

BLUE CHIP CASINO II

Michigan City, Indiana
January 2005 - January 2006



The Blue Chip Casino II project began in January 2005 but the coating system did not begin until around April 1, 2005. This was the largest Casino Boat built in the world at the time. All corrosion protection and insulation protection is performed by Superior International II, Inc. coatings. The boat was dry docked in the building stage so that the coatings could be applied as the steel was assembled and welded. No Sand Blast of the metal was performed saving millions. The total exterior underwater to above water was coated for corrosion protection and insulation using SPI coating systems. The total interior was coated including all ductwork to control condensation and provide better insulation than the air-filled insulation materials had ever provided in the older boats currently in use to judge against. The boat is approximately 200' x 400' and has four decks. Opened January 31, 2006.



The metal was produced in Alabama, shipped to the midwest to be laser cut and then shipped to Michigan City, Indiana to weld together and construct the boat. When the metal arrived for welding and assembly, it had rusted to as much as a 1/8" depth. The coating developed, [**RUSTGRIP®**](#), for this type of performance only requires a simple prep with a power washing to clean it and then allowed to dry completely before coating. The RUST GRIP is designed to penetrate deep into the pores and rough surface to make the initial anchor lock, then as it absorbs the atmospheric humidity as part of it's curing process, it expands and swells into the pores to seal off air and moisture and finally sets up to a 6780 psi surface tensile strength within three weeks. The total of all metal surfaces for both interior and exterior from bottom to top, exterior to interior was primed with the [**RUSTGRIP®**](#).



The coating systems are comprised of :

Underwater coating system – exterior hull

Primer - **RUSTGRIP®** permanent corrosion control

Top coat - **MOIST METAL GRIP®** additional corrosion control to face the water and submersion.

From the water line on the exterior down five feet into the water, **ENAMO GRIP®** was used as a top coat over the **MOIST METAL GRIP®** to prevent any chalking from UV through the surface water.



Above water coating system – walls, flooring, ceilings, supports and hull for both exterior and interior.

Primer - **RUSTGRIP®** permanent corrosion control

Base - **SUPER THERM®** moisture impervious Insulation

Finish - **ENAMOGRIP®** in an off white for color, gloss and low maintenance

Detailing - **ENAMOGRIP®** stripes in colour.



Interior coating system - Walls, ceilings, flooring over all metal surfaces

Primer - **RUSTGRIP**® permanent corrosion control

Base - **SUPER THERM**® moisture impervious Insulation

Finish - **ENAMOGRIP**® for color, gloss and low maintenance

Note: Before the application to the top deck of the boat, when the snow would fall, then the sun would come out, the decking would heat up from the radiation of the sun to the point of melting the snow. After the **SUPER THERM**® was applied during a good week of weather, the snow that fell, stayed on the deck for months due to the fact that the radiation could not heat up the decking any longer.

Also, in the older boat behind the new construction, the existing insulation materials allowed constant condensation to the point of welding catch channels along each wall to divert the water running down the walls to the pumps. After the application of **SUPER THERM**® in the new boat operation there has been no condensation on walls or any metal surfaces. True insulation blocks heat gain into itself or the metal to prevent this.



Problems solved by using the coatings to corrosion protect and insulate this ship:

1. No white sandblast required before coating the metal after welding. This alone saved over 2 million dollars (\$2,000,000.00 USD). Just power washed to remove dirt and residue. Completely dry then coat.

2. Fiberglass had always allowed condensation to develop and cause corrosion (CUI) and wet metal skin. So much water flowed down the sides that catch rails were installed to catch the water running down the interior side of the ship metal skin during winter. **SUPER THERM®** completely eliminated this problem and no condensation has ever developed during the winter months after the HVAC system was installed and operating properly.

3. **SUPER THERM®** eliminates *THERMAL BRIDGING* by providing full insulation over all the metal skin, including the cross beams, support arms, railings, etc. This provides a 100% coverage over all the metal attaching to the exterior cold side. Reports from maintenance manager are that *the boat is using less fuel to heat the boat than was estimated when the consumption rate was set up for fiberglass.*

This bridging effect was addressed by ASHREA code group in their 90.1 construction code. They produced a chart to identify the ability of fiberglass in this case as being unable to insulate metal construction and produced a chart showing the drop in prescribed performance, described below as "effective R value". The R rated 19-21 is effectively only an R 7.4 when applied into a metal construction. Additionally, when the fiberglass is compressed into place, this "R" value is reduced even further.



Table 402R Parallel Path Correction Factors for Metal Roof Trusses

Size of Members	Spacing of Framing (inches o.c.)	Insulation R-value	Correction Factor	Effective R-value
All	48	R-0	1.00	R-0
		R-5	0.96	R-4.8
		R-10	0.92	R-9.2
		R-15	0.88	R-13.2
		R-20	0.85	R-17.0
		R-25	0.81	R-20.3
		R-30	0.79	R-23.7
		R-35	0.76	R-26.6
		R-40	0.73	R-29.2
		R-45	0.71	R-32.0
		R-50	0.69	R-34.5
		R-55	0.67	R-36.0

Table 402S Effective R-values for Wall Insulation Installed Between Metal Framing

Nominal Framing Depth	Nominal Insulation R-value	Correction Factor	Effective R-value
4" @ 16" o.c.	R-11	0.50	R-5.5
	R-13	0.46	R-6.0
	R-15	0.43	R-6.4
4" @ 24" o.c.	R-11	0.60	R-6.6
	R-13	0.55	R-7.2
	R-15	0.52	R-7.8
6" @ 16" o.c.	R-19	0.37	R-7.1
	R-21	0.35	R-7.4
6" @ 24" o.c.	R-19	0.45	R-8.6
	R-21	0.43	R-9.0
8" @ 16" o.c.	R-25	0.31	R-7.8
	R-25	0.38	R-9.6

The correction factors for metal framed walls may be used with metal studs of 16 ga. or lighter.

Table 402T Effective R-value of Fiberglass Batts Compressed in Various Depth Cavities (h-ft²·°F/Btu)

Nominal Lumber Size	Actual Depth of Cavity	Insulation R-values at Standard Thickness:														
		38C	38	30C	30	25	22	21	19	15	13	11	8	5	3	
2" x 12"	11-1/4"	38	37													
2" x 10"	9-1/4"		32	30												
2" x 8"	7-1/4"		27		26	24										
2" x 6"	5-1/2"					21	20	21	18							
2" x 4"	3-1/2"							14	13	15	13	11				
2" x 3"	2-1/2"										10					
2" x 2"	1-1/2"										6.5	6.0	5.7			
2" x 1"	1/2"													3.2	3.0	

The standard thicknesses are as follows: 10-1/4" for R-38C, 12" for R-38, 8-1/4" for R-30C, 9-1/2" for R-30, 8" for R-25, 6-3/4" for R-22, 5-1/2" for R-21, 6-1/4" for R-19, 3-1/2" for R-15, 3-1/2" for R-13, 3-1/2" for R-11, 2-1/2" for R-8, 1-1/2" for R-5 and 3/4" for R-3.



4. **SUPER THERM®** is coated on exterior side to prevent the metal during summer months from heating. **SUPER THERM®** blocks heat load into the metal which is the most important insulation effect that can be achieved. Fiberglass, foams and other such materials allow 100% of the heat load to happen, then these materials try to retard or slow down the heat flow to the interior or exterior. These materials could be considered outdated 20th century insulation materials because they allow heat load. **SUPER THERM®** is the 21st century insulation material that blocks the "initial" heat load from happening into the surface of the substrate. If the surface cannot load heat, there is no heat to transfer through. Instead of having an "R" rating which is a measurement method for full heat load and then transfer, **SUPER THERM®** measures "emittance" (0.05) which equals absorption of heat. The lower the emittance, the lower the amount of heat absorbed and transferred. At the same time, a measurement of how fast the surface heat is thrown off is measured by emissivity which **SUPER THERM®** tested to 0.90 with 1.0 being the best to throw off any heat that is loaded into the surface. Therefore, as convective heat on the interior of the ship is circulated, this heat tries to load into the surface of the metal or **SUPER THERM®**. The emissivity of the **SUPER THERM®** can repel this heat at a 90% rate and keep it from being retained in the coating and repels this heat back to the interior atmosphere or ambient temperature of the boat. This is how **SUPER THERM®** is able to retain the heated air inside the boat during the severe winter months. If someone touches the side of the boat on the interior, it will not feel warm. This usually is thought to be bad in that the side feels lukewarm and therefore not holding the heat. In reality, the **SUPER THERM®** will not absorb and hold the heat because it releases it back to the ambient inside the boat. If it did absorb the heat, then this heat would transfer through the metal to the exterior, In this situation, then the wall would feel warm because it absorbed and held the heat which is exactly what the **SUPER THERM®** it designed to prevent. Never would we want the heat to be absorbed and "loaded". If loaded, it transfers to the cold side to dissipate and be lost.

5. **SUPER THERM®** blocks Infrared radiation to 99.5% in testing. **Sunlight:** 57% of all heat comes from infrared radiation. **SUPER THERM** blocks 92% of visual light (40% of any radiation heat load) and 96% of UV (3% of radiation heat load). **Mechanical heat:** produces infrared radiation to heat the interior during winter and while body heat is re-radiation or far infrared which is transported by convection and. **SUPER THERM®** is designed to control.

Both Exterior (summer) and Interior (winter) temperature controls are maintained by using **SUPER THERM®**.