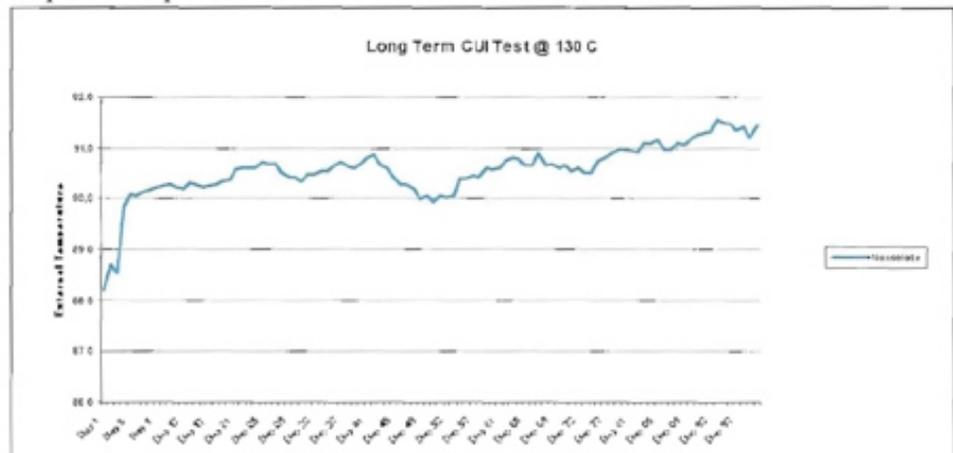
## British Petroleum Standard: BC/BP/JC issue 1 revision C | CUI Exposure Test

The oil was heated to 130°C and held for 100 days. During the 100 days the coating was sprayed with artificial seawater periodically over every 24 hours. Before the exposure test the coating has 0.20mm holidays milled through the coating to the substrate at three locations and saw cuts were made through the coating at the top and bottom of the cornered joint. Testing was performed over a pipe section filled with oil and coated with 3-coats Synavax™ Heat Shield™ High Heat coating.

CUI Exposure Test	
Test Specification BC/BP/JC issue 1 revision C	
Result	
After completing the exposure the coating exhibited no visible signs of cracking, flaked or disbondment.	

CUI Exposure Test		
Rating Assessment After Exposure		
Test Specification	Assessment	Rating
BS 3900 Part H2	Degree of Blistering	2(S4)
BS 3900 Part H3	Degree of Rusting	Ri3 (less than 1%)
BS 3900 Part H4	Degree of Cracking	0(0)
BS 3900 Part H5	Degree of Flaking	0(0)

Graph: CUI exposure test





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# Testing Data | Thermal Conductivity

The test showed that the coating maintained a consistent insulating temperature throughout the test and did not exhibit signs of cracking, flaking or disbondment.

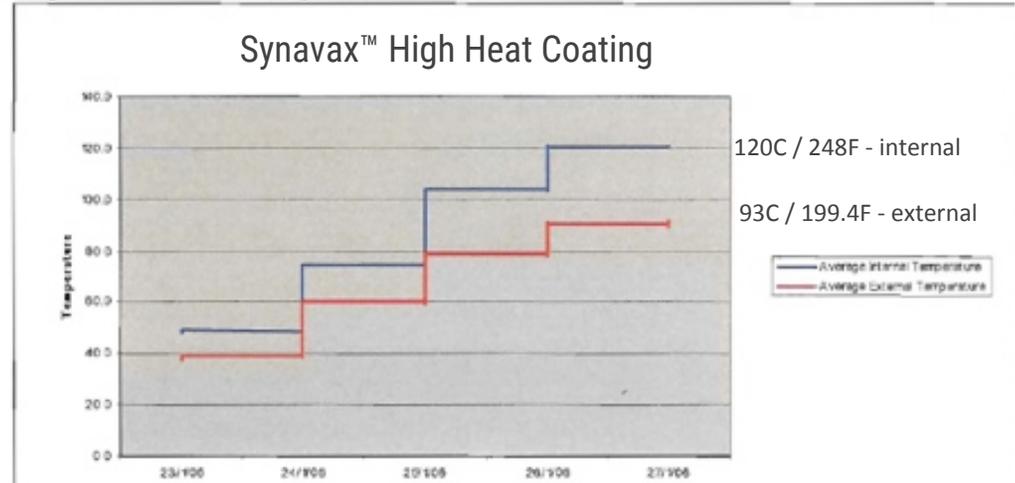
## British Petroleum Standard: BC/BP/JC issue 1 revision C | Thermal Conductivity Test

The oil was heated to 60°C and held for 24 hours then increased to 90°C and held for 24 hours then increased to 110°C and held for 24 hours then increased to 130°C. Testing was performed over a pipe section filled with oil and coated with 3-coats Synavax™ Heat Shield™ High Heat coating.

Thermal Conductivity Test	
Test Specification BC/BP/JC issue 1 revision C	
Result	
After completing the exposure the coating exhibited no visible signs of cracking, flaked or disbondment.	

CUI Exposure Test		
Rating Assessment After Exposure		
Test Specification	Assessment	Rating
BS 3900 Part H2	Degree of Blistering	2(S4)
BS 3900 Part H3	Degree of Rusting	Ri3 (less than 1%)
BS 3900 Part H4	Degree of Cracking	0(0)
BS 3900 Part H5	Degree of Flaking	0(0)

Graph: Thermal conductivity test





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## Testing Data | Corrosion

Exceptional corrosion and CUI resistance even in the harshest of offshore or factory environments. Meets the toughest oil & gas and industry corrosion standards.

### Independent 3rd Party Testing:

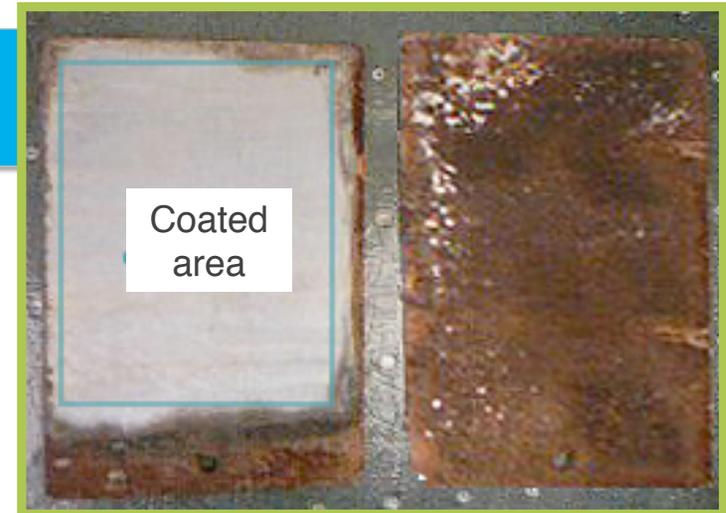
By the NADCAP accredited laboratory Assured Testing Services

The GM9540P Accelerated Salt Fog Corrosion Test is an advanced cyclic method originally developed by General Motors and now the corrosion test preferred by the US Navy and many industries.

GM9540P replicates many of the worst-case environments. The popularity of cyclic testing comes from the improved reliability of results that can be correlated with actual use. Cyclic refers to the repeated changes in test conditions, ideally to replicate the changing environments where the product will be used.

### Our Results:

Testing was done simultaneously on a steel control (uncoated) panel and panels coated with Synavax™ coatings. The results show that after 1 cycle of the test, the steel control (uncoated) panel failed with 100% red rust present, and that after 24 cycles of the test, the Synavax™ coated panel passed with no red rust present. Passing 8 cycles is considered the standard for an anticorrosion coating.





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## Testing Data | Thermal

- 1) UNI EN ISO 8990:1999, "Standard Test Method Thermal Performance of Building Assemblies"  
3-coats over 8cm cement wall sections

Heat transmission reduced by 34.8%  
Thermal resistance (1/U) increased by 28.98%

- 2) ASTM E1530, "Resistance to Thermal Transmission"  
2-coats over concrete roof tiles

Heat transmission reduced by 29.7%

- 3) ASTM C518 / ISO 8301, "Thermal Conductivity" – At cold temperatures, 0 deg. C/32 deg. F  
4-coats and 8-coats over glass

4-coats at 32F - Heat transmission reduced by 10%  
8 coats at 32F – Heat transmission reduced by 33%



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# Moisture Resistance

Synavax™ coatings are highly moisture repellent helping to protect your surfaces from moisture penetration. But they are also breathable, which means they will not cause moisture vapor trapping issues that can cause severe damage to buildings over time.

Synavax™ Coated Concrete Tile  
Water Beads – Doesn't Soak In  
Dries Significantly Faster

Uncoated Concrete Tile  
Water Soaks Into Surface  
Takes Much Longer to Dry



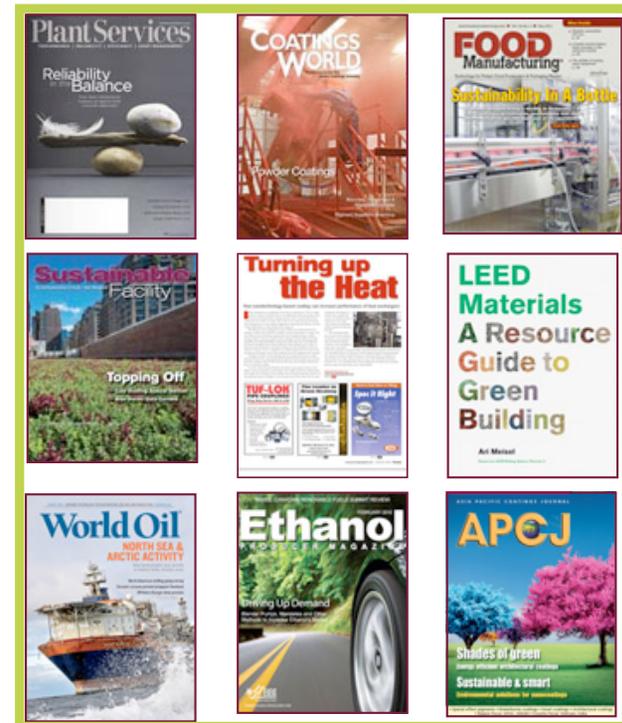


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## Awards and Press



A sample of some places you may have read about our coatings



- ✓ *BUILDINGS* Magazine Top Money-Saving Products 2012
- ✓ BUILDERnews Magazine Best Product of 2008 in Energy Efficiency category
- ✓ Listed in the top 100 products of 2008 by Qualified Remodeler Magazine
- ✓ Top 100 Award for 2008 by Building Products Magazine
- ✓ Project at the Suvarnabhumi International Airport chosen by the Journal of Architectural Coatings as a Top Green Project Pick in 2009



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# Be Bold! Join Other Sustainable Leaders.

**We Pride Ourselves On Extreme Customer Support**

*Please contact us for your complimentary Sustainable Specification Today!*

*Francesca Crolley*

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