

Unitherm Preinsulated Tubing Bundles

**Using Preinsulated Tubing Bundles
in Field Fabricated Heat Tracing
Systems**



Field Fabricated Heat Tracing

A combination of various tubes, insulation materials, heaters, and coverings, generally in 3 ft to 10 ft lengths, assembled at the job site.

Preinsulated Tubing Bundles

A pre-engineered system with tubes, insulation, heater, and jacket; machine fabricated and sent to the job site in lengths up to 1000 feet.



Field Fabricated

- Pipe
- Heavy Walled
- Socket Weld, Flange or Threaded
- Straight Lengths
- Cannot bend

Preinsulated

- Tubing
- Wall Sized for Pressure Requirements
- Leak Tight Fittings
- Continuous Lengths
- Easily Bent and Formed



Construction Tubing

Field Fabricated

- Carbon Steel
- Austenitic Stainless Steel
- Ferritic Stainless Steel
- Copper

Preinsulated

- Low Carbon Steel
- Austenitic & Ferritic Stainless Steel
- Copper
- Nickel Alloys
- Reactive Metals
- Fluoropolymer Tubes
- Thermoplastic Tubes
- Hose



Field Fabricated

- **Self Regulating Heating Element**
- **Constant Power Density Heater**
- **Mineral Insulated Heater**

Preinsulated

- **Self Regulating Heating Element**
- **Constant Power Density Heater**
- **Mineral Insulated Heater**
- **Series Resistant Heater**



Construction Insulation Materials



Field Fabricated

- **Mineral Wool**
- **Fiberglass**
- **Calcium Silicate**
- **Pearlite**

Preinsulated

- **Fibrous Glass**
- **Glass Rope**
- **Polyester**
- **Silicone Foam**



Construction Outer Jacket



Field Fabricated

- **Mastic**
- **Aluminized
Film**
- **Aluminum**
- **Stainless Steel**

Preinsulated

- **Flame Retardant
PVC**
- **Flame Retardant
Polyolefin**
- **Flame Retardant
Thermoplastic
Elastomers**



Features and Benefits

Field Fabricated Heat Tracing



Feature

Benefit

- Size Range → ■ Fit Pipes from 1/2" to 24" and Larger
- Temperature Range → ■ Lines from -100C to +500C
- Adaptable → ■ Good For Short Runs with Multiple Valves



Features and Benefits

Field Fabricated Heat Tracing



Feature

Benefit

- Common Materials
 - ■ Available Locally
 - ■ Low Material Cost
 - ■ Mix & Match

- Rapid Project Start → ■ May Improve Repair Time on Breakdowns



Features and Benefits

Preinsulated Tubing Bundles

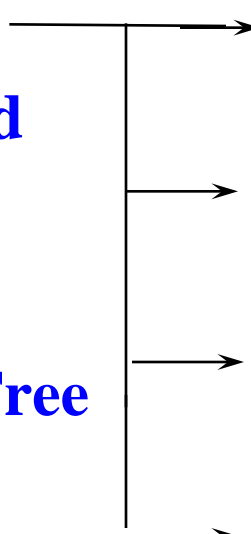


Feature

- **Preinsulated**
- **Pre-Engineered**
- **Small OD's**
- **Long Lengths**
- **Maintenance Free**

Benefit

- **Lower Installation Costs**
- **More Efficient Heat Transfer**
- **Consistent Thermal Characteristics**
- **Insulation Sized for Application**





Features and Benefits

Preinsulated Tubing Bundles

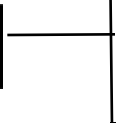


Feature

- **Preinsulated**
- **Pre-Engineered**
- **Small OD's**
- **Long Lengths**
- **Maintenance Free**

Benefit

- **Reduced Design Costs**
- **Predictable Operating Characteristics**





Features and Benefits

Preinsulated Tubing Bundles



Feature

- **Preinsulated**
- **Pre-Engineered**
- **Small OD's**
- **Long Lengths**
- **Maintenance Free**

Benefit

- ■ **Light, Flexible, Easy to Handle**
- ■ **Easily Bent and Formed**
- ■ **Efficient Space Utilization**
- ■ **Easier Instrument Access**



Features and Benefits

Preinsulated Tubing Bundles



Feature

- Preinsulated
- Pre-Engineered
- Small OD's
- **Long Lengths**
- Maintenance Free

Benefit

- Reduced Waste
 - Pipe/Tube
 - Insulation
 - Jacket
- Eliminate Intermediate Fittings





Features and Benefits

Preinsulated Tubing Bundles



Feature

- Preinsulated
- Pre-Engineered
- Small OD's
- Long Lengths
- **Maintenance Free**

Benefit

- Continuous Jacket Means No Wet Insulation
- No Fittings to Leak
- Insulation Does Not Crack or Shatter





Applications and Uses

Field Fabricated Lines

- Main Supply Lines
- Process Lines Larger than 1" OD
- Steam Supply or Condensate Return Manifolds
- Short Runs with Fittings/Valves in Close Proximity

Preinsulated Tubing

- Steam Supply - Manifold to Process
- Condensate Return - Process to Manifold
- Instrument Lines
- Impulse Lines
- Viscosity Maintenance

Applications and Uses

- **Breakdown Repairs**
- **Glass-Lined Pipe**
- **High Temperature Applications >400°C**
- **Adhesive Transfer**
- **Wax Transfer**
- **Pill Coating Machines**
- **Glue Guns**
- **Drum Filling**
- **Emmissions Monitoring**



Construction Costs

Sample Refinery Expansion



Project 1: 250ft 2” OD Sched 40 Black Pipe, Insulated and Steam Traced to Maintain 125^o C at a Low Ambient of +10^o C

Project 2: Steam Supply Line- 1000ft 3/4” T316 Stainless Steel Tube, Insulated for 150 PSIG Saturated Steam - 50ft Runs from Manifold

Project 3: Freeze Protection Line for Instruments

500 ft dual 1/2” T316 Stainless Steel Tube, Protected with 50 PSIG Saturated Steam - 50ft Runs

Project 1: 250ft 2" OD Sched 40 Black Pipe, Insulated and Steam Traced to Maintain 125°C at a Low Ambient of +10°C

Materials

**Pipe: 2" Sched 80 Pipe with 150# Welded Flange Fittings e/e
Pipe Supplied in 20ft length, \$8.97USD/ft**
\$2242.50

Tracer: 1/2" Soft Copper tube in 60ft rolls, \$0.75USD/ft
\$ 187.50

**Heat Transfer Cement: Used to insure good contact
between tracer and process pipe.**
\$ 45.50

**Insulation/Jacket: 2.5"IPS, 1.5" thick Fiberglass Pipe
Insulation with weatherproof jacket, \$1.82USD/ft**
\$ 455.00

Project 1: 250ft 2" OD Sched 40 Black Pipe, Insulated and Steam Traced to Maintain 125°C at a Low Ambient of +10°C

Labor

- | | |
|---|-------------------------|
| 1. Install 2" Pipe, Hangers and Structural Work; | \$3757.50 |
| 2. Install 1/2" Copper Tracer over Pipe, Coat with Heat Transfer Cement; | \$ 690.00 |
| 3. Install Insulation and Jacket; | <u>\$ 870.00</u> |

Material Cost

- | | |
|-------------------|------------------|
| | \$2930.50 |
| Total Cost | \$8248.00 |

**Project 2: Steam Supply Line- 1000ft 3/4" T316 Stainless Steel Tube,
Insulated for 150 PSIG Saturated Steam - 50ft Runs from Manifold**

**Field Fabricated Heat
Trace**

Materials:

**1000 ft - 3/4" Sched 40
T316SS Pipe - 20ft length
Threaded e/e**

**40 - 3/4" SS Threaded
Couplings**

40 - 3/4" SS Unions

40 - 3/4"x 2" SS Nipples

100 - Pipe Supports

Preinsulated Heat Trace

Materials:

**1000 ft - 3/4"OD x.035" wall
T316 Welded Tube
Preinsulated with Fibrous
Glass and Covered with
Weather Resistant PVC
Outer Jacket**

40 - 3/4" Tube Adapters

150 - Tube Supports

**Project 2: Steam Supply Line- 1000ft 3/4" T316 Stainless Steel Tube,
Insulated for 150 PSIG Saturated Steam - 50ft Runs from Manifold**



**Field Fabricated Heat
Trace**

Materials:

60 - 3/4" T316 SS elbows

1000 ft - 1/2" Thick

**Fiberglass Thermal
Insulation for 3/4" Pipe.**

**60 - Insulation Elbows with
Weather Resistant Covers**

**1000 ft - Weather Resistant
Cover for Insulation**

**Preinsulated Heat Trace
Materials:**

**No additional materials
required**

**Project 2: Steam Supply Line- 1000ft 3/4” T316 Stainless Steel Tube,
Insulated for 150 PSIG Saturated Steam - 50ft Runs from Manifold**

Field Fabricated Heat Trace

Material Costs:

Pipe	\$5370.00
Couplings	\$ 198.00
Unions	\$ 715.00
Elbows	\$ 420.00
Supports	\$ 523.00
Insulation	\$ 690.00
Insulation Elbows	\$ 398.00
Jacket	\$ 460.00
Total Materials	\$8774.00

Preinsulated Heat Trace

Material Costs:

Preinsulated Tubing	\$7500.00
Adapters	\$1534.00
Supports	\$ 375.00
Total Materials	\$9409.00

**Project 2: Steam Supply Line- 1000ft 3/4” T316 Stainless Steel Tube,
Insulated for 150 PSIG Saturated Steam - 50ft Runs from Manifold**

**Field Fabricated Heat
Trace**

Labor:

**Install pipe, couplings
and hangers \$7480.00**

Install insulation \$3720.00

Install jacket \$5190.00

Material Costs \$8774.00

Total Cost \$25164.00

Preinsulated Heat Trace

Labor:

Install Preinsulated

Bundle \$4500.00

Material Costs \$9409.00

Total Cost \$13909.00

Project 3: Freeze Protection Line for Instruments
500 ft dual 1/2" T316 Stainless Steel Tube, Protected with 50 PSIG
Saturated Steam - 50ft Runs



Field Fabricated Heat Trace

Materials:

**1000 ft - 1/2" Sched 40 T316
SS Pipe, Threaded e/e,
20 ft Straight Lengths**

**600 ft - 3/8" Soft Copper
Tube, 60 ft Coils**

80 - 1/2" T316 SS Elbows

**40 - 1/2" T316 SS Threaded
Couplings**

Preinsulated Heat Trace

Materials:

**500 ft - Preinsulated, Steam
Traced Tubing with two
1/2"OD x.035" wall T316
SS Tubes and one 3/8"OD
x.032 Soft Copper Tracer,
Fibrous Glass Thermal
Insulation and Weather
Resistant PVC Outer
Jacket**

Project 3: Freeze Protection Line for Instruments
500 ft dual 1/2" T316 Stainless Steel Tube, Protected with 50 PSIG
Saturated Steam - 50ft Runs



Field Fabricated Heat Trace

Materials:

80 - 1/2" T316 SS Unions

80 - 1/2"x2" SS Nipples

**40 - 3/8" Copper Tube
Adapters**

80 - Pipe Supports

**500 ft - 1" Thick Fiberglass
Thermal Insulation, 1" ID**

Preinsulated Heat Trace

Materials:

**80 - 1/2" T316 SS Tube
Adapters**

**40 - 3/8" Copper Tube
Adapters**

80 - Pipe Supports

Project 3: Freeze Protection Line for Instruments
500 ft dual 1/2" T316 Stainless Steel Tube, Protected with 50 PSIG
Saturated Steam - 50ft Runs



Field Fabricated Heat Trace

Materials:

40 - Insulation Elbows with Weather Resistant Covers

500 ft - Weather Resistant Cover for Insulation

Preinsulated Heat Trace

Materials:

No additional materials required

Project 3: Freeze Protection Line for Instruments
500 ft dual 1/2" T316 Stainless Steel Tube, Protected with 50 PSIG
Saturated Steam - 50ft Runs

Field Fabricated Heat Trace

Material Costs:

Pipe	\$5250.00
Copper Tube	\$ 234.00
SS Fittings	\$ 396.00
Copper Adapters	\$ 110.00
Supports	\$ 418.00
Insulation	\$ 345.00
Insulation Elbows	\$ 265.00
Jacket	\$ 230.00

Total Materials \$7248.00

Preinsulated Heat Trace

Material Costs:

Preinsulated Tubing	\$7250.00
SS Adapters	\$1920.00
Copper Adapters	\$ 110.00
Supports	\$ 200.00

Total Materials \$9480.00

Project 3: Freeze Protection Line for Instruments
500 ft dual 1/2" T316 Stainless Steel Tube, Protected with 50 PSIG
Saturated Steam - 50ft Runs

Field Fabricated Heat Trace	
Labor:	
Install pipe, couplings and hangers	\$6650.00
Install Heat Trace	\$ 950.00
Install insulation	\$1860.00
Install jacket	<u>\$2595.00</u>
Material Costs	<u>\$7248.00</u>
Total Cost	\$19303.00

Preinsulated Heat Trace	
Labor:	
Install Preinsulated Bundle	<u>\$3250.00</u>
Material Costs	<u>\$9480.00</u>
Total Cost	\$12730.00

Additional Savings with Preinsulated Bundles

Efficiency Savings

**Field fabricated system, 1000 ft of 1/2" Steam Supply
line operating at 150psig**

**1/2" pipe with 1/2" Fiberglass Thermal insulation at
85% efficiency has a heat loss of 40000Btu/hr.**

**1/2" preinsulated bundle with Fibrous Glass Thermal
insulation at 95% efficiency has a heat loss of
33000Btu/hr**

Difference is 7000Btu/hr or 60,000,000 Btu/year

Reduction in Leak Losses

Chemical Plant Steam Supply/Condensate Return System

**Ten Supply and Ten Return Manifolds with 24 lines each,
average run length 65 feet with three direction changes.**

Total of 3360 fittings. 1% leak rate = 34 leaking fittings

If each fitting leak is approximately 1/16" diameter

Total loss is roughly 7.9 million pounds of steam per year

If steam is \$10.00/1000 pounds, loss is \$79,000.00/yr

**Preinsulated bundles in same installation would have 960
fittings,**

**At same loss rate, total loss would be about 1/4th of the
previous system for a savings of \$56,500/yr**



Combination Systems



- **System should be tailored to use the best qualities of each type of installation**
- **Each has benefits in certain applications**
- **Each has design constraints that must be obeyed**
- **A combination of the two types generally yields the best results**