

# Turning up the Heat

## How nanotechnology-based coating can increase performance of heat exchangers

Heat exchangers are an integral part of any heat or energy process. They are widely used in a number of industries such as air conditioning, textile, power plants, chemical and petrochemical plants, refining and many others to provide efficient heat transfer from one medium to another. Due to their use on a large scale for both heating and cooling processes in many industrial applications, improving their efficiency can have a wide overall impact on a plant facility and its energy use.

The efficiency of heat exchangers lies in how well they can transfer heat from one medium to another with as little loss as possible. Lost heat energy equates to expense. The most efficient means of reducing energy loss from heat exchanger processes would be through insulation. However, insulation of heat exchangers has been difficult and nearly impossible with traditional fiberglass, rockwool and similar types due to their bulk and how fast they breakdown from moisture infiltration. Heat exchangers can be subject to both steam and condensation, so the perfect insulation for them would be one that was resistant to moisture, was in a coating form so it could be sprayed onto the exterior of any size and type of exchanger, and one that would also protect the equipment from corrosion.

Through the science of nanotechnology, this new insulation has become a reality. Industrial Nanotech, Inc. began producing Nansulate® thermal insulation and corrosion prevention coatings in April of 2004, and since that time, heat exchanger insulation has been one of their key markets.

At Erenko Textile, the plant did side-by-side trials on same capacity machines at 60 degrees C process temperature over 60 minutes. They visually counted the number of times steam supply valve is opened up. These machines have automated temperature controls, so if the temperature drops to 58 degrees C, the valve opens up, and then closes when the target

temperature of 62 degrees C is reached. Over a period of 60 minutes, the insulated machine required two steam supply cycles, whereas the uninsulated machine required 24 steam supply cycles.

The technology behind this next generation insulation incorporates a nanocomposite with extremely low thermal conduction and a hydrophobic nature into a water-based acrylic latex, giving the coatings the ability to provide thermal insulation, corrosion resistance and mold resistance in a thin layer. In ISO standard testing for thermal properties the coatings were shown to block 34.8 percent of thermal transfer (at a thickness of approximately seven mils), and have passed 24 cycles of the GM9540P Accelerated Corrosion Test. The technology offers a novel combination of benefits that can quickly decrease energy and maintenance costs in plant facilities.



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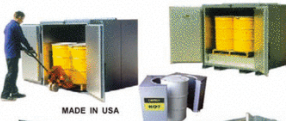
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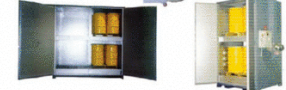
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