

With global manufacturing and warehouse facilities, Thermon supplies heat tracing products to meet the needs of customers around the world. Thermon offers complete heating solutions, including heating cables and terminations, control systems, engineering/design services, and installation.

Every product must pass extensive quality control and performance tests including heat output, thermal stability and long-term aging and are further tested and certified by major approval agencies to verify proper performance for their intended application.



Electric Heating Cables



Control Systems

Worldwide Offices

Americas

Acworth, Georgia
 Baton Rouge, Louisiana
 El Dorado Hills, California
 Houston, Texas
 Huntersville, North Carolina
 Mogadore, Ohio
 San Marcos, Texas
 Wilmington, Delaware
 Mexico City, Mexico

Canada

Calgary, Alberta
 Edmonton, Alberta
 Sarnia, Ontario
 St. Laurent, Quebec
 Sallisbury, New Brunswick

Europe

Pijnacker, The Netherlands
 Newcastle, England
 Paris, France
 Gladbach, Germany
 Atyrau, Kazakhstan
 Moscow, Russia
 Sakhalin, Russia
 Yakutia, Russia

Asia Pacific

Melbourne, Australia
 Sydney, Australia
 Auckland, New Zealand
 Singapore
 Kuala Lumpur, Malaysia
 Beijing, China
 Shanghai, China
 Mumbai, India
 Calcutta, India
 Yokohama, Japan
 Seoul, Korea

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Foundation Heating for Frost Heave Prevention Systems



The Heat Tracing Specialists®



THERMON . . . The Heat Tracing Specialists®

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 www.thermon.com In Canada call 800-563-8461

Introduction . . .

Cold or cryogenic storage facilities contain products at temperatures well below freezing, 32°F (0°C). Storage of liquid products are often in either above or below ground vessels. Because of the subfreezing temperatures internal to the vessel, freezing of the soil below and/or around the vessel can occur. This, in turn, can result in heaving of the soil and subsequent damage to the structure or foundation.

As a world leader in the manufacture of heat tracing products, **Thermon..The Heat Tracing Specialists®**, has been supplying electric heating solutions for foundation heating systems for LNG, LPG, Ammonia and other stored products for over 30 years.

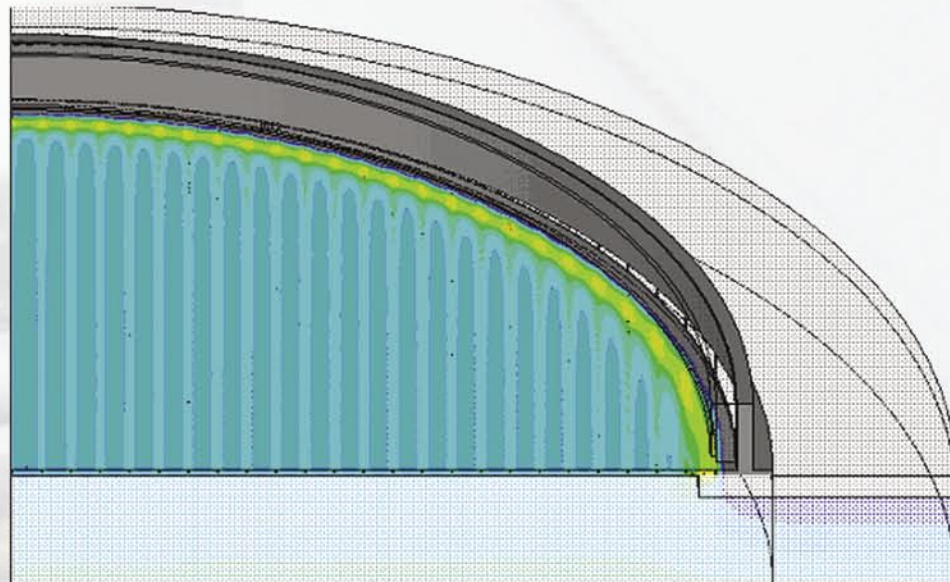
Analysis and Design . . .

The foundation heating system is governed by the following factors:

- Product Storage Temperature
- Insulation Thickness and Thermal Conductivity
- Design Safety Factor
- Heating Cable Characteristics
- Conduit Spacing and Configuration
- Storage Vessel Environment
- Customer Requirements

Whether the application consists of a conventional ring wall foundation or offshore gravity based structure, Thermon will evaluate the system using the latest 3D FEA thermal modeling, and provide recommendations based on the results of these studies with **performance guaranteed**.

3D FEA Model



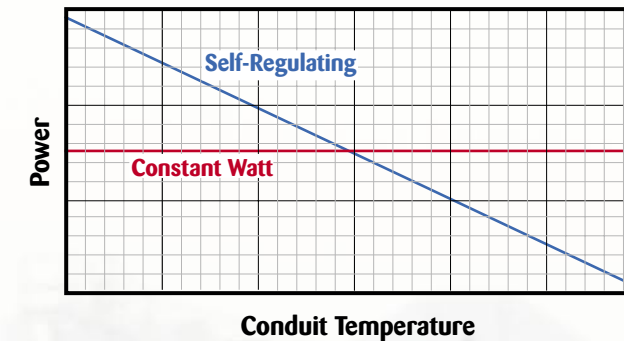
Thermon's experience optimizes the cost-of-ownership with system reliability. Utilizing traditional Parallel heating cables or Series Resistance heating cables, Thermon will evaluate the application and provide the best heating solution possible. Thermon recommends all foundation heating systems comply with NFPA 59A and EN 1473.

Heating Cable Selection . . .

There are many factors to be considered in selecting the proper heating cable.

- System Voltage
- Conduit Spacing/Configuration
- Heating Cable Characteristics and Reliability
- Mechanical Strength
- Total Installed Cost

Thermon's constant wattage or SX™ self-regulating heating cables have a long history of performance and reliability when used in these applications.



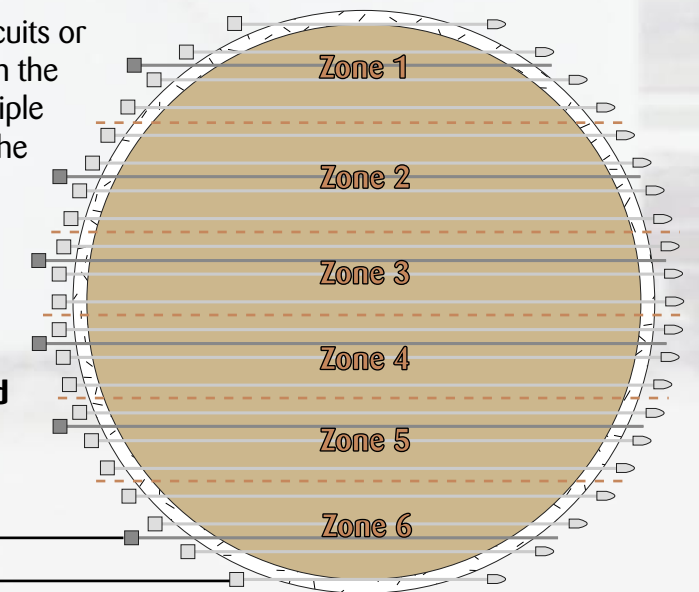
Control and Monitoring . . .

The heating system should include an effective and versatile temperature control system. Maintaining the substrate at temperatures higher than necessary, not only consumes excess power for heating but also requires additional cooling of the stored fluid.

Thermon's TC line of single, dual, and multipoint controllers provide on/off, proportional, or power clamping control. The proportional or power clamping approach will minimize temperature excursions of the conduit and reduce, if not eliminate, the "breathing" effect, which leads to condensation buildup.

Since the number of circuits or heating zones varies with the installation and the facility, multiple circuits are required to allow some flexibility in the heat delivered across the heated region. Some applications require redundant heating system design or independent temperature monitoring (conventional or fiber optic) with links to the facility DCS.

Let Thermon design and supply an engineered system that will work for your application. Contact Thermon for additional details.



Temperature Sensor
Heating Conduit