



**CONNECT AND PROTECT**

## FROST HEAVE PREVENTION

For liquified gas storage tanks

  
nVent

**RAYCHEM**



## **A SOLUTIONS COMPANY**

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As the world's largest provider of complete electrical heat management systems, primarily for the general process, oil and gas, chemical, and power generation industries, nVent provides innovative products and turnkey solutions under market-leading brands—nVent RAYCHEM, PYROTENAX, and TRACER. Our premiere turnkey solutions include full life cycle support—ranging from front-end engineering and installation to maintenance and operation services. Our global experience and office presence in 48 countries uniquely position us to manage the heat needed for projects of any size and scope.

## **THE HEART OF OUR SOLUTIONS**

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As the inventor of self-regulating heat tracing, our RAYCHEM brand is recognized for technical leadership in the industries we serve. RAYCHEM cable delivers the appropriate amount of heat exactly when and where it is needed, adjusting the output produced in response to ambient and process conditions, making it ideal for heat management systems. Since inventing the technology, nVent has sold over one billion feet of RAYCHEM brand self-regulating cable. In addition to a self-regulating product set addressing a full range of temperature needs, we also offer other types of heating cables and systems, control and monitoring solutions, and a full range of services related to our products.

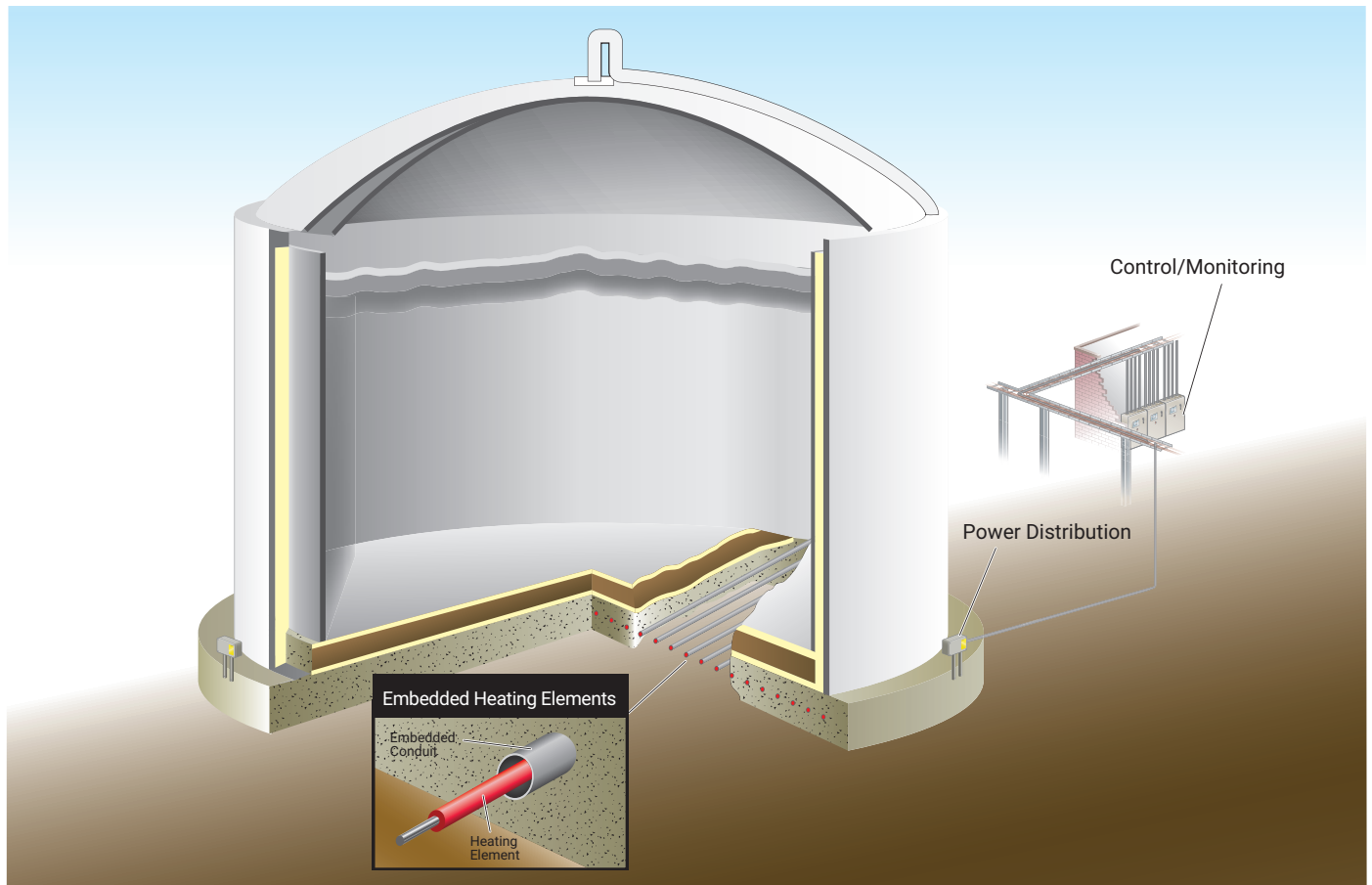
## **FROST HEAVE PREVENTION**

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For over 30 years, our engineered heating systems have satisfied the unique requirements of base heating to ensure structural integrity of cryogenic and low-temperature storage tanks. nVent provides a variety of embedded Heat Management Systems for frost heave prevention or foundation heating and similar applications. Our leading products, state-of-the-art design tools, and project management experience ensure the proper selection of technology, execution strategy, and adherence to applicable standards.

# Typical Above Ground Liquefied Gas Storage Tank

Integrated systems include Heating Elements, Power Distribution, and Control and Monitoring components featuring fibre optic distributed temperature sensing for enhanced reliability and safety.



## Heating Technologies for Liquefied Gas Storage Tanks

nVent offers the latest in Heat-Tracing technologies to address Frost Heave Prevention for Liquefied Gas Storage tanks. The selection of the appropriate technology can be heavily dependent on storage, technology, site, and power distribution requirements. Our offerings include self-regulating, parallel resistance constant wattage, and ferro-magnetic skin-effect systems. To ensure proper performance, nVent offers solutions that include material only, material and engineering, and complete turnkey packages.

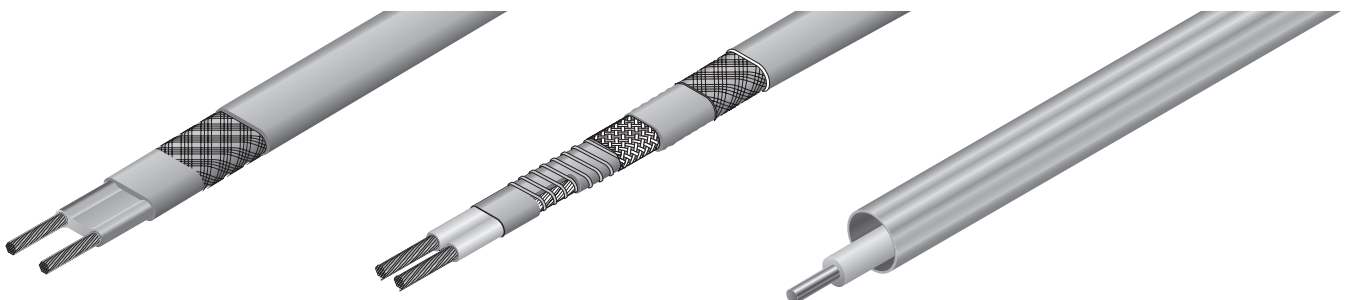
### Our offerings include:

- Self-regulating systems
- Parallel resistance constant wattage
- Ferro-magnetic skin-effect systems

NVENT RAYCHEM FHP

NVENT RAYCHEM FHPC

NVENT RAYCHEM STS



## SAFETY PERFORMANCE

Safety as our Number One Priority—  
'Safety Culture' is employed to ensure  
that all work is performed safely, and that  
all aspects of design and construction  
are executed with 'safe' constructability  
as the driving force.



## QUALITY ASSURANCE AND QUALITY CONTROL

Manufacturing, engineering and design process followed up with on-site testing and documentation ensures your frost heave prevention system is operating properly when commissioned.



## CLIENTS AND REFERENCES

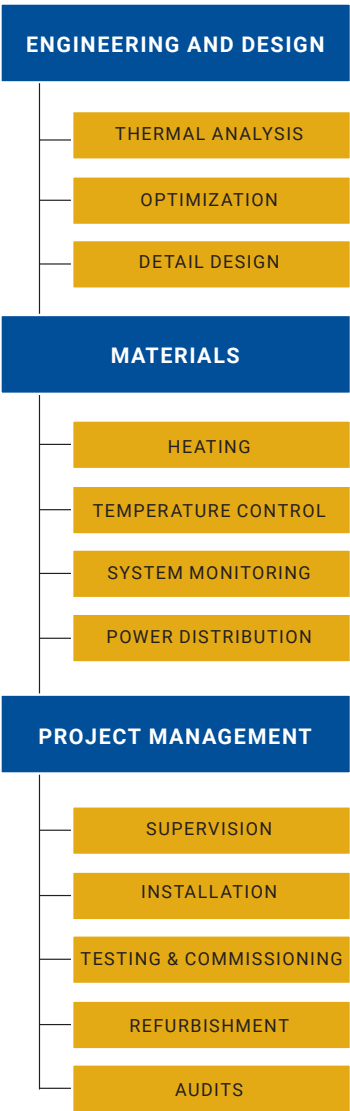


Our Frost Heave Prevention systems can be found in applications worldwide:

LNG Poland, Poland • Yansab Olefins Plant, Saudi Arabia • South Hook, UK • FOS, Cavaou, France • Darwin LNG, Australia • Adriatic LNG, Italy • Ammonia Storage Jorf Lasfar, Morocco • Sines LNG, Portugal • Masaiseed Qatar, Qatar • Bintulu MLNG, Malaysia • GUPCO, Egypt • Bonny Island, Nigeria • Dabhol, India • Karsto, Norway • KOGAS LNG, Korea • JOGMEC Propane, Japan

# Frost Heave Prevention System

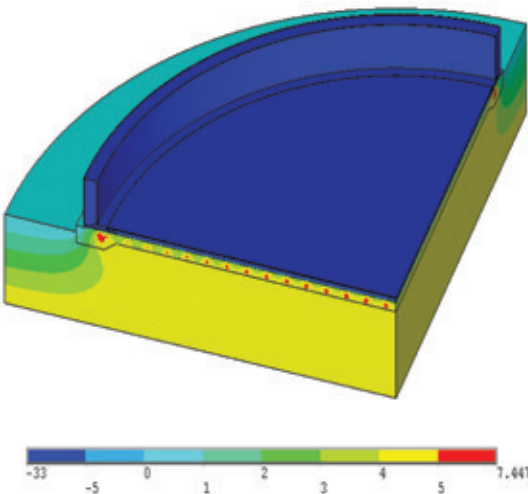
## NVENT CAPABILITIES



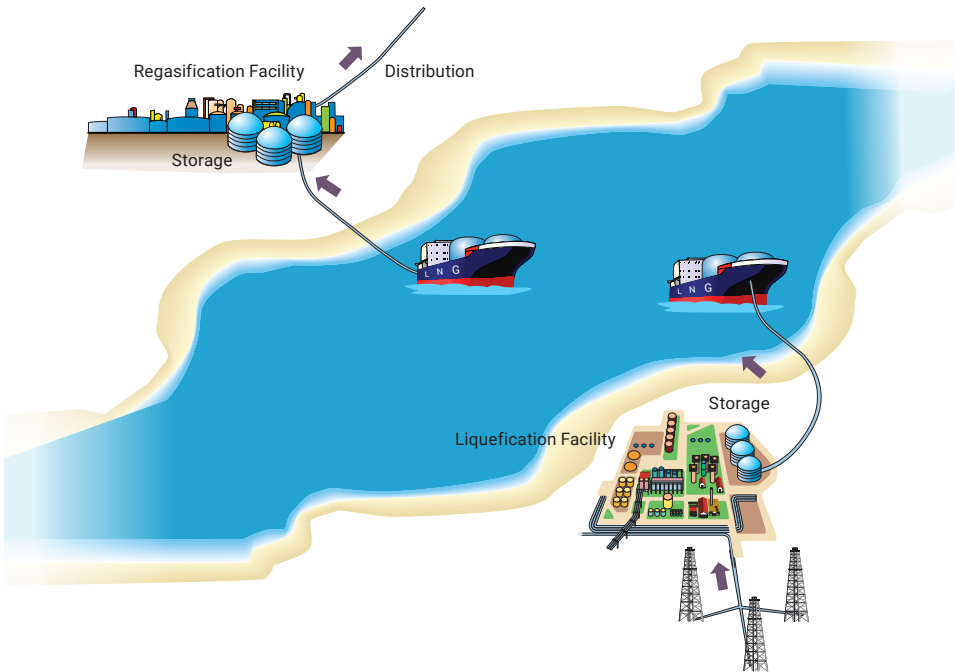
## THERMAL ANALYSIS

Thermal analysis of the foundation serves as a basis for establishing heater power, duty cycle and conduit spacing requirements.

nVent utilizes a suite of Thermal Analysis tools from SlabHeat, our proprietary 2D finite difference engineering software, to 2D- and 3D-finite element analysis (FEA). These services are essential to establish the ideal heat input for the tank base and to enhance the reliability and efficiency of the frost heave prevention system—designs can be optimized to minimize installed and operating cost.



## LNG VALUE CHAIN



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Our powerful portfolio of brands:

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