

# **Instruction Manual**

for

## **Gaumer Process Self Regulating Heat Trace System**

|                                                                                               |
|-----------------------------------------------------------------------------------------------|
| <p>“Controlled Document, changes require authorization<br/>from the certification agency”</p> |
|-----------------------------------------------------------------------------------------------|

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○ **Heating Cable Model Names:**

| Model Name  | Max. continuous operating temperature<br>(Power on or off) | Max. intermittent<br>temperature (power off) |
|-------------|------------------------------------------------------------|----------------------------------------------|
| GHT*-1/2CR  | 150°F (65°C)                                               | 185°F (85°C)                                 |
| GHT*-1/2CT  | 150°F (65°C)                                               | 185°F (85°C)                                 |
| GHU**-1/2CT | 250°F (120°C)                                              | 392°F (200°C)                                |
| GHK**-1/2CT | 300°F (150°C)                                              | 482°F (250°C)                                |

*\*Power output per unit length*

3: Nominal Power Output 3W/ft (10W/m) @50°F (10°C) on metal pipe

5: Nominal Power Output 5W/ft (16W/m) @50°F (10°C) on metal pipe

8: Nominal Power Output 8W/ft (26W/m) @50°F (10°C) on metal pipe

10: Nominal Power Output 10W/ft (33W/m) @50°F (10°C) on metal pipe

12: Nominal Power Output 12W/ft (40W/m) @50°F (10°C) on metal pipe

[Note] 12W/ft Only available in Supply Voltage: 2 (200 – 277V)

*\*\*Power output per unit length*

5: Nominal Power Output 5W/ft (16W/m) @50°F (10°C) on metal pipe

10: Nominal Power Output 10W/ft (33W/m) @50°F (10°C) on metal pipe

15: Nominal Power Output 15W/ft (49W/m) @50°F (10°C) on metal pipe

20: Nominal Power Output 20W/ft (66W/m) @50°F (10°C) on metal pipe

○ **Associated International Standards:**

US Standards; FM 3600: 2022, ANSI/UL 50E:2020, ANSI/UL 60079-0:2020,  
ANSI/UL 60079-7:2021, ANSI/UL 60079-30-1:2017,  
ANSI/UL 60079-31:2015

CA Standards; CSA C22.2 No. 94.2:2020, CSA C22.2 No. 60079-0:2019,  
CSA C22.2 No. 60079-7:2018, CSA C22.2 No. 60079-30-1:2017,  
CSA C22.2 No. 60079-31:2015, CSA C22.2 No. 60529:2016

ATEX: EN IEC 60079-0: 2018  
EN IEC 60079-7:2015+A1:2018, EN 60079-30-1:2017, EN 60079-31:2014

IECEx: IEC 60079-0:2017  
IEC 60079-30-1:2022, IEC 60079-7:2017, IEC 60079-30-1:2015

○ **Approvals: FM approved**

FM US Certificate Number: FM24US0113X

Class I, Division 2, Groups A, B, C and D T\*

Class II/III, Division 2, Groups E, F and G T\*

Class I, Zone 1, AEx 60079-30-1 IIC T\* Gb; Zone 21, AEx 60079-30-1 IIIC T\* °C Db

Class I, Zone 1, AEx eb IIC T\* Gb; Zone 21, AEx tb IIIC T\* °C Db

Type 4X, IP66

Ta = -40°C to +55°C

FM CANADA: FM24CA0042X

Class I, Division 2, Groups A, B, C and D T\*

Class II/III, Division 2, Groups E, F and G T\*

Class I, Zone 1, Ex 60079-30-1 IIC T\* Gb; Zone 21, Ex 60079-30-1 IIIC T\* °C Db

Class I, Zone 1, Ex eb IIC T\* Gb; Zone 21, Ex tb IIIC T\* °C Db

Type 4X, IP66

Ta = -40°C to +55°C

ATEX Certificate Number: FM24ATEX0018X

II 2 G Ex 60079-30-1 IIC T6...T2 Gb

II 2 D Ex 60079-30-1 IIIC T85°C... T300°C Db

II 2 G Ex eb IIC T\* Gb and II 2 D Ex tb IIIC T\*°C Db with Ingress Protection IP66

IECEX Certificate Number: IECEX FMG 24.0017X

Ex 60079-30-1 IIC T6...T2 Gb

Ex 60079-30-1 IIIC T85°C... T300°C Db

Ex eb IIC Gb and Ex tb IIIC Db with Ingress Protection IP66

T\* = For T-rating, please refer to cable documentation.

**• Revision History**

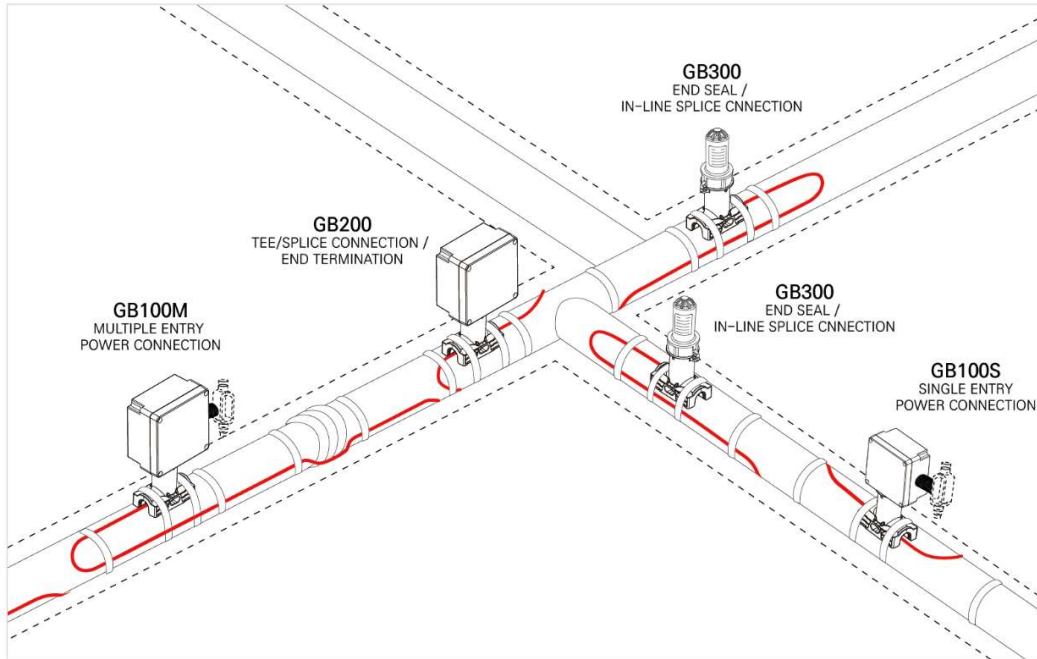
| Rev | Date            | Revised                                                   |
|-----|-----------------|-----------------------------------------------------------|
| A   | 29 MAY 2024     | Initial release version                                   |
| B   | 5 AUGUST 2024   | Revision B                                                |
| C   | 22 OCTOBER 2024 | Revision C                                                |
| D   | 5 JUNE 2025     | Added GB100S-A, GB100S-E, GB100M-A-2P, GB100M-E-2P, GB300 |
|     |                 |                                                           |
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## 1.0 Gaumer Process Heat Tracing System Overview

### 1.1 System Diagram

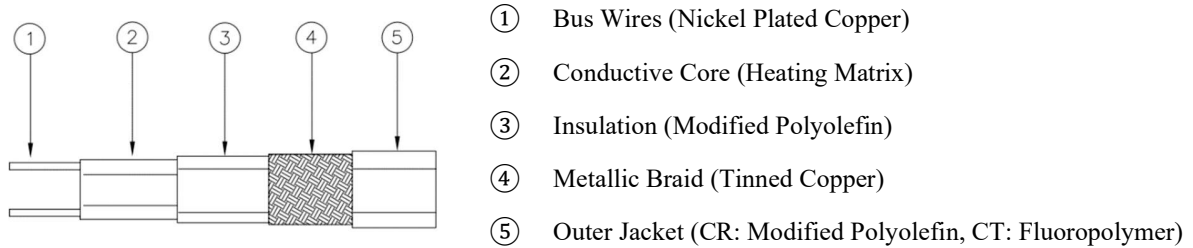


|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heating Cables | <p><b>GHT-CR, GHT-CT</b></p> <p>3, 5, 8, 10, 12 W/ft @50°F on pipe<br/>(10, 16, 26, 33, 39W/m @10°C on pipe)</p> <p><i>[Note] 12W/ft (39W/m) Only available in Supply Voltage: 2 (200 – 277V)</i></p> <p><b>GHU-CT</b></p> <p>5, 10, 15, 20 W/ft @50°F on pipe<br/>(16, 33, 49, 66W/m @10°C on pipe)</p> <p><b>GHK-CT</b></p> <p>5, 10, 15, 20 W/ft @50°F on pipe<br/>(16, 33, 49, 66W/m @10°C on pipe)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Kits           | <p><b>GB100S</b> Power Connection Kit with Junction Box for Single Heating Cable</p> <ul style="list-style-type: none"> <li>• GB 100S-A has one 3/4" through hole for 3/4" conduit and fittings.</li> <li>• GB 100S-E has one M25 through hole for M25 conduit and fittings.</li> </ul> <p><b>GB100M</b> Power Connection Kits with Junction Box for Multiple Heating Cables.</p> <ul style="list-style-type: none"> <li>• GB100M-A(or GB100M-E) has one 3/4"(or M25) through hole for 3/4"(or M25) conduit and fittings to connect power to a maximum of three heating cables.</li> <li>• GB100M-A-2P(or GB100M-E-2P) has two 3/4"(or M25) through-holes for 3/4"(or M25) conduit and fittings to connect dual power to two heating cables.</li> </ul> <p><b>GB200</b> Tee, Splice Connection or End Termination Kit with Junction Box</p> <p><b>GB300</b> End Seal or In-Line Splice Connection Kit</p> |

## 2.0 GHT-CR/CT Self-Regulating Heating Cable

GHT self-regulating heating cable can be used for freeze protection and temperature maintenance for pipe or tank up to 150°F (65°C) in nonhazardous and hazardous locations.

### 2.1 Basic Construction



### 2.2 Technical Specification

|                                                                                          |                                                                                                                                                   |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. Intermittent Exposure Temp.<br>(Heating device de-energized)                        | 185°F (85°C)                                                                                                                                      |
| Max. Maintain or Continuous Exposure Temp.<br>(Heating device energized or de-energized) | 150°F (65°C)                                                                                                                                      |
| Supply Voltage                                                                           | 100 – 120V, 200 – 277V                                                                                                                            |
| Output Wattage                                                                           | 3, 5, 8, 10, 12* W/ft @50°F on pipe<br>(10, 16, 26, 33, 39*W/m @10°C on pipe)<br>(*12W/ft (39W/m) only available in supply voltage of 200 – 277V) |
| Bus wire                                                                                 | 16 AWG                                                                                                                                            |
| Min. Bending Radius                                                                      | 0.5" @68°F (13mm @20°C), 1.6" @-58°F (40mm @-50°C)                                                                                                |
| Min. Installation Temperature                                                            | -58°F (-50°C)                                                                                                                                     |
| Min. Start-up Temperature                                                                | -40°F (-40°C)                                                                                                                                     |
| Outer Jacket Color                                                                       | GHT-CR: Dark Gray / GHT-CT: Black                                                                                                                 |
| Heating Cable Dimensions (Nominal)                                                       | GHT-CR: 0.49 in x 0.25 in (12.5mm x 6.0mm)<br>GHT-CT: 0.46 in x 0.21 in (11.8mm x 5.0mm)                                                          |
| Temperature Classification                                                               | T6 / T85°C                                                                                                                                        |
| Material                                                                                 | Insulation: Modified Polyolefin<br>Outer jacket: CR (Modified Polyolefin), CT (Fluoropolymer)                                                     |

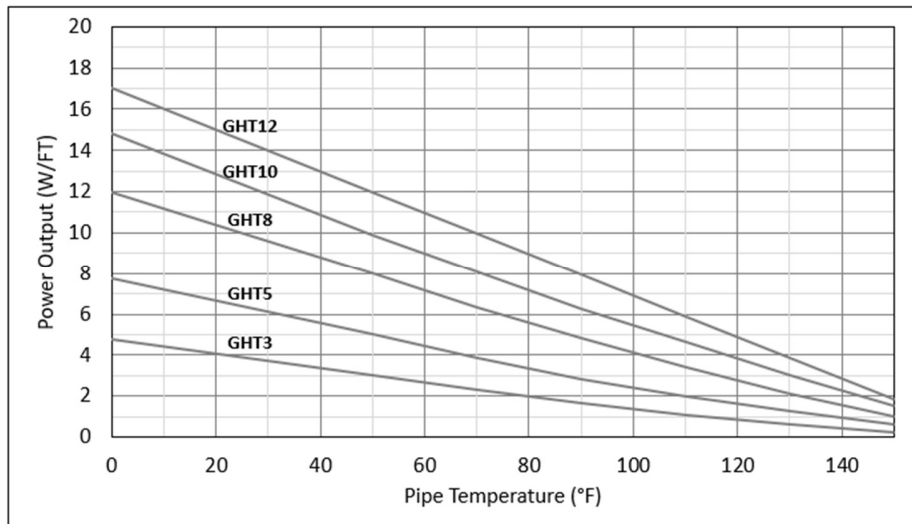
### 2.3 Heating Cable Catalog Number

| GHT        | 10                                     | - | 2                            | CR                                           |
|------------|----------------------------------------|---|------------------------------|----------------------------------------------|
| Model Name | Rated Output [Watts/ft]                |   | Voltage                      | Outer Jacket                                 |
|            | 3, 5, 8, 10, 12 on<br>50°F (10°C) Pipe |   | 1= 100-120 V<br>2= 200-277 V | CR: Modified Polyolefin<br>CT: Fluoropolymer |

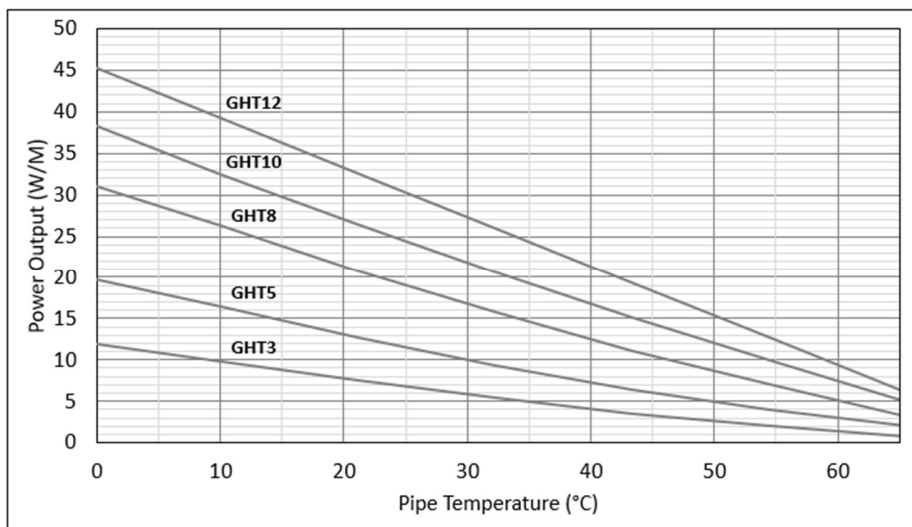
[Note] 12W/ft Only available in Supply Voltage: 2 (200 – 277V)

### 2.4 Nominal Power Output Rating on Metal Pipes at 120V / 240V

- North American Standard (Imperial Units: feet)



- European Standard (Metric Units: meters)



## 2.5 Circuit Length Adjustment Factor

| Voltage | GHT3-2 | GHT5-2 | GHT8-2 | GHT10-2 | GHT12-2 |
|---------|--------|--------|--------|---------|---------|
| 208V    | 0.969  | 0.957  | 0.925  | 0.920   | 0.915   |
| 240V    | 1.000  | 1.000  | 1.000  | 1.000   | 1.000   |
| 277V    | 1.054  | 1.065  | 1.088  | 1.120   | 1.130   |

## 2.6 Power Adjustment Factor

| Voltage | GHT3-2 | GHT5-2 | GHT8-2 | GHT10-2 | GHT12-2 |
|---------|--------|--------|--------|---------|---------|
| 208V    | 0.800  | 0.820  | 0.880  | 0.910   | 0.943   |
| 240V    | 1.000  | 1.000  | 1.000  | 1.000   | 1.000   |
| 277V    | 1.190  | 1.170  | 1.120  | 1.100   | 1.071   |

## 2.7 Maximum Circuit Lengths Based on Circuit Breaker Sizes

- North American Standard (Imperial Units: feet)

| Catalog Number | Start-Up Temperature<br>°F (°C) | Maximum Circuit Length per Circuit Breaker, feet |     |     |     |      |     |     |     |
|----------------|---------------------------------|--------------------------------------------------|-----|-----|-----|------|-----|-----|-----|
|                |                                 | 120V                                             |     |     |     | 240V |     |     |     |
|                |                                 | 15A                                              | 20A | 30A | 40A | 15A  | 20A | 30A | 40A |
| GHT 3          | 50 (10)                         | 327                                              | 377 | 377 | 377 | 654  | 732 | 732 | 732 |
|                | 0 (-18)                         | 200                                              | 266 | 377 | 377 | 400  | 533 | 732 | 732 |
|                | -20 (-29)                       | 173                                              | 231 | 346 | 377 | 346  | 461 | 692 | 732 |
|                | -40 (-40)                       | 152                                              | 203 | 305 | 377 | 305  | 406 | 610 | 732 |
| GHT 5          | 50 (10)                         | 200                                              | 267 | 302 | 302 | 400  | 533 | 604 | 604 |
|                | 0 (-18)                         | 126                                              | 168 | 252 | 302 | 252  | 336 | 504 | 604 |
|                | -20 (-29)                       | 110                                              | 146 | 220 | 293 | 220  | 293 | 439 | 586 |
|                | -40 (-40)                       | 97                                               | 130 | 195 | 259 | 195  | 259 | 389 | 519 |
| GHT 8          | 50 (10)                         | 154                                              | 205 | 243 | 243 | 307  | 409 | 482 | 482 |
|                | 0 (-18)                         | 104                                              | 138 | 207 | 243 | 207  | 276 | 415 | 482 |
|                | -20 (-29)                       | 92                                               | 122 | 184 | 243 | 184  | 245 | 367 | 482 |
|                | -40 (-40)                       | 82                                               | 110 | 165 | 219 | 165  | 219 | 329 | 439 |
| GHT 10         | 50 (10)                         | 125                                              | 167 | 207 | 207 | 250  | 334 | 410 | 410 |
|                | 0 (-18)                         | 90                                               | 120 | 179 | 207 | 179  | 239 | 359 | 410 |
|                | -20 (-29)                       | 81                                               | 107 | 161 | 207 | 161  | 215 | 322 | 410 |
|                | -40 (-40)                       | 73                                               | 97  | 146 | 195 | 146  | 195 | 292 | 390 |
| GHT 12         | 50 (10)                         |                                                  |     |     |     | 222  | 295 | 322 | 322 |
|                | 0 (-18)                         |                                                  |     |     |     | 156  | 209 | 313 | 322 |
|                | -20 (-29)                       |                                                  |     |     |     | 140  | 187 | 280 | 322 |
|                | -40 (-40)                       |                                                  |     |     |     | 127  | 169 | 253 | 322 |

- European Standard (Metric Units: meters)

| Catalog Number | Start-Up Temperature (°C) | Maximum Circuit Length per Circuit Breaker, meters |     |     |     |
|----------------|---------------------------|----------------------------------------------------|-----|-----|-----|
|                |                           | 230V                                               |     |     |     |
|                |                           | 16A                                                | 25A | 32A | 40A |
| GHT3           | 10                        | 219                                                | 223 | 223 | 223 |
|                | -20                       | 134                                                | 212 | 223 | 223 |
|                | -30                       | 116                                                | 195 | 223 | 223 |
|                | -40                       | 102                                                | 172 | 223 | 223 |
| GHT5           | 10                        | 134                                                | 184 | 184 | 184 |
|                | -20                       | 85                                                 | 142 | 184 | 184 |
|                | -30                       | 74                                                 | 124 | 174 | 183 |
|                | -40                       | 65                                                 | 110 | 154 | 163 |
| GHT8           | 10                        | 103                                                | 147 | 147 | 147 |
|                | -20                       | 70                                                 | 117 | 147 | 147 |
|                | -30                       | 62                                                 | 103 | 145 | 147 |
|                | -40                       | 55                                                 | 93  | 130 | 140 |
| GHT10          | 10                        | 84                                                 | 123 | 125 | 125 |
|                | -20                       | 60                                                 | 101 | 125 | 125 |
|                | -30                       | 54                                                 | 91  | 125 | 125 |
|                | -40                       | 49                                                 | 82  | 116 | 125 |
| GHT12          | 10                        | 74                                                 | 86  | 98  | 98  |
|                | -20                       | 58                                                 | 73  | 88  | 88  |
|                | -30                       | 55                                                 | 71  | 86  | 86  |
|                | -40                       | 52                                                 | 68  | 84  | 84  |

## 2.8 Specific Conditions of Use

- The GHT Series Heating Cables must be installed using Gaumer Process GB100S, GB100M, GB200, and GB300 Series Connection Kits.
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.

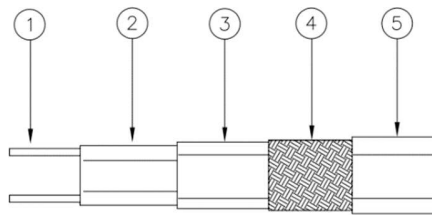
## 2.9 Schedule of Limitations

- The maximum intermittent exposure temperature (Heating device de-energized) is 185°F (85°C).
- The maximum continuous exposure temperature (heating device energized or de-energized) is 150°F (65°C).
- The maximum supply voltage is 100 – 120V, for the (-1) models and 200 – 277V for the (-2) models.
- The minimum installation temperature is -58°F (-50°C).
- The minimum bend radius is 40mm at -58°F (-50°C).
- T-code ratings for the GHT-CR and GHT-CT is T6.

### 3.0 GHU-CT Self-regulating Heating

GHU self-regulating heating cable can be used for freeze protection and temperature maintenance for pipe or tank up to 250°F (120°C) in nonhazardous and hazardous locations.

#### 3.1 Cable Basic Construction



- ① Bus Wires (Nickel Plated Copper)
- ② Conductive Core (Heating Matrix)
- ③ Insulation (Fluoropolymer)
- ④ Metallic Braid (Tinned Copper)
- ⑤ Outer Jacket (Fluoropolymer)

#### 3.2 Technical Specification

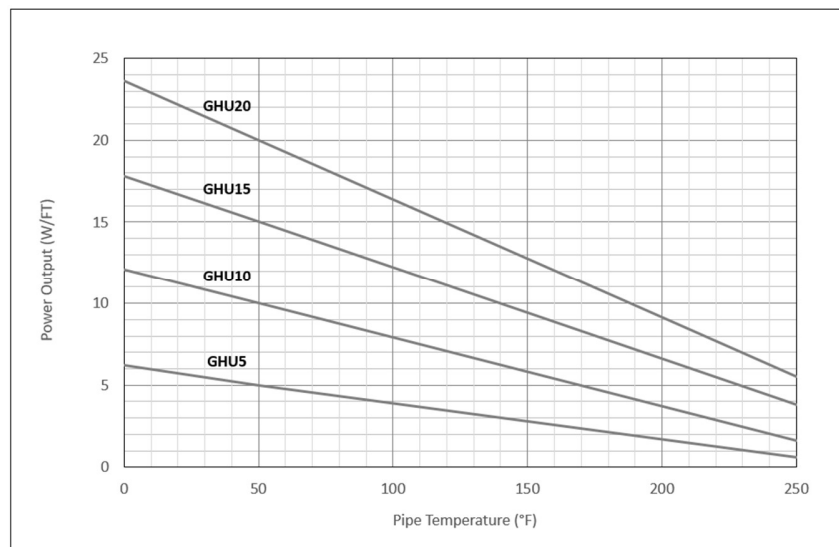
|                                                                   |                                                                       |
|-------------------------------------------------------------------|-----------------------------------------------------------------------|
| Max. Intermittent Exposure Temp.<br>(Heating device de-energized) | 392°F (200°C)                                                         |
| Max. Maintain or Continuous Exposure Temp.<br>(Power on or off)   | 250°F (120°C)                                                         |
| Supply Voltage                                                    | 100 – 120V, 200 – 277V                                                |
| Output Wattage                                                    | 5, 10, 15, 20 W/ft @50°F on pipe<br>(16, 33, 49, 66W/m @10°C on pipe) |
| Bus wire                                                          | 16 AWG                                                                |
| Min. Bending Radius                                               | 0.8" @70°F (20mm @20°C),<br>1.8" @-76°F (45mm @-60°C)                 |
| Min. Installation Temperature                                     | -76°F (-60°C)                                                         |
| Min. Start-up Temperature                                         | -40°F (-40°C)                                                         |
| Outer Jacket Color                                                | Yellow                                                                |
| Heating Cable Dimensions (Nominal)                                | 0.43 in x 0.20 in (11.0mm x 5.0mm)                                    |
| Temperature Classification                                        | T3 / T200°C                                                           |
| Material                                                          | Insulation: Fluoropolymer<br>Outer jacket: Fluoropolymer              |

### 3.3 Heating Cable Catalog Number

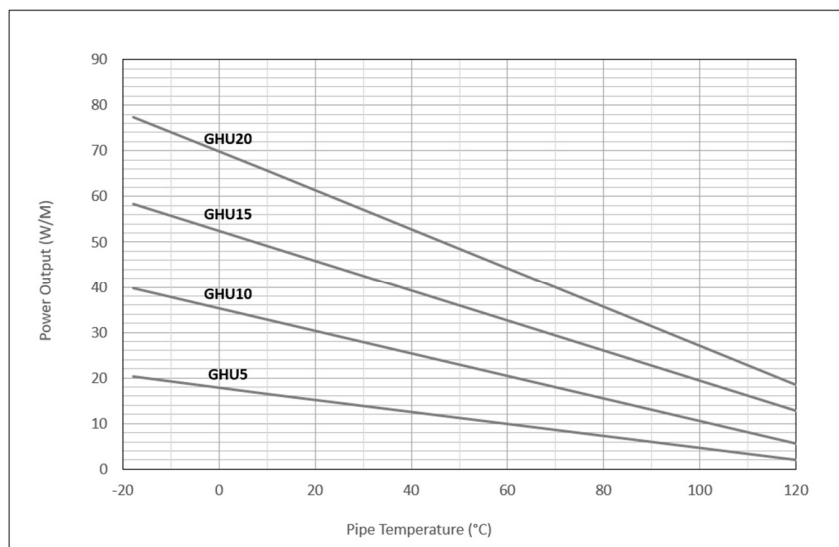
| GHU        | 20                                                           | - | 2                                       | CT                                |
|------------|--------------------------------------------------------------|---|-----------------------------------------|-----------------------------------|
| Model Name | Rated Output [Watts/ft]<br>5, 10, 15, 20 on 50°F (10°C) Pipe |   | Voltage<br>1= 100-120 V<br>2= 200-277 V | Outer Jacket<br>CT: Fluoropolymer |

### 3.4 Nominal Power Output Rating on Metal Pipes at 120V / 240V

- **North American Standard (Imperial Units: feet)**



- **European Standard (Metric Units: meters)**



### 3.5 Circuit Length Adjustment Factor

| Voltage | GHU5-2 | GHU10-2 | GHU15-2 | GHU20-2 |
|---------|--------|---------|---------|---------|
| 208V    | 0.94   | 0.94    | 0.93    | 0.94    |
| 240V    | 1.00   | 1.00    | 1.00    | 1.00    |
| 277V    | 1.09   | 1.09    | 1.11    | 1.11    |

### 3.6 Power Adjustment Factor

| Voltage | GHU5-2 | GHU10-2 | GHU15-2 | GHU20-2 |
|---------|--------|---------|---------|---------|
| 208V    | 0.88   | 0.89    | 0.90    | 0.91    |
| 240V    | 1.00   | 1.00    | 1.00    | 1.00    |
| 277V    | 1.06   | 1.07    | 1.07    | 1.06    |

### 3.7 Maximum Circuit Lengths Based on Circuit Breaker Sizes

#### • North American Standard (Imperial Units: feet)

| Catalog Number | Start-Up<br>Temperature<br>°F (°C) | Maximum Circuit Length per Circuit Breaker, feet |     |     |     |     |      |     |     |     |     |
|----------------|------------------------------------|--------------------------------------------------|-----|-----|-----|-----|------|-----|-----|-----|-----|
|                |                                    | 120V                                             |     |     |     |     | 240V |     |     |     |     |
|                |                                    | 15A                                              | 20A | 30A | 40A | 50A | 15A  | 20A | 30A | 40A | 50A |
| GHU5-CT        | 50 (10)                            | 180                                              | 240 | 358 | 358 | 358 | 360  | 480 | 709 | 709 | 709 |
|                | 0 (-18)                            | 141                                              | 187 | 281 | 358 | 358 | 281  | 375 | 562 | 709 | 709 |
|                | -20 (-29)                          | 129                                              | 172 | 258 | 345 | 358 | 258  | 345 | 517 | 689 | 709 |
|                | -40 (-40)                          | 120                                              | 159 | 239 | 319 | 358 | 239  | 319 | 478 | 638 | 709 |
| GHU10-CT       | 50 (10)                            | 107                                              | 142 | 213 | 253 | 253 | 213  | 284 | 427 | 502 | 502 |
|                | 0 (-18)                            | 87                                               | 116 | 174 | 232 | 253 | 174  | 232 | 348 | 464 | 502 |
|                | -20 (-29)                          | 81                                               | 108 | 162 | 216 | 253 | 162  | 216 | 324 | 432 | 502 |
|                | -40 (-40)                          | 76                                               | 101 | 152 | 202 | 253 | 152  | 202 | 303 | 404 | 502 |
| GHU15-CT       | 50 (10)                            | 78                                               | 104 | 156 | 203 | 203 | 156  | 208 | 312 | 400 | 400 |
|                | 0 (-18)                            | 65                                               | 87  | 130 | 174 | 203 | 130  | 174 | 261 | 347 | 400 |
|                | -20 (-29)                          | 61                                               | 82  | 122 | 163 | 203 | 122  | 163 | 245 | 326 | 400 |
|                | -40 (-40)                          | 58                                               | 77  | 115 | 154 | 192 | 115  | 154 | 230 | 307 | 384 |
| GHU20-CT       | 50 (10)                            | 58                                               | 78  | 117 | 155 | 174 | 117  | 155 | 233 | 311 | 348 |
|                | 0 (-18)                            | 50                                               | 67  | 100 | 134 | 167 | 100  | 134 | 200 | 267 | 334 |
|                | -20 (-29)                          | 47                                               | 63  | 95  | 126 | 158 | 95   | 126 | 190 | 253 | 316 |
|                | -40 (-40)                          | 45                                               | 60  | 90  | 120 | 150 | 90   | 120 | 180 | 240 | 300 |

• **European Standard (Metric Units: meters)**

| Catalog Number | Start-Up Temperature<br>(°C) | Maximum Circuit Length per Circuit Breaker, meters<br>230V |     |     |     |
|----------------|------------------------------|------------------------------------------------------------|-----|-----|-----|
|                |                              | 16A                                                        | 25A | 32A | 40A |
| GHU5           | 10                           | 143                                                        | 216 | 216 | 216 |
|                | -20                          | 113                                                        | 173 | 216 | 216 |
|                | -30                          | 105                                                        | 160 | 202 | 211 |
|                | -40                          | 98                                                         | 149 | 187 | 195 |
| GHU10          | 10                           | 85                                                         | 130 | 153 | 153 |
|                | -20                          | 70                                                         | 107 | 136 | 141 |
|                | -30                          | 66                                                         | 100 | 126 | 134 |
|                | -40                          | 62                                                         | 94  | 118 | 125 |
| GHU15          | 10                           | 62                                                         | 95  | 122 | 122 |
|                | -20                          | 52                                                         | 80  | 102 | 107 |
|                | -30                          | 50                                                         | 76  | 95  | 100 |
|                | -40                          | 47                                                         | 72  | 90  | 95  |
| GHU20          | 10                           | 46                                                         | 71  | 91  | 95  |
|                | -20                          | 40                                                         | 61  | 78  | 81  |
|                | -30                          | 38                                                         | 59  | 74  | 78  |
|                | -40                          | 37                                                         | 56  | 70  | 75  |

### 3.9 Specific Conditions of Use– ATEX / IECEx Only

- The GHU Series Heating Cables must be installed using Gaumer Process GB100S, GB100M, GB200, and GB300 Series Connection Kits.
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.

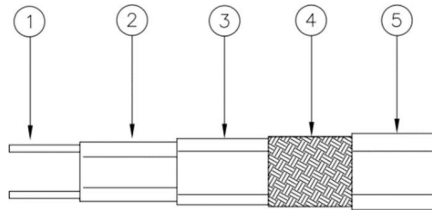
### 3.8 Schedule of Limitation

- The maximum intermittent exposure temperature (Heating device de-energized) is 392°F (200°C).
- The maximum continuous exposure temperature (heating device energized or de-energized) is 250°F (120°C).
- The maximum supply voltage is 100 – 120V, for the (-1) models and 200 – 277V for the (-2) models.
- The minimum installation temperature is -76°F (-60°C).
- The minimum bend radius is 45mm at -76°F (-60°C).
- T-code ratings is T3.

## 4.0 GHK-CT Self-regulating Heating Cable

GHK self-regulating heating cable can be used for freeze protection and temperature maintenance for pipe or tank up to 300°F (150°C) in nonhazardous and hazardous locations.

### 4.1 Basic Construction



- ① Bus Wires (Nickel Plated Copper)
- ② Conductive Core (Heating Matrix)
- ③ Insulation (Fluoropolymer)
- ④ Metallic Braid (Tinned Copper)
- ⑤ Outer Jacket (Fluoropolymer)

### 4.2 Technical Specification

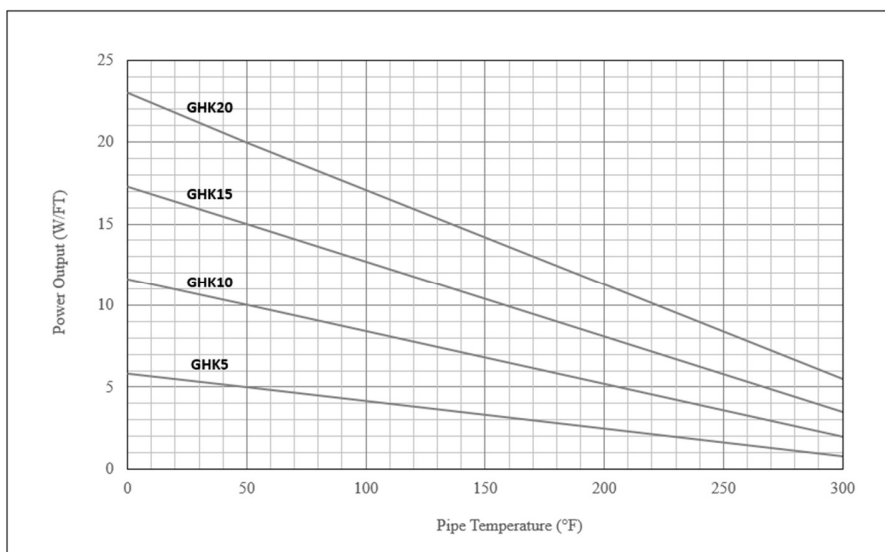
|                                                                   |                                                                                                                                                   |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. Intermittent Exposure Temp.<br>(Heating device de-energized) | 482°F (250°C)                                                                                                                                     |
| Max. Maintain or Continuous Exposure Temp.<br>(Power on or off)   | 300°F (150°C)                                                                                                                                     |
| Supply Voltage                                                    | 100 – 120V, 200 – 277V                                                                                                                            |
| Output Wattage                                                    | 5, 10, 15, 20 W/ft @50°F on pipe<br>(16, 33, 49, 66W/m @10°C on pipe)                                                                             |
| Bus wire                                                          | 16 AWG                                                                                                                                            |
| Min. Bending Radius                                               | 0.8" 70°F (20mm @20°C), 1.8" @-76°F (45mm @-60°C)                                                                                                 |
| Min. Installation Temperature                                     | -76°F (-60°C)                                                                                                                                     |
| Min. Start-up Temperature                                         | -40°F (-40°C)                                                                                                                                     |
| Outer Jacket Color                                                | Red                                                                                                                                               |
| Heating Cable Dimensions (Nominal)                                | 0.50 in x 0.20 in (13.0mm x 5.0mm)                                                                                                                |
| Temperature Classification                                        | US and Canada:<br>T3/T200°C: GHK5, GHK10, GHK15<br>T2D/T215°C: GHK20<br><br>ATEX and IECEx:<br>T3/T200°C: GHK5, GHK10, GHK15<br>T2D/T300°C: GHK20 |
| Material                                                          | Insulation: Fluoropolymer<br>Outer jacket: Fluoropolymer                                                                                          |

### 4.3 Heating Cable Catalog Number

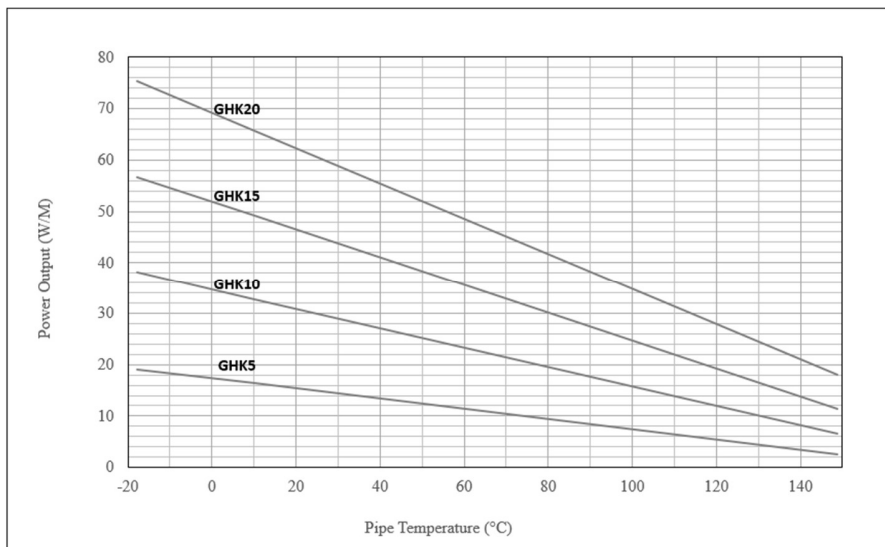
| GHK        | 20                             | - | 2                            | CT                |
|------------|--------------------------------|---|------------------------------|-------------------|
| Model Name | Rated Output [Watts/m]         |   | Voltage                      | Outer Jacket      |
|            | 5, 10, 15, 20 Pipe 50°F (10°C) |   | 1= 100-120 V<br>2= 200-277 V | CT: Fluoropolymer |

### 4.4 Nominal Power Output Rating on Metal Pipes at 120V / 240V

- North American Standard (Imperial Units: feet)



- European Standard (Metric Units: meters)



#### 4.5 Circuit Length Adjustment Factor

| Voltage | GHK5-2 | GHK10-2 | GHK15-2 | GHK20-2 |
|---------|--------|---------|---------|---------|
| 208V    | 0.93   | 0.94    | 0.94    | 0.94    |
| 240V0   | 1.00   | 1.00    | 1.00    | 1.00    |
| 277V    | 1.10   | 1.10    | 1.11    | 1.11    |

#### 4.6 Power Adjustment Factor

| Voltage | GHK5-2 | GHK10-2 | GHK15-2 | GHK20-2 |
|---------|--------|---------|---------|---------|
| 208V    | 0.93   | 0.94    | 0.94    | 0.94    |
| 240V    | 1.00   | 1.00    | 1.00    | 1.00    |
| 277V    | 1.10   | 1.10    | 1.11    | 1.11    |

#### 4.7 Maximum Circuit Lengths Based on Circuit Breaker Sizes

##### • North American Standard (Imperial Units: feet)

| Catalog Number | Start-Up<br>Temperature<br>°F (°C) | Maximum Circuit Length per Circuit Breaker, feet |     |     |     |     |      |     |     |     |     |
|----------------|------------------------------------|--------------------------------------------------|-----|-----|-----|-----|------|-----|-----|-----|-----|
|                |                                    | 120V                                             |     |     |     |     | 240V |     |     |     |     |
|                |                                    | 15A                                              | 20A | 30A | 40A | 50A | 15A  | 20A | 30A | 40A | 50A |
| GHK5-CT        | 50 (10)                            | 180                                              | 240 | 358 | 358 | 358 | 360  | 480 | 709 | 709 | 709 |
|                | 0 (-18)                            | 141                                              | 187 | 281 | 358 | 358 | 281  | 375 | 562 | 709 | 709 |
|                | -20 (-29)                          | 129                                              | 172 | 258 | 345 | 358 | 258  | 345 | 517 | 689 | 709 |
|                | -40 (-40)                          | 120                                              | 159 | 239 | 319 | 358 | 239  | 319 | 478 | 638 | 709 |
| GHK10-CT       | 50 (10)                            | 107                                              | 142 | 213 | 253 | 253 | 213  | 284 | 427 | 502 | 502 |
|                | 0 (-18)                            | 87                                               | 116 | 174 | 232 | 253 | 174  | 232 | 348 | 464 | 502 |
|                | -20 (-29)                          | 81                                               | 108 | 162 | 216 | 253 | 162  | 216 | 324 | 432 | 502 |
|                | -40 (-40)                          | 76                                               | 101 | 152 | 202 | 253 | 152  | 202 | 303 | 404 | 502 |
| GHK15-CT       | 50 (10)                            | 78                                               | 104 | 156 | 203 | 203 | 156  | 208 | 312 | 400 | 400 |
|                | 0 (-18)                            | 65                                               | 87  | 130 | 174 | 203 | 130  | 174 | 261 | 347 | 400 |
|                | -20 (-29)                          | 61                                               | 82  | 122 | 163 | 203 | 122  | 163 | 245 | 326 | 400 |
|                | -40 (-40)                          | 58                                               | 77  | 115 | 154 | 192 | 115  | 154 | 230 | 307 | 384 |
| GHK20-CT       | 50 (10)                            | 58                                               | 78  | 117 | 155 | 174 | 117  | 155 | 233 | 311 | 348 |
|                | 0 (-18)                            | 50                                               | 67  | 100 | 134 | 167 | 100  | 134 | 200 | 267 | 334 |
|                | -20 (-29)                          | 47                                               | 63  | 95  | 126 | 158 | 95   | 126 | 190 | 253 | 316 |
|                | -40 (-40)                          | 45                                               | 60  | 90  | 120 | 150 | 90   | 120 | 180 | 240 | 300 |

- European Standard (Metric Units: meters)

| Catalog Number | Start-Up Temperature<br>(°C) | Maximum Circuit Length per Circuit Breaker, meters |     |     |     |
|----------------|------------------------------|----------------------------------------------------|-----|-----|-----|
|                |                              | 230V                                               |     |     |     |
|                |                              | 16A                                                | 25A | 32A | 40A |
| GHK5           | 10                           | 143                                                | 216 | 216 | 216 |
|                | -20                          | 113                                                | 173 | 216 | 216 |
|                | -30                          | 105                                                | 160 | 202 | 211 |
|                | -40                          | 98                                                 | 149 | 187 | 195 |
| GHK10          | 10                           | 85                                                 | 130 | 153 | 153 |
|                | -20                          | 70                                                 | 107 | 136 | 141 |
|                | -30                          | 66                                                 | 100 | 126 | 134 |
|                | -40                          | 62                                                 | 94  | 118 | 125 |
| GHK15          | 10                           | 62                                                 | 95  | 122 | 122 |
|                | -20                          | 52                                                 | 80  | 102 | 107 |
|                | -30                          | 50                                                 | 76  | 95  | 100 |
|                | -40                          | 47                                                 | 72  | 90  | 95  |
| GHK20          | 10                           | 46                                                 | 71  | 91  | 95  |
|                | -20                          | 40                                                 | 61  | 78  | 81  |
|                | -30                          | 38                                                 | 59  | 74  | 78  |
|                | -40                          | 37                                                 | 56  | 70  | 75  |

#### 4.8 Specific Conditions of Use

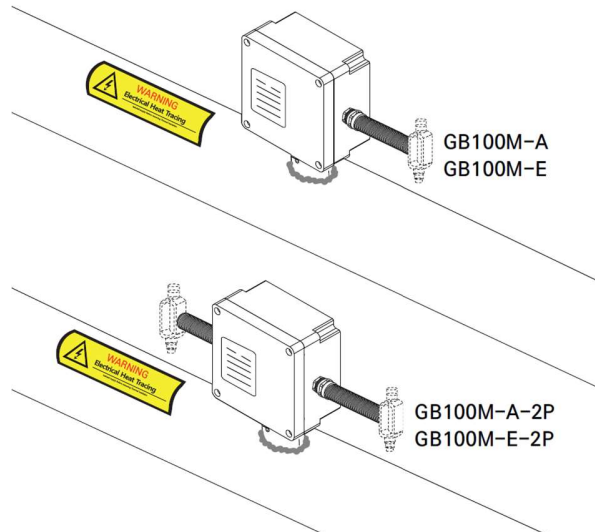
- The GHK Series Heating Cables must be installed using Gaumer Process GB100S, GB100M, GB200, and GB300 Series Connection Kits.
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.

#### 4.8 Schedule of Limitation

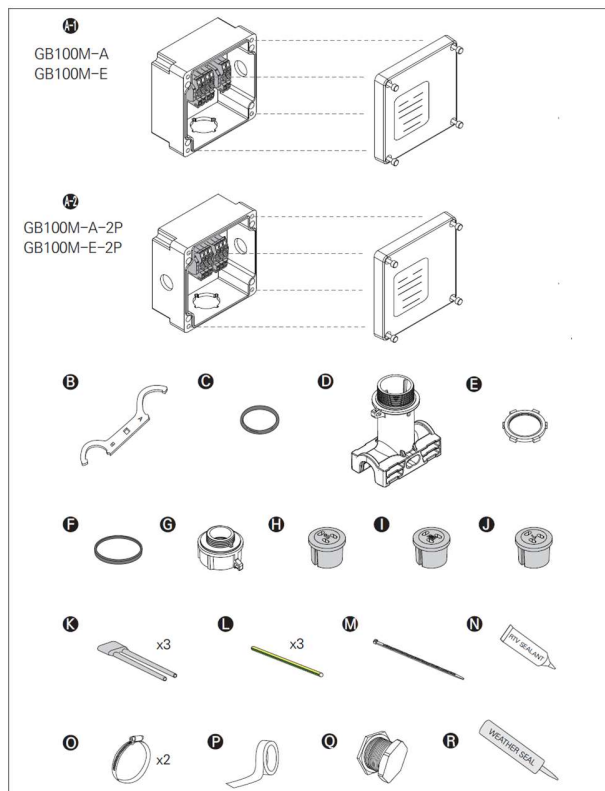
- The maximum intermittent exposure temperature (Heating device de-energized) is 482°F (250°C).
- The maximum continuous exposure temperature (heating device energized or de-energized) is 300°F (150°C).
- The maximum supply voltage is 100 – 120V for the (-1) models and 200 – 277V for the (-2) models.
- The minimum installation temperature is -76°F (-60°C).
- The minimum bend radius is 45mm at -76°F (-60°C).
- T-code ratings for the (5, 10, 15 W/ft) is T3 and T2D for the 20 W/ft.

## 5.0 Multiple Entry Power Connection Kit, GB100M

Power connection kit for use with GHT-CR, GHT-CT, GHU-CT, and GHK-CT industrial self-regulating heating cables. **GB100M-A** and **GB100M-E** can be used to connect power to a maximum of three heating cables. **GB100M-A-2P** and **GB100M-E-2P** can be used to connect dual power to two separate heating cable circuits.



## 5.1 Kit Contents



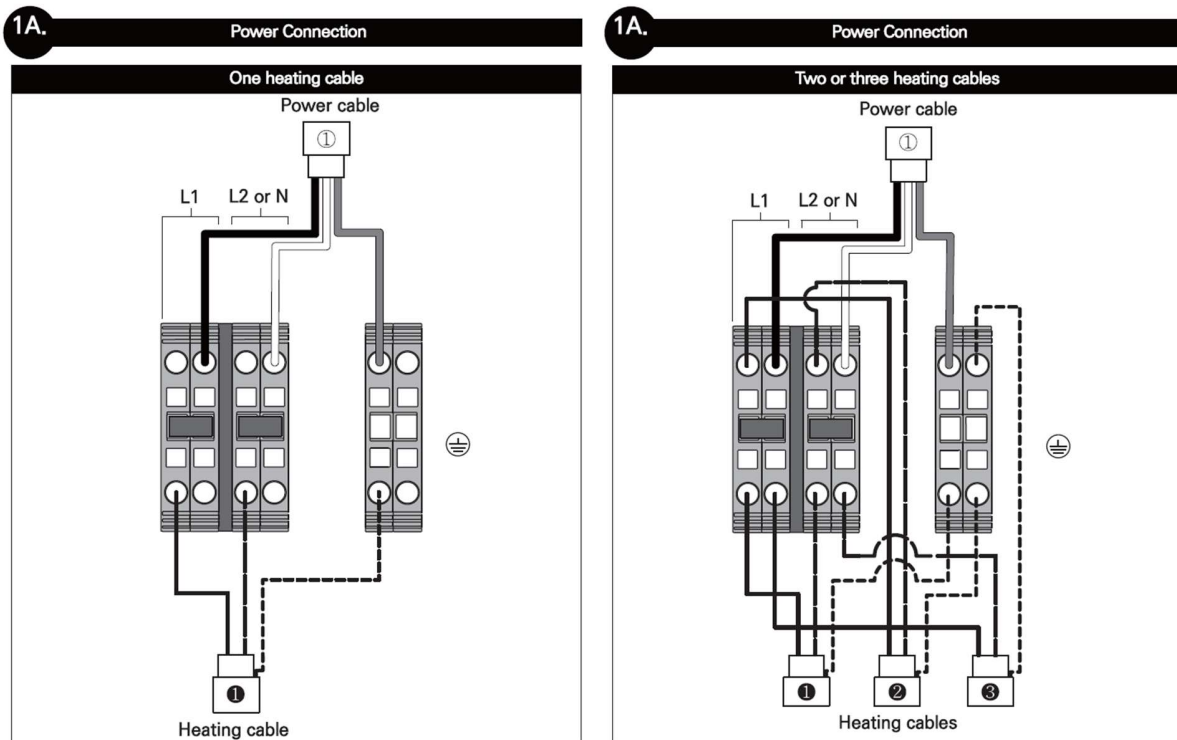
| Item | Description                           | Qty. |
|------|---------------------------------------|------|
| A-1  | GB100M-A(-E) Junction Box Assembly    | 1    |
| A-2  | GB100M-A(-E)-2P Junction Box Assembly |      |
| B    | Wrench                                | 1    |
| C    | Stand O-ring                          | 1    |
| D    | Pipe Stand                            | 1    |
| E    | Lock Nut                              | 1    |
| F    | Square-Ring for Compression Cap       | 1    |
| G    | Compression Cap                       | 1    |
| H    | S Grommet for GHU-CT, GHT-CT          | 1    |
| I    | M Grommet for GHT-CR                  | 1    |
| J    | L Grommet for GHK-CT                  | 1    |
| K    | Core Sealer                           | 3    |
| L    | Insulation Tube (Y/G)                 | 3    |
| M    | Cable Tie                             | 1    |
| N    | RTV Sealant                           | 1    |
| O    | Pipe Strap (Sold Separately)          | 2    |
| P    | Fixing Tape (Sold Separately)         | 1    |
| Q    | Sealing Plug (Sold Separately)        | 1    |
| R    | Weather Seal (Sold Separately)        | 1    |

## 5.2 Specifications

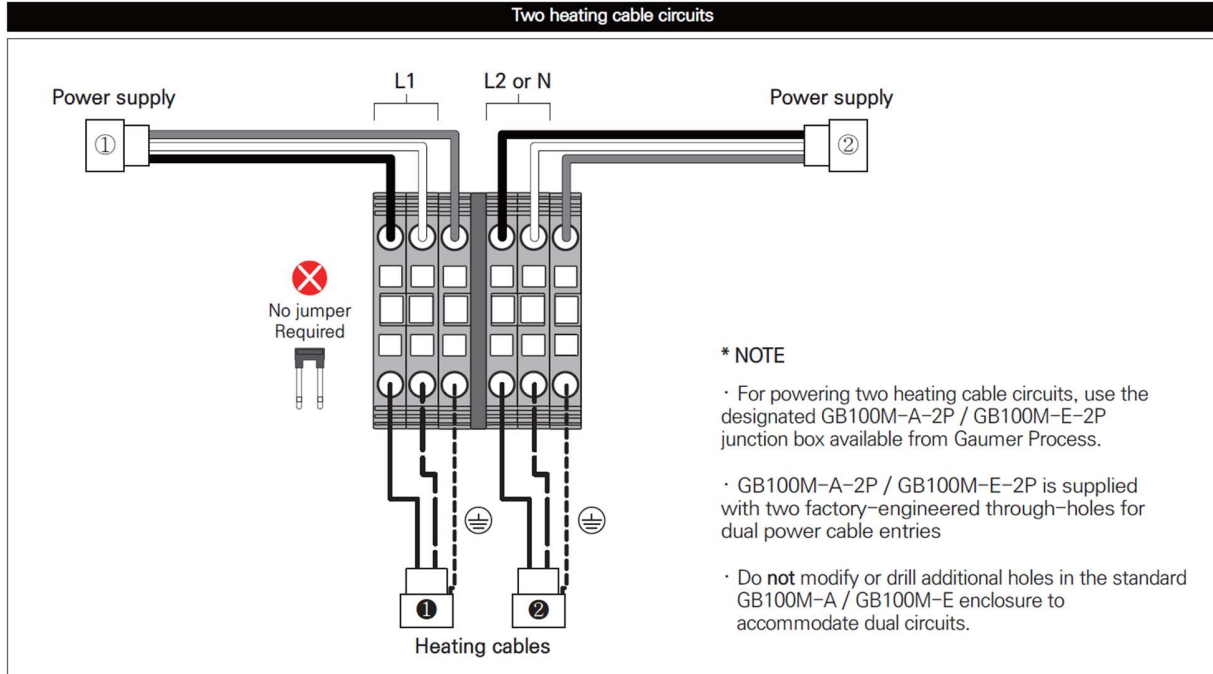
|                                            | GB100M-A / GB100M-A-2P                                                              | GB100M-E / GB100M-E-2P                                  |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------|
| Heating cable capability                   | GHT-CR, GHT-CT, GHU-CT, GHK-CT                                                      |                                                         |
| Supply Voltage                             | 100 – 277 Vac                                                                       | 100 – 277 Vac                                           |
| Ingress protection                         | NEMA Type 4X, IP66                                                                  | IP66                                                    |
| Ambient Temperature Range                  | -40°F to +131°F                                                                     | -40°C to +55°C                                          |
| Min. Installation Temperature              | -40°F                                                                               | -40°C                                                   |
| Through hole for conduit                   | 1 x 3/4" NPT for GB100M-A,<br>2 x 3/4" NPT for GB100M-A-2P                          | 1 x M25 for GB100M-E,<br>2 x M25 for GB100M-E-2P        |
| Max. Conductor Size                        | 8AWG Stranded (6AWG optional)                                                       | 10mm <sup>2</sup> Stranded (16mm <sup>2</sup> optional) |
| Max. Circuit Breaker Size                  | 50A                                                                                 | 40A                                                     |
| Installation Accessories (Sold separately) | Conduit and fittings, Sealing plug kit, Pipe straps, Fiberglass tape, Aluminum tape |                                                         |

## 5.3 Wire Diagram

Power Connection: GB100M-A and GB100M-E with Single Power Entry



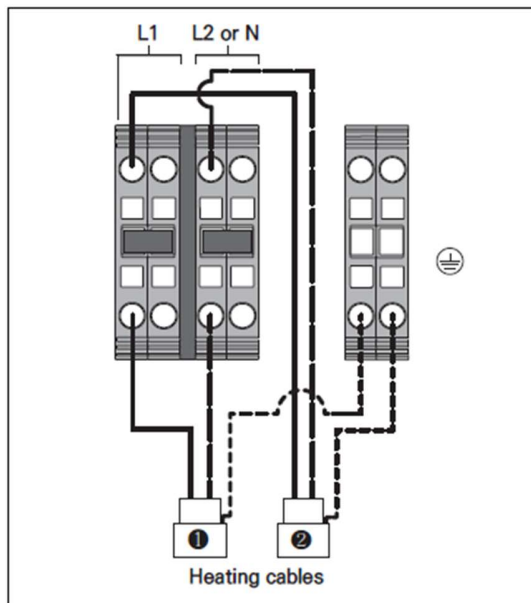
## Power Connection: GB100M-A-2P and GB100M-E-2P with Dual Power Entries



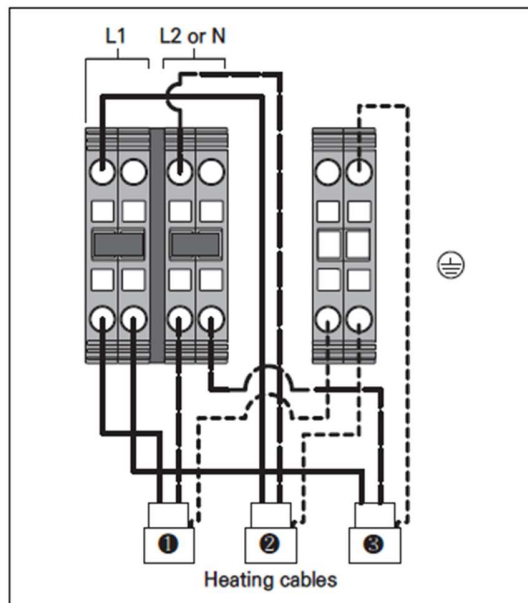
## Terminal Block Wiring

\*Note: When using the GB100M Series Power Connection Kits for tee, splice, or end termination, unused through-holes must be sealed with Gaumer Process Sealing plug kit (sold separately).

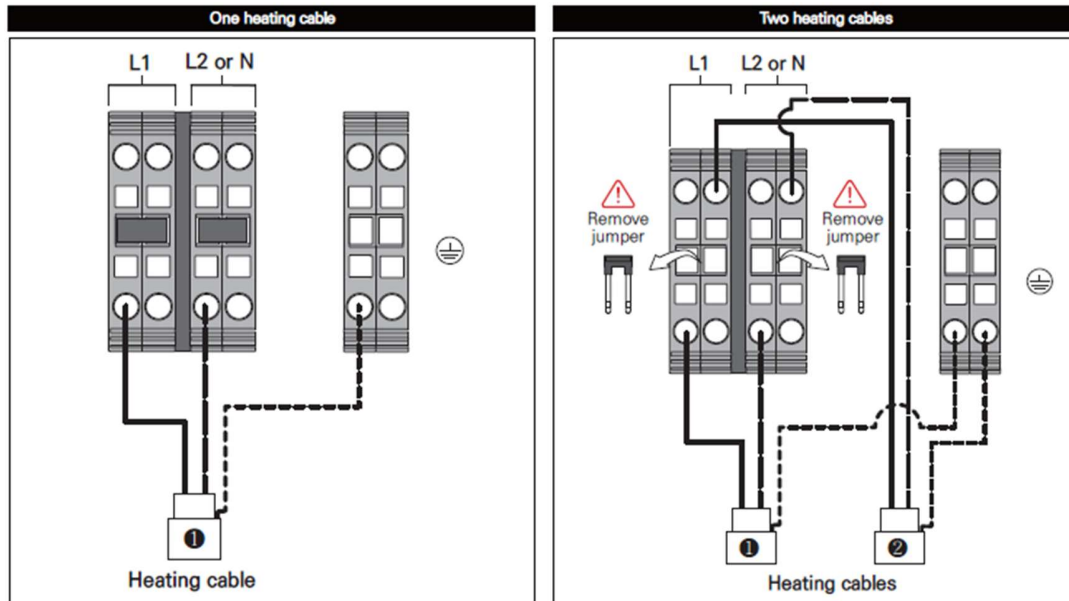
### Splice Connection



### Tee Connection



## End Termination

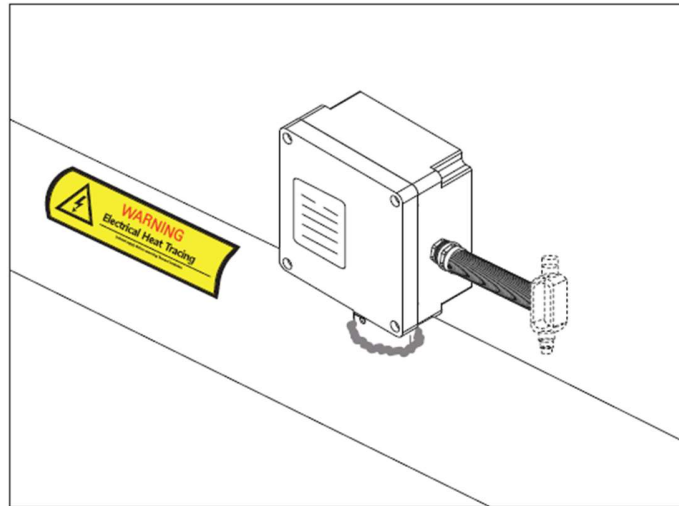


### 5.4 Specific Conditions of Use

- GB100M Series Connection Kits must be installed using Gaumer Process GHT, GHU, and GHK Series Heating Cables..
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.
- To use this kit for splice, tee, or end termination, Gaumer Process Sealing Plug must be purchased separately.

## 6.0 Single Entry Power Connection Kit, GB100S

Power connection kit for use with GHT-CR, GHT-CT, GHU-CT, and GHK-CT industrial self-regulating heating cables. This kit is used to connect power to one heating cable.



### 6.1 Kit Contents

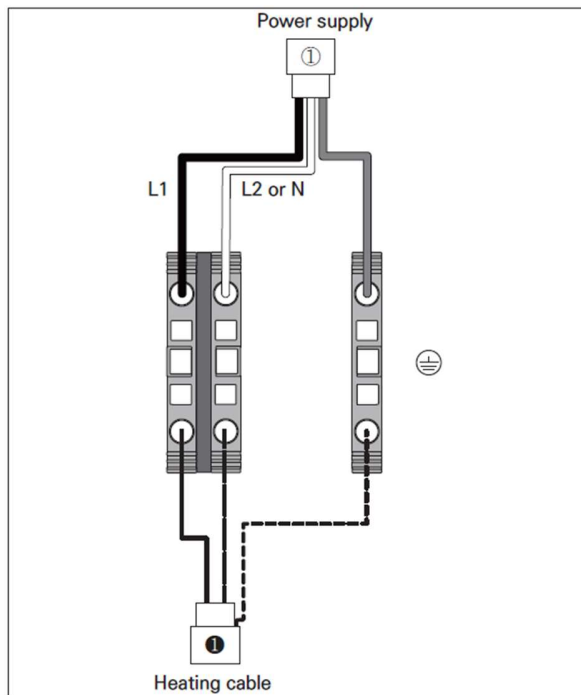
| Item | Description                     | Qty. |
|------|---------------------------------|------|
| A    | Junction Box Assembly           | 1    |
| B    | Wrench                          | 1    |
| C    | Stand O-Ring                    | 1    |
| D    | Pipe Stand                      | 1    |
| E    | Lock Nut                        | 1    |
| F    | Square-Ring for Compression Cap | 1    |
| G    | Compression Cap                 | 1    |
| H    | S Grommet for GHU-CT, GHT-CT    | 1    |
| I    | M Grommet for GHT-CR            | 1    |
| J    | L Grommet for GHK-CT            | 1    |
| K    | Core Sealer                     | 1    |
| L    | Insulation Tube (Y/G)           | 1    |
| M    | Cable Tie                       | 1    |
| N    | RTV Sealant                     | 1    |
| O    | Pipe Strap (Sold Separately)    | 2    |
| P    | Fixing Tape (Sold Separately)   | 1    |
| Q    | Sealing Plug (Sold Separately)  | 1    |
| R    | Weather Seal (Sold Separately)  | 1    |

## 6.2 Specifications

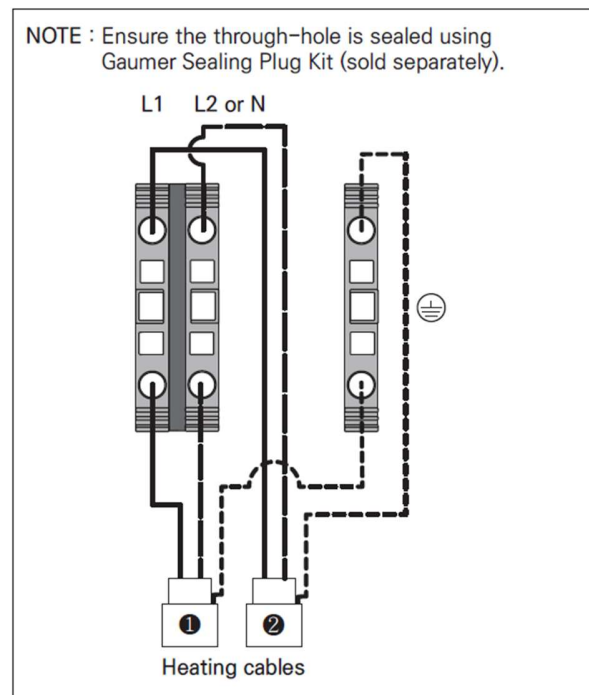
|                                            | GB100S-A                                                                            | GB100S-E                                                |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------|
| Heating cable capability                   | GHT-CR, GHT-CT, GHU-CT, GHK-CT                                                      |                                                         |
| Supply Voltage                             | 100 – 277 Vac                                                                       | 100 – 277 Vac                                           |
| Ingress protection                         | NEMA Type 4X, IP66                                                                  | IP66                                                    |
| Ambient Temperature Range                  | -40°F to +131°F                                                                     | -40°C to +55°C                                          |
| Min. Installation Temperature              | -40°F                                                                               | -40°C                                                   |
| Through hole for conduit                   | 1 x 3/4" NPT                                                                        | 1 x M25                                                 |
| Max. Conductor Size                        | 8AWG Stranded (6AWG optional)                                                       | 10mm <sup>2</sup> Stranded (16mm <sup>2</sup> optional) |
| Max. Circuit Breaker Size                  | 50A                                                                                 | 40A                                                     |
| Installation Accessories (Sold separately) | Conduit and fittings, Sealing plug kit, Pipe straps, Fiberglass tape, Aluminum tape |                                                         |

## 6.3 Wire Diagram

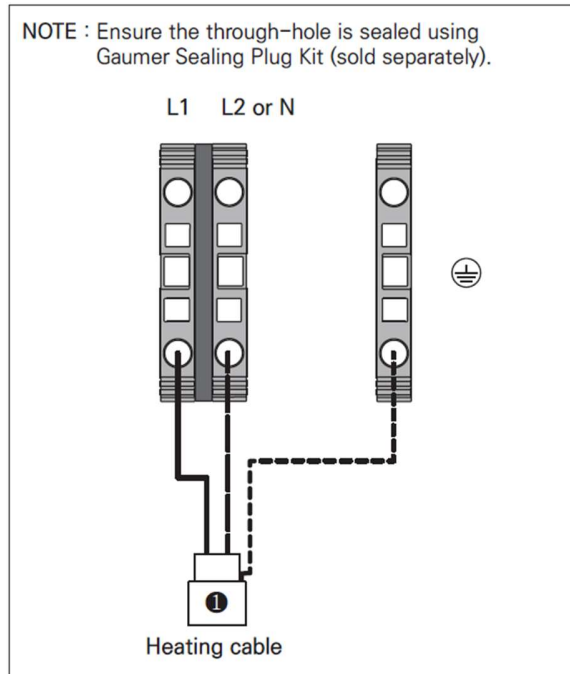
### Power Connection



### Splice Connection



## End Termination

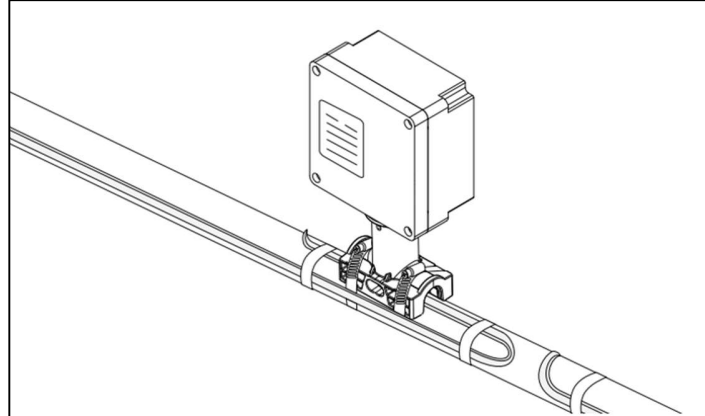


### 6.4 Specific Conditions of Use

- GB100S Series Connection Kits must be installed using Gaumer Process GHT, GHU, and GHK Series Heating Cables.
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.
- To use this kit for splice or end termination, Gaumer Process Sealing Plug must be purchased separately.

## 7.0 Tee/Splice Connection & End Termination Kit, GB200

Tee/Splice connection or End Termination kit for use with GHT-CR, GHT-CT, GHU-CT, and GHK-CT industrial self-regulating heating cables.



### 6.1 Kit Contents

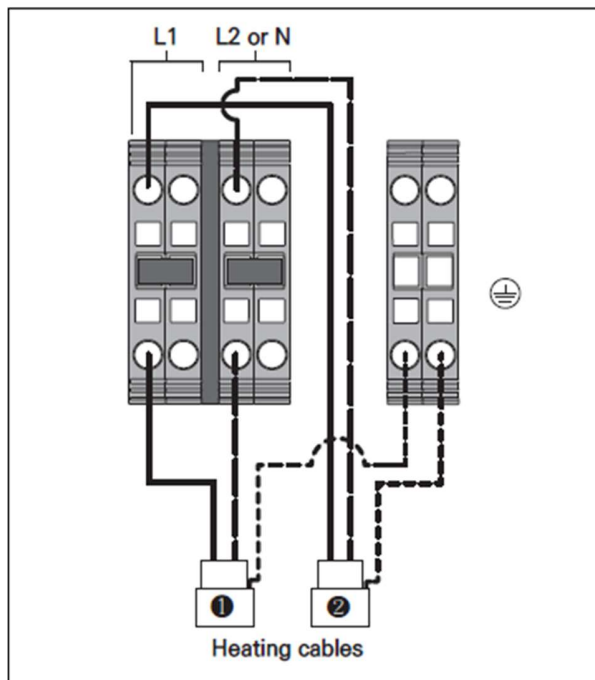
| Item | Description                     | Qty. |
|------|---------------------------------|------|
| A    | Junction Box Assembly           | 1    |
| B    | Wrench                          | 1    |
| C    | Stand O-ring                    | 1    |
| D    | Pipe Stand                      | 1    |
| E    | Lock Nut                        | 1    |
| F    | Square-Ring for Compression Cap | 1    |
| G    | Compression Cap                 | 1    |
| H    | S Grommet for GHU-CT, GHT-CT    | 1    |
| I    | M Grommet for GHT-CR            | 1    |
| J    | L Grommet for GHK-CT            | 1    |
| K    | Core Sealer                     | 3    |
| L    | Insulation Tube (Y/G)           | 3    |
| M    | Cable Tie                       | 1    |
| N    | RTV Sealant                     | 1    |
| O    | Pipe Strap (Sold Separately)    | 2    |
| P    | Fixing Tape (Sold Separately)   | 1    |
| Q    | Weather Seal (Sold Separately)  | 1    |

## 6.2 Specifications

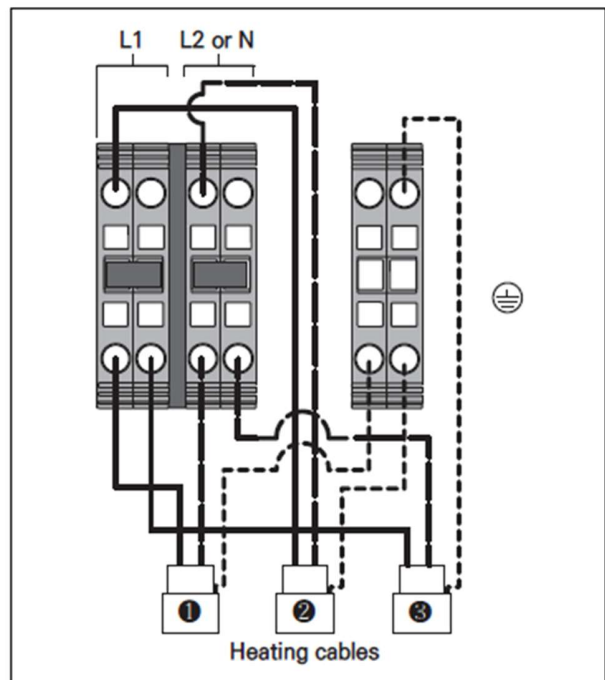
|                                            |                                             |
|--------------------------------------------|---------------------------------------------|
|                                            | GB200                                       |
| Heating cable capability                   | GHT-CR, GHT-CT, GHU-CT, GHK-CT              |
| Ingress protection                         | NEMA Type 4X, IP66                          |
| Ambient Temperature Range                  | -40°F (-40°C) to +131°F (+55°C)             |
| Min. Installation Temperature              | -40°F (-40°C)                               |
| Installation Accessories (Sold separately) | Pipe straps, Fiberglass tape, Aluminum tape |

## 6.3 Wire Diagram

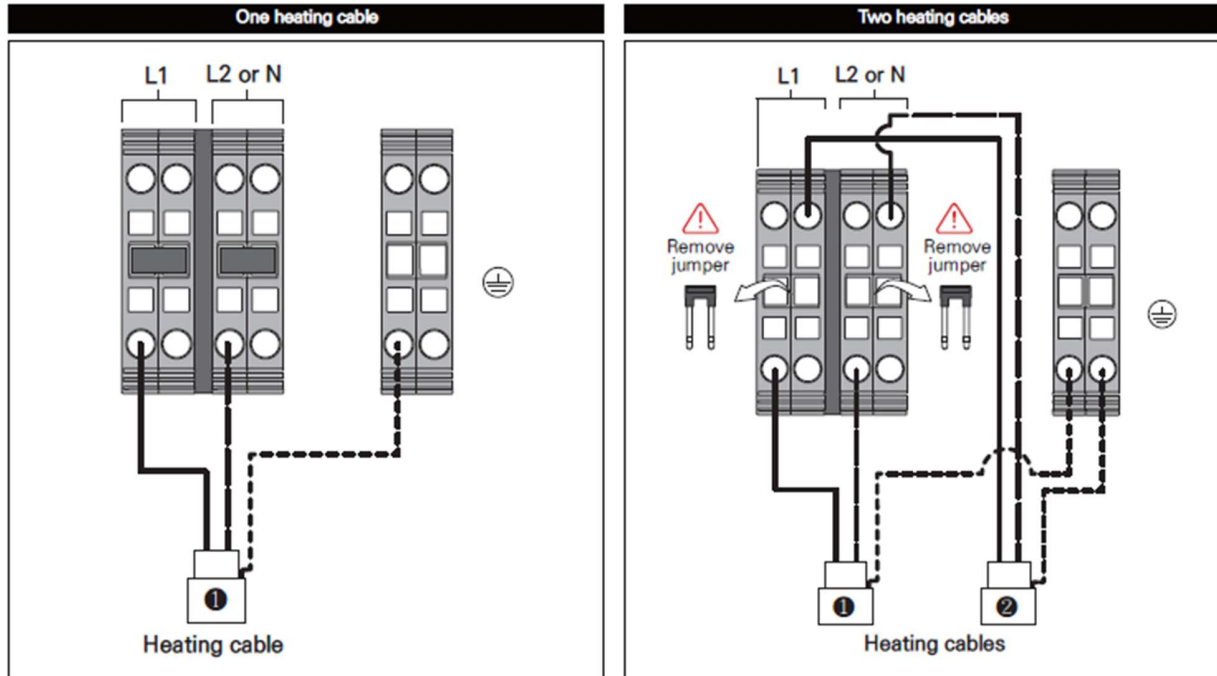
Splice Connection



Tee Connection



## End Termination

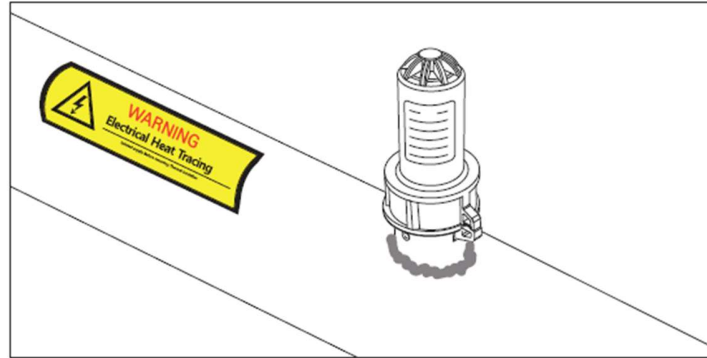


## 6.4 Specific Conditions of Use

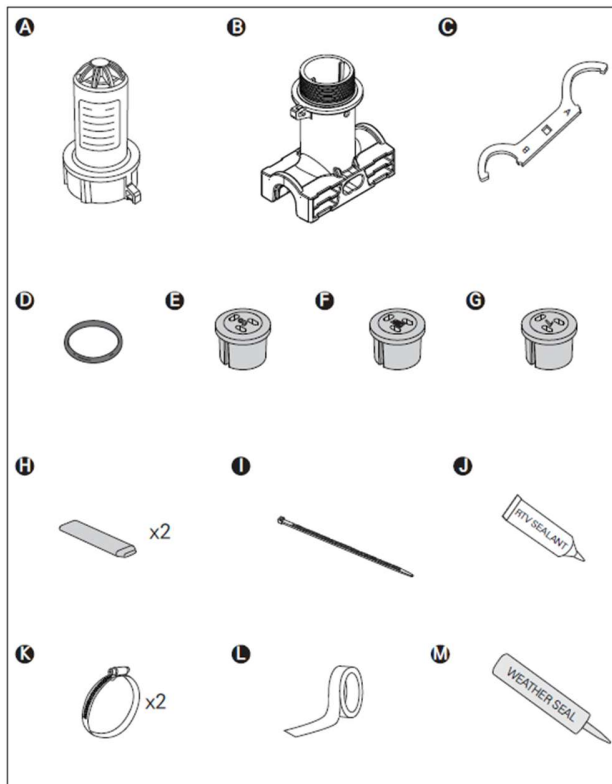
- GB200 Series Connection Kits must be installed using Gaumer Process GHT, GHU, and GHK Series Heating Cables..
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.

## 8.0 End Seal / In-Line Splice Connection Kit, GB300

Tee/Splice connection and End Termination kit for use with GHT-CR, GHT-CT, GHU-CT, and GHK-CT industrial self-regulating heating cables.



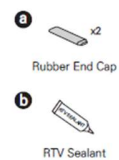
### 8.1 Kit Contents



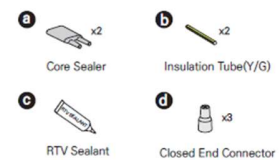
| Item | Description                    | Qty. |
|------|--------------------------------|------|
| A    | End Cap                        | 1    |
| B    | Pipe Stand                     | 1    |
| C    | Wrench                         | 1    |
| D    | Stand O-ring                   | 1    |
| E    | S Grommet for GHU-CT, GHT-CT   | 1    |
| F    | M Grommet for GHT-CR           | 1    |
| G    | L Grommet for GHK-CT           | 1    |
| H    | Rubber End Cap                 | 2    |
| I    | Cable Tie                      | 1    |
| J    | RTV Sealant                    | 1    |
| K    | Pipe Strap (Sold Separately)   | 2    |
| L    | Fixing Tape (Sold Separately)  | 1    |
| M    | Weather Seal (Sold Separately) | 1    |

#### Accessory Package

**"GB-EK" for End Seal**  
<Included in GB300 kit>



**"GB-SK" for Splice connection**  
<Sold separately>



## 8.2 Specifications

|                                            |                                                    |
|--------------------------------------------|----------------------------------------------------|
|                                            | GB300                                              |
| Heating cable capability                   | GHT-CR, GHT-CT, GHU-CT, GHK-CT                     |
| Ingress protection                         | NEMA Type 4X, IP66                                 |
| Ambient Temperature Range                  | -40°F (-40°C) to +131°F (+55°C)                    |
| Min. Installation Temperature              | -40°F (-40°C)                                      |
| Installation Accessories (Sold separately) | GB-SK, Pipe straps, Fiberglass tape, Aluminum tape |

## 8.3 Specific Conditions of Use

- GB300 must be installed using Gaumer Process GHT, GHU, and GHK Series Heating Cables.
- Refer to the installation instructions to reduce the potential of an electrostatic charging hazard on the enclosures of the connection kits.
- The end-user shall mount the equipment per Gaumer Process instructions.

## Appendix 1. Caution Label



- To be posted at appropriate locations and/or at frequent intervals along the circuit. One label for every 10 feet (3 m) of pipe, alternating on either side of the pipe, to be attached to the outside of the thermal insulation weather barrier.
- Also install at equipment requiring periodic maintenance (valves, pumps, instruments, etc.)
- Materials: Polyester laminated silver polyester sheet, adhesive type.

## Appendix 2. Installation Instruction of Heating Cables

### *General Information*

**IMPORTANT:** In order to maintain validity of warranty coverage of the electric trace heating cable systems, follow the steps in this manual including instructions, tests and required documentation of the installation/test report.

***WARNING:** heat-tracing systems must be installed correctly to ensure proper operation and to prevent shock and fire. Read these important warnings and carefully follow all the installation instructions.*

To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with Gaumer Process requirements, agency certifications, national electrical codes, ground-fault equipment protection must be used on each heating cable branch circuit. Arcing may not be stopped by conventional circuit breakers.

- Approvals and performance of the heat-tracing systems are based on the use of Gaumer Process specified parts only. Do not substitute parts or use vinyl electrical tape.
- Bus wires will short if they contact each other. Keep bus wires separated.
- The black heating cable cores are conductive and can cause electrical shortage. They must be properly insulated and kept dry.
- Damaged bus wires can overheat or short. Do not break bus wire strands when preparing the cable for connection.
- Damaged heating cable can cause electrical arcing or fire. Do not use metal attachments such as pipe straps or tie wire. Use only Gaumer Process approved fixing tapes and cable ties to secure the cable to the pipe.
- Do not attempt to repair or energize damaged cable. Remove damaged cable at once and replace with a new length using the appropriate Gaumer Process splice kit.
- Re-use of the grommets, or use of the wrong grommet, can cause leaks, cracked components, shock, or fire. Be sure the type of grommet is correct for the heating cable being installed. Use a new grommet whenever the cable has been pulled out of the component.
- Use only fire-resistant insulation which is compatible with the application and the maximum exposure temperature of the heat trace cable.
- To prevent fire or explosion in hazardous locations, verify that the maximum sheath temperature of the heating cable (or T-Rating) is below the auto-ignition temperature of the gases in the classified hazardous area. For further information, see the design documentation.
- The minimum installation temperature for GHT-CR, GHT-CT self-regulating heating cables:  $-58^{\circ}\text{F}$  ( $-50^{\circ}\text{C}$ )
- The minimum installation temperature for GHU-CT, GHK-CT self-regulating heating cables:  $-76^{\circ}\text{F}$  ( $-60^{\circ}\text{C}$ )
- The minimum start-up temperature for GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables:  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ )
- Consult with engineering specialists if the application is temperature maintenance and/or the environment is hazardous locations.
- The documentation requirements according to EN 60079-30-1:2017, sections 7.2, 7.3, 7.4, 7.5 and 7.6 need to be considered for the certification of the final heat tracing system.

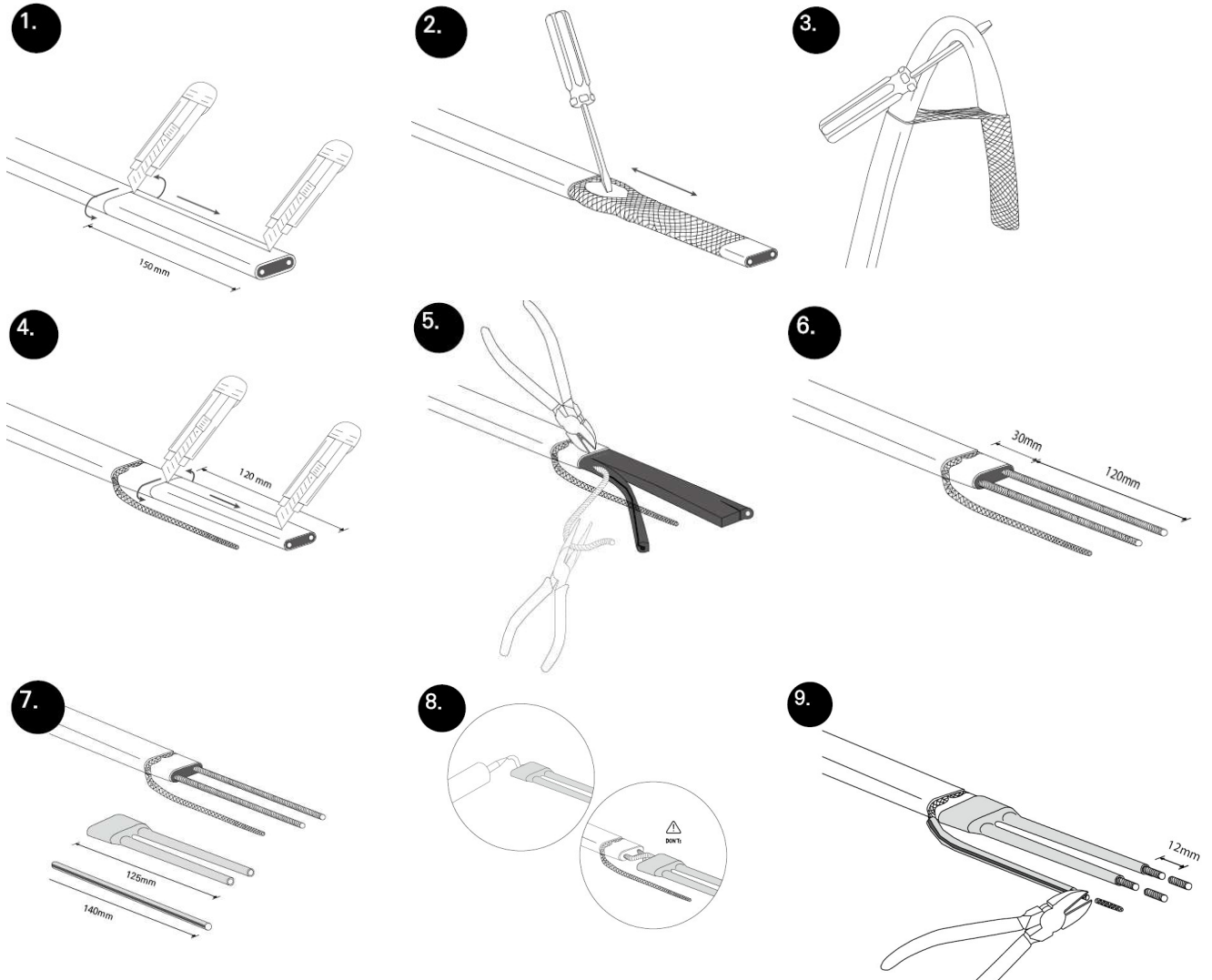
- CAUTION: The heat trace system must be protected with thermal insulation and/or appropriate covering to avoid mechanical damage.
- GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables are intended for both indoor and outdoor applications.
- Ground fault equipment protection is required for each circuit.
- De-energize circuits before installation or servicing.
- Keep ends of GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables and kit components dry before and during installation.
- The braid of GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables shall be connected to a suitable grounding terminal.
- The presence of GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables shall be made evident by the posting of caution labels at appropriate locations and/or at frequent intervals along the circuit.
- The insulation resistance of the heating cable shall be measured and recorded after installation and shall not be less than 50 MΩ under 500 Vdc.
- Persons involved in the installation and testing of electric trace heating systems shall be suitably trained in all special techniques required. Installation shall be carried out under the supervision of a qualified person.
- GHT-CR, GHT-CT self-regulating heating cables' minimum bend radius: 0.5" @68°F (13mm @20°C), 1.6" @-58°F (40mm @-50°C)
- GHU-CT, GHK-CT self-regulating heating cables' minimum bend radius: 0.8" 70°F (20mm @20°C), 1.8" @-76°F (45mm @-60°C)
- GHT-CR, GHT-CT, GHU-CT, and GHK-CT self-regulating heating cables allow for multiple overlapping of the heating cables. Heating cable does not bend easily in the flat plane. Do not force such a bend, as the heating cable may be damaged.

#### Notes

1. Connection kits must be used with correctly installed certified enclosures that are suitable for the application. When connecting certified terminals using associated accessories, the required creepage distances and clearances shall be observed.
2. All heat-traced lines must be thermally insulated.
3. Temperature control is recommended for all freeze-protection and temperature-maintenance trace heating applications.
4. Line sensing method with one or two RTD per heat trace circuits is recommended for temperature maintenance applications.
5. Ambient sensing method can be used for freeze protection applications.
6. Contact Gaumer Process for customized temperature control panel with power distribution.

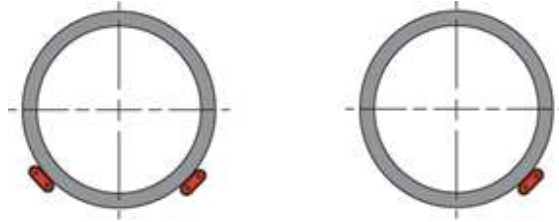
### How to Strip

How to prepare heating cable with core sealer

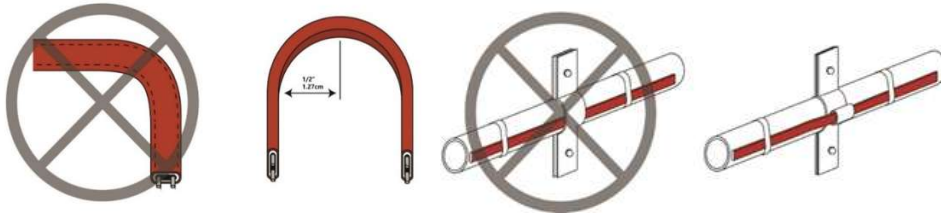


### *Typical heating cable arrangement*

Heat trace cable usually is arranged at 4 and/or 8 o'clock side on the pipe



**Caution** - Be careful not to press the cable and bending



\* To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with national electrical codes, ground-fault equipment protection for each heating cable circuit must be designed and installed. Only qualified persons, shall design and install ground fault equipment, circuit breaker, thermal insulation, and provide supervision, service and maintenance.

## *Field Installation*

### 1 Setting and pulling cable

#### 1.1 Handling the heating cable

- Use a stable holding device for unwinding the heating cable from the spool or reel.
- Remove the heating cable in a straight line from the spool or reel.
- Do not bend or pinch the heating cable, or pull it over sharp edges.
- Do not tread on or drive over the heating cable; do not use it as a loop for stepping on.
- The ends of the heating cable are always fitted with a protective cap.

#### 1.2 Tapes

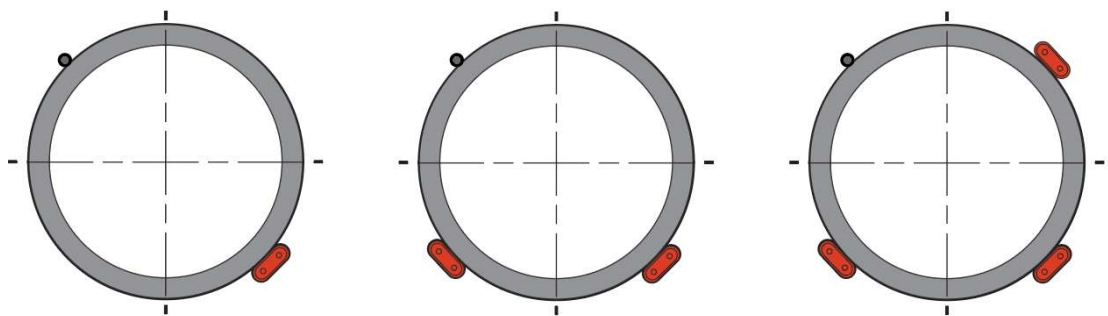
- Use recommended attachment tapes to secure the heating cable on the pipe: fiberglass tape, or aluminum tape.

### 2 Installation on pipes

#### 2.1 Straight tracing

##### 2.1.1 Initial heating cable installation

- Begin installing the heating cable at the proposed end-of-circuit location, following the guidance in the isometric system diagrams (if provided).
- Lay out the heating cable on the pipe, at the 4 or 8 o'clock position (Illustration on page 17), securing it tightly against the pipe with attachment tape. Wrap bands of tape around the heating cable and pipe at intervals of 12" (30 cm) or less, keeping the heating cable in close contact with the pipe.



- If accessibility is a problem, the heating cable may be installed at the 10 or 2 o'clock position.
- Refer to below table to estimate the number of rolls of attachment tape required, based on the pipe length and diameter. The table below details the coverage length of a single attachment tape roll for installation purposes. The tape roll is 96 feet in length, and the attachment tape is applied at 1 foot (30 cm) intervals along the pipe.

| Installation length per 96-foot-long attachment tape |       |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------------------------------------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pipe diameter in inches                              | ½"-1" | 1¼"  | 1½" | 2"  | 3"  | 4"  | 6"  | 8"  | 10" | 12" | 14" | 16" | 18" | 20" | 24" | 30" |
| Pipe length installed                                | 115'  | 102' | 97' | 84' | 66' | 57' | 44' | 35' | 31' | 26' | 23' | 20' | 18' | 16' | 14' | 11' |

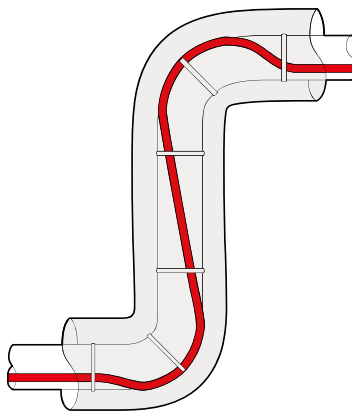
- A continuous covering of aluminum foil tape may also be required under special circumstances, including:
  - where spray or foam thermal insulation will be applied (curing temperature to be verified),
  - where nonmetallic piping is used, or
  - design requirements dictate the use of aluminum tape.
- Allow extra length of heating cable for power connections, splices, and any in-line heat sinks, such as valves, flanges, and supports. See page 7 through page 12 for details on how to properly install the heating cable at these sites and the allowance of heating cable required.
- Install temperature sensors at least 90° away from heating cable locations as indicated as the black dot in the diagram above.

**WARNING: Fire and Shock Hazard. Do not use metal attachments such as pipe straps or tie wire. Do not use vinyl-based electrical or duct tape.**

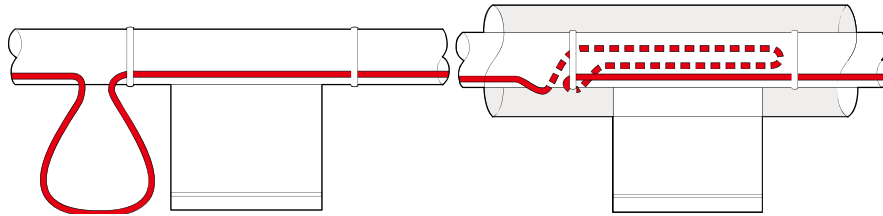
**CAUTION: Do not exceed the heating cable's specified minimum bend radius. Refer to product's specification sheets for the minimum bend radius of a specific heating cable type.**

## 2.2 Heat Sinks

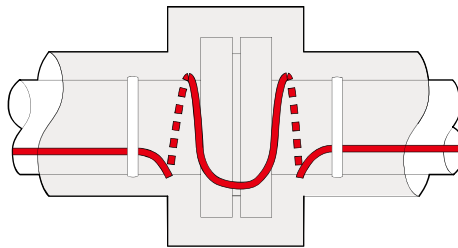
- Elbow: Locate the heating cable on the outside radius of the elbow. Secure the heating cable to the pipe with attachment tape on each side of the elbow.



- Support: For uninsulated pipe supports, allow twice the length of the support, plus an additional 16" (40 cm) of heating cable. Install the heating cable in a loop, following as a guide. Insulated pipe supports do not require additional length of heating cable.



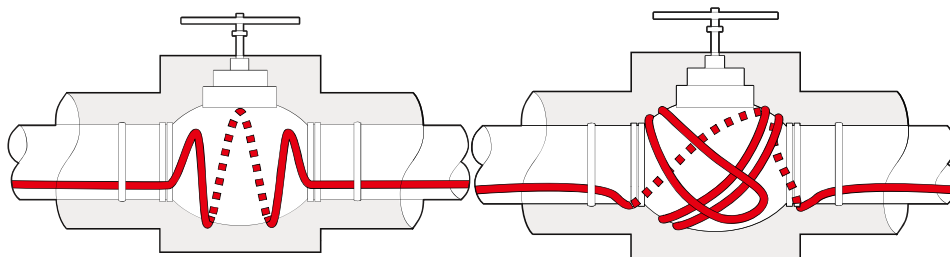
- Flange: Loop the heating cable around the pipe on each side of, and adjacent to, the flange. Be sure to keep the heating cable in close contact with the flange throughout the length of the bend.



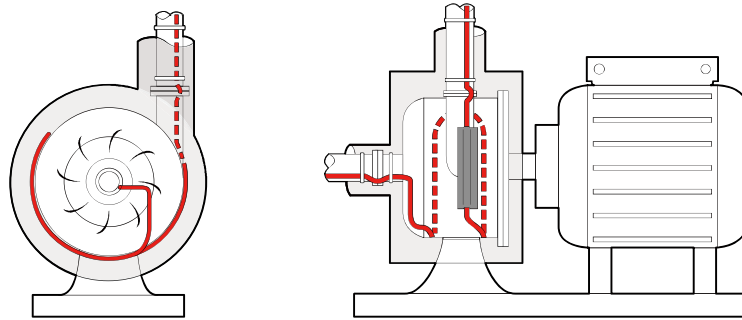
### 3 Installation on Valves and Pumps

- Valves, pumps, and other miscellaneous equipment require additional passes of heating cable to offset the increased heat loss that occurs at these sites.
- Refer to the isometric system drawings, provided by Gaumer Process Engineering, for allowances specific to each line and circuit.
- Install the heating cable using a looping technique, using Illustrations below as a guide, such that the valve or pump may be removed for required service and maintenance.
- Keep the heating cable in close contact with the pipe and heat sink areas, to compensate for additional heat loss.

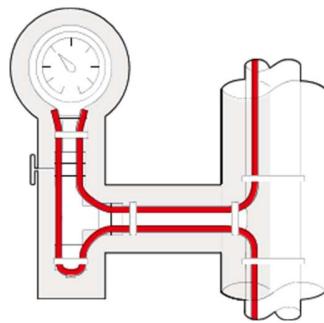
- Valve



- Pump



- Gauge



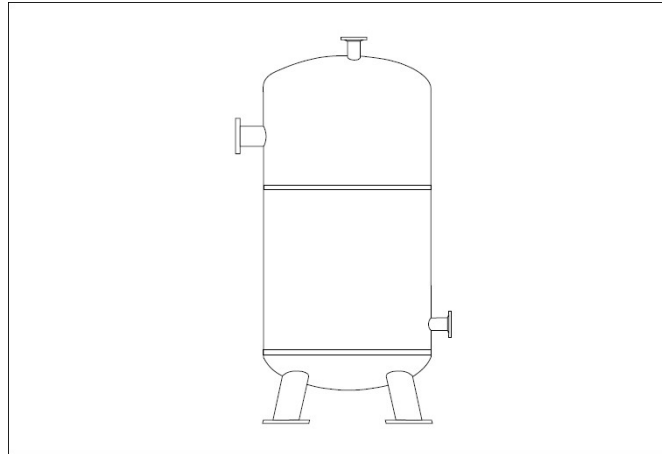
### 3.1 Completing the Heating cable Installation

- Secure the end-of-circuit termination kit and work back toward the power supply.
- Keep the heating cable in secure contact with the pipe, using bands of attachment tape at least every 12" (30 cm).
- Secure any required temperature sensors to the pipe using attachment tape, with RTD placed 1.5m away from valves, flanges, supports, elbows, pumps, shoes and other heat sinks.
- Complete any required splice connections in accordance with the installation instructions provided with the splice kit.
- Install any power connection kits in accordance with the detailed installation instructions provided with the kit.
- Connect the metallic braid of the heating cable to a suitable earthing/ground terminal.
- Before completing the power connections, perform an Insulation Resistance (IR) Test and record the values in the "Installation and Inspection Records" (refer to Appendix 3). The recorded value shall not be less than 50 MΩ under 500 Vdc.
- Record the line number and all other associated circuit information in the Installation and Inspection Records.

## 4 Installation on Tanks and Vessels

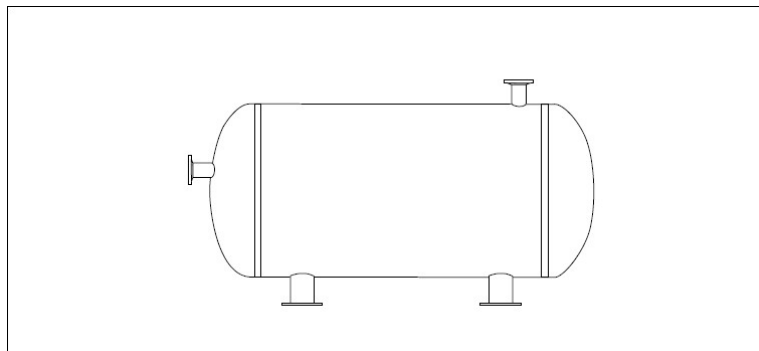
### 4.1 Upright tank

For tank diameters of up to 6.6 ft (2 m) the heating cable is fastened with a clamping ring. This is mounted on the tank using a clamping tool. To fasten the heating cable prefix a polyester clamping ring with slight tension both to the upper position of the surface to be heated and just over the lower base using a turnbuckle.



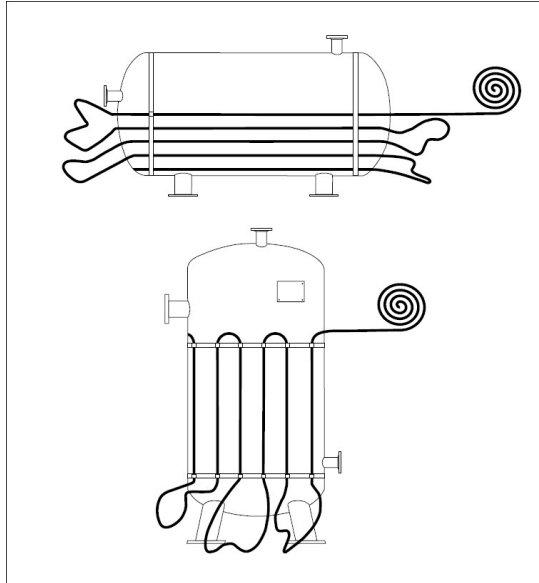
### 4.2 Horizontal tank

Using a turnbuckle fasten a clamping ring with slight tension both at the beginning and end of the tank, just near the base.



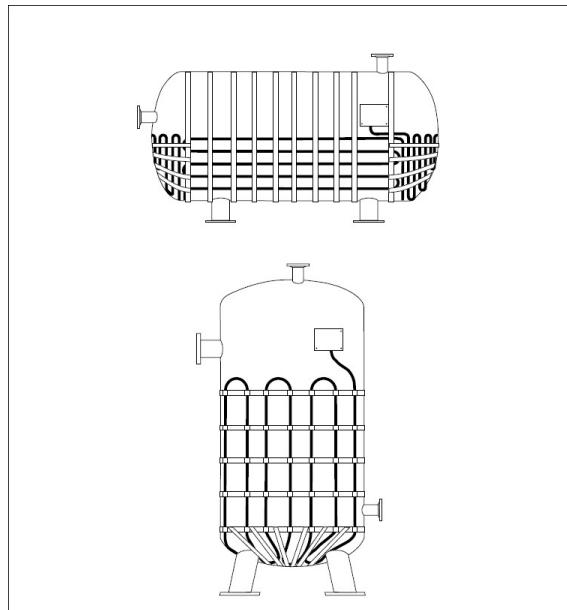
### 4.3 Installing the heating cable

Install the heating cable, beginning at the supply point, and fix it at the distances specified in the project planning documentation with the aid of the pre-mounted clamping rings. Please also allow for material addition for the base (bases).

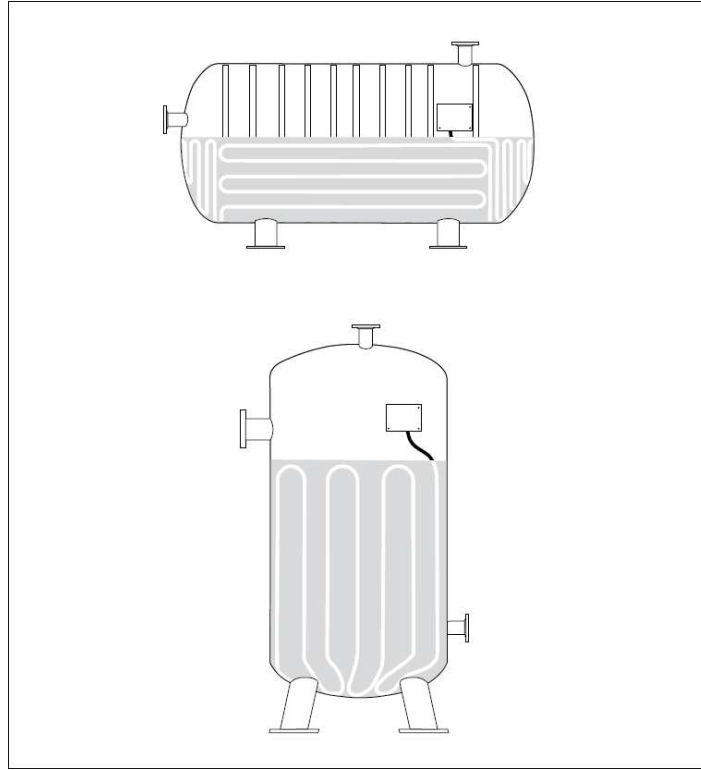


After installing the heating tape, this is then aligned exactly according to the project planning specifications and fixed firmly to the bases and the cylinder using the clamping rings provided. In doing so care should be taken that the clamping rings are not tightened too firmly so as not to damage the heating tape. It should be possible to move the heating tape slightly under the clamping ring.

The distances between the clamping ring fixture should not exceed 10" (25.4 cm). If necessary, the distances should be reduced.



After completing installation of the heating cable, glued over with aluminum self-adhesive tape or the tank is wrapped in aluminum foil. In this way heat transmission is improved and at the same time penetration of insulating material between the heating cable and tank wall is prevented.



Consult with engineering specialists to inquire appropriate spacing for each application, installation for vessel nozzles and bridles, and recommended placement for GB Connection Kit installation.

## 5 Insulation

### 5.1 Pre-Insulation Checks

Visually inspect the heating cable and components for correct installation and damage. Damaged cable must be replaced. Perform insulation resistance testing, known as a Megger test, prior to covering the pipe with thermal insulation.

### 5.2 Installing Thermal Insulation

- Properly installed and well-maintained thermal insulation is critical to the performance of the heat tracing system. Without proper insulation, heat losses are generally too high to be offset by a conventional heat tracing system.
- Properly insulate all heat sinks, including pipe supports, hangers, flanges, and in most cases, valve bonnets.
- Install a protective vapor barrier over the insulation, regardless of the type or thickness of insulation used. The vapor barrier protects the insulation from moisture intrusion and physical damage and ensures the proper performance of the trace heating system.
- Seal all any openings such as gaps, cracks, holes etc. around the vapor barrier.
- After ensuring that the insulation is weather-tight, document the completion of the insulation in the After Installation of Thermal Insulation section of the “Installation and inspection Record”
- Consult with engineering specialists to inquire heat loss calculation and recommended insulation type and thickness.

### 5.3 After Installing Thermal Insulation

The presence of heating cable shall be made evident by posting of caution labels at appropriate locations and/or at frequent intervals along the circuit.

- Apply the provided peel-and-stick “Electric Heat Tracing - Caution” labels along the pipe, on the outermost surface of the thermal insulation or vapor barrier, at intervals of 10 feet (32 meters) or less.
- Apply the caution labels at any other appropriate locations, such as valves.

### 5.4 Post-Insulation Testing

After the insulation is complete, perform an insulation resistance test on each circuit to confirm that the cable has not been damaged.

**WARNING: Use only fire-resistant insulation, such as fiberglass, mineral wool, or calcium silicate.**

### *Tests*

Following test requirements shall be performed in the field and the test results shall be recorded in the “Installation and Inspection Records” (refer to Appendix 3).

#### 1 Visual inspection

- Visually inspect the pipe, insulation, and connections to the heating cable for physical damage. Check that no moisture is present, electrical connections are tight and grounded, insulation is dry and sealed, and control and monitoring systems are operational and properly set. Damaged heating cable must be replaced.
- Check inside heating cable components for proper installation, overheating, corrosion, moisture, and loose connections.
- Check the electrical connections to ensure that ground and bus wires are insulated over their full length.
- Check for damaged or wet thermal insulation; damaged, missing or cracked lagging and weather-proofing.
- Check that end seals, splices, and tees are properly labeled on insulation cladding.
- Check control and monitoring system for moisture, corrosion, set point, switch operation and capillary damage.

#### 2 Insulation Resistance

Perform insulation resistance test at each stage of installation as well as at regular maintenance schedule.

- Before installing heat trace cable
- Before installing connection kits
- Before installing thermal insulation
- After installing thermal insulation
- Before start-up or commissioning
- Regular system inspection
- After any repair

##### 2.1 Procedure

- ① De-energize the circuit.
- ② Disconnect bus wires from terminal block, if installed.
- ③ Set test voltage at 0 Vdc.
- ④ Connect the negative (–) lead to the heating cable metallic braid.
- ⑤ Connect the positive (+) lead to both heating cable bus wires simultaneously.
- ⑥ Turn on the mega-ohmmeter and set the voltage to 500 Vdc; apply the voltage for 1 minute. The meter needle should stop moving. Rapid deflection indicates a short. Record the insulation resistance value in the Installation and Inspection Reports.
- ⑦ Turn off the mega-ohmmeter.
- ⑧ If the mega-ohmmeter does not self-discharge, discharge phase connection to ground with a suitable grounding rod. Disconnect the mega-ohmmeter.

- ⑨ Repeat this test between braid and pipe.
- ⑩ Reconnect bus wires to terminal block.
- ⑪ Reconnect the thermostat.

### 3 Power check

The heating cable power per foot (meter) is calculated by dividing the total wattage by the total length of a circuit. The current, voltage, operation temperature, and length must be known. Circuit length can be determined from “as built” drawings, meter marks on cable.

The watts per foot (meter) can be compared to the heating cable output indicated on the product data sheet at the temperature of operation. This gives a good indication of heating cable performance.

- Power the heating cable and allow it to stabilize for 10 minutes, then measure current and voltage at the junction box. If a thermostat or controller is used, refer to details below.
- Check the pipe temperature under the thermal insulation at several locations.
- Calculate the power (watts/ft) of the heating cable by multiplying the current by the input voltage and dividing by the actual circuit length.

$$\text{Power (w/ft or m)} = \text{Volts (Vac)} \times \text{Current (A)} / \text{Length (ft or m)}$$

### 4 Ground-fault test

Test all ground-fault breakers per manufacturer’s instructions or check for any alarms in case controller is installed.

### 5 Final Inspection

- Perform and record IR test after thermal insulation and/or before commissioning to verify that the trace heater has not been damaged during installation.
- Ensure that all junction boxes, temperature controllers, cable glands, etc., are properly secured and sealed.
- Refer to 3 Power check section and record measurements under the power check section in Appendix 3 – Installation and Inspection Records
- If a control device is used, ensure it is configured to switch off the heating cable to prevent the surface temperature from exceeding the Temperature Class (T-rating) specified for the hazardous area, in accordance with IEC 60079-30-1.

## Appendix 3. Installation and Inspection Records

| Appendix 3. Installation and Inspection Records                                                                                     |              |              |              |              |              |              |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. Please enter the the information to your best knowledge.                                                                         |              |              |              |              |              |              |
| 2. All applicable tests or checks below must be performed at installation or at any time the cable is cut, damaged, or reinstalled. |              |              |              |              |              |              |
| <b>Part I: General Information</b>                                                                                                  |              |              |              |              |              |              |
| Facility                                                                                                                            |              |              |              |              |              |              |
| Circuit Number                                                                                                                      |              |              |              |              |              |              |
| Circuit Lengh                                                                                                                       |              |              |              |              |              |              |
| Circuit Breaker Number                                                                                                              |              |              |              |              |              |              |
| Drawing Number                                                                                                                      |              |              |              |              |              |              |
| Heating Cable Model                                                                                                                 |              |              |              |              |              |              |
| Connection Accessories                                                                                                              |              |              |              |              |              |              |
| Date (When Part I is Recorded)                                                                                                      |              |              |              |              |              |              |
| <b>Part II: Visual Checks</b>                                                                                                       | Date/Initial | Date/Initial | Date/Initial | Date/Initial | Date/Initial | Date/Initial |
| Any Physical Damages, Moisture, Liquids, Corrosion Cables?                                                                          |              |              |              |              |              |              |
| Any Moisture, Liquids, Corrosion, Damage inside Junction Boxes or End Seal?                                                         |              |              |              |              |              |              |
| Are Bus Wires and Braid Connected properly inside Junction Boxes?                                                                   |              |              |              |              |              |              |
| Are the Junction Box Lock Nut and Lid Water Tight?                                                                                  |              |              |              |              |              |              |
| Is the Thermal Insulation Wet or Damaged?                                                                                           |              |              |              |              |              |              |
| Is the Thermal Insulation Complete and Waterproof?                                                                                  |              |              |              |              |              |              |
| Are Caution Labels Fixed on Outside of Thermal Insulation (Every 10ft or 3m or Less)?                                               |              |              |              |              |              |              |
| <b>Part III: Thermal Insulation Checks</b>                                                                                          |              |              |              |              |              |              |
| Megger Test (500Vdc, bypass Controls) - Test A: Bus to Braid (MΩ)                                                                   |              |              |              |              |              |              |
| Megger Test (500Vdc, bypass Controls) - Test B: Braid to Pipe (MΩ)                                                                  |              |              |              |              |              |              |
| Are Connection Kits Outside of Thermal Insulation and Visible?                                                                      |              |              |              |              |              |              |
| <b>Part IV: Electrical and Power Check</b>                                                                                          |              |              |              |              |              |              |
| Circuit Voltage (V)                                                                                                                 |              |              |              |              |              |              |
| Voltage at the End of Circuit (V)                                                                                                   |              |              |              |              |              |              |
| Circuit Amperage (A) after 30 min and Ambient Temperature (°F)                                                                      |              |              |              |              |              |              |
| Pipe Temperature (°F)                                                                                                               |              |              |              |              |              |              |
| <b>Part V: Control Checks</b>                                                                                                       |              |              |              |              |              |              |
| Is Temperature Control Set Properly?                                                                                                |              |              |              |              |              |              |
| Is the Sensor Located and Fixed on Pipe Properly?                                                                                   |              |              |              |              |              |              |
| Is the Sensor Protected and Undamaged?                                                                                              |              |              |              |              |              |              |
| <b>Part VI: Other</b>                                                                                                               |              |              |              |              |              |              |
| (List any other tests or inspection results)                                                                                        |              |              |              |              |              |              |
|                                                                                                                                     |              |              |              |              |              |              |
|                                                                                                                                     |              |              |              |              |              |              |

**Contact Information**

|                                       |                                                     |
|---------------------------------------|-----------------------------------------------------|
| <b>Full name of Manufacturer</b>      | <b>Gaumer Process</b>                               |
| <b>Address</b>                        | 13616 Hempstead Road,<br>Houston, TX 77040<br>U.S.A |
| <b>Contact person for Follow up</b>   |                                                     |
| <b>Contact person's phone number</b>  | +1 (800) 460-5200                                   |
| <b>Contact person's fax number</b>    |                                                     |
| <b>Contact person's email address</b> | sales@gaumer.com                                    |