

# Specialty Heaters



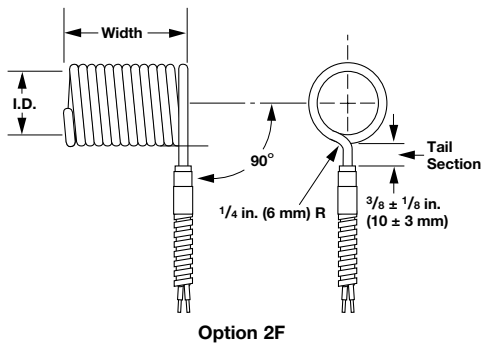
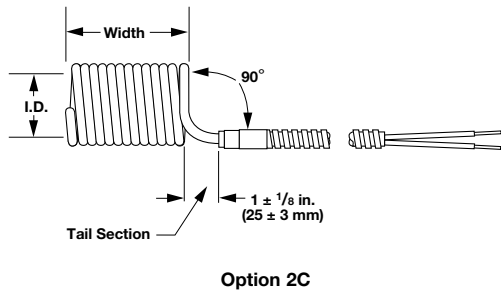
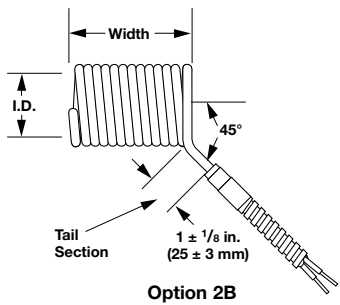
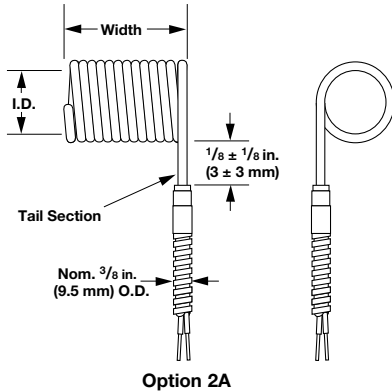
## Coil/Cable Heaters

### Formation Options

#### Coil Heaters

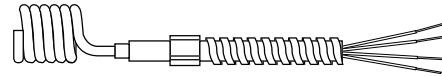
The coil heater can be tight wound or open pitch.

#### Lead Orientation Options for Coiled Cable Heaters



**Note:** Coiling or complex forming of stock heaters will generally result in increased resistance and reduction in wattage below 10 percent tolerance. Please contact factory before specifying power and resistance tolerance for formed cables.

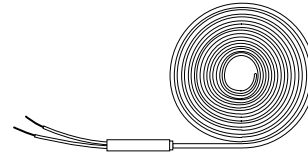
#### Closed Coil without Distributed Wattage



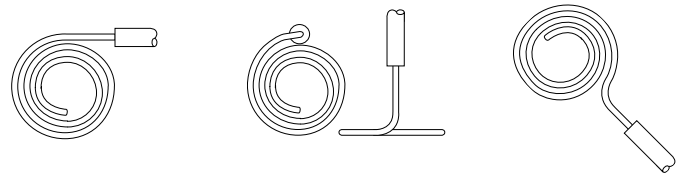
#### Closed Coil with Distributed Wattage



#### Flat Spiral



Flat, spiral formations are used to heat flat circular surfaces. This formation is often used in semiconductor and medical applications.



**Flat Spiral with 2A Type Lead Orientation**

**Flat Spiral with 2C Type Lead Orientation**

**Flat Spiral with 2F Type Lead Orientation**

| Flat Spiral Inside Diameter Standards |                |                    |                 |                |                 |                 |
|---------------------------------------|----------------|--------------------|-----------------|----------------|-----------------|-----------------|
|                                       |                | Cable Diameter—in. |                 |                |                 |                 |
|                                       |                | 1/16<br>(0.062)    | 3/32<br>(0.094) | 1/8<br>(0.125) | 5/32<br>(0.156) | 3/16<br>(0.188) |
| Spiral Inside Diameter—in.            | 5/8 (0.625)    | ✓                  | ✓               | ✓              |                 |                 |
|                                       | 3/4 (0.75)     |                    | ✓               | ✓              | ✓               | ✓               |
|                                       | 7/8 (0.875)    |                    |                 | ✓              | ✓               |                 |
|                                       | 1 (1.0)        |                    |                 | ✓              | ✓               | ✓               |
|                                       | 1 3/16 (1.187) |                    |                 | ✓              |                 |                 |
|                                       | 1 1/4 (1.25)   |                    |                 | ✓              |                 |                 |
|                                       | 1 1/2 (1.5)    |                    |                 | ✓              | ✓               | ✓               |
|                                       | 2 (2.0)        |                    |                 | ✓              |                 |                 |
|                                       | 2 1/2 (2.5)    |                    |                 | ✓              |                 |                 |
|                                       | 3 (3.0)        |                    |                 | ✓              | ✓               | ✓               |

**Note:** Maximum outside diameter is 6 inches.

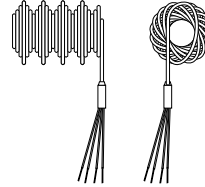


## Coil/Cable Heaters

### Formation Options (Continued)

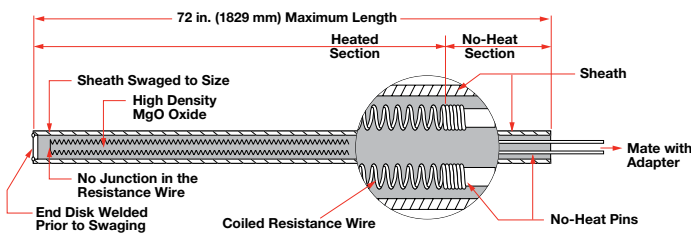
#### Star Wound

Star wound formations are usually inserted into pipes or ducts and used to heat moving air or liquids. The offset coils increase and induce turbulent flow. This allows the flowing material to have better contact with the heater surface to provide efficient heat transfer.



### Internal Construction

#### Sheath with Coiled Internal Resistance Wire

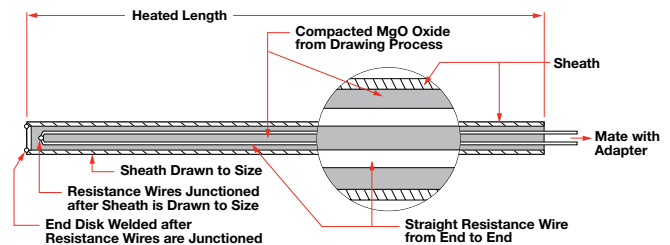


Resistance wire wound into a small coil is loaded into insulating cores, then into metal tubing and swaged to final size. This construction method is called **coil wire or parallel coil**.

The coil method allows for a no-heat section in the sheath. The length of either the heated section or the no-heat section is variable as long as the combined length does not exceed 72 in. (1829 mm). Other features of this construction method include:

- Variable ohms/foot within a minimum and maximum range
- Variable location of the thermocouple junction
- Grounded or ungrounded thermocouple junction
- No-heat sections
- 304 stainless steel
- A variety of diameters and shapes:
  - 0.094 in. (2.4 mm) round
  - 0.125 in. (3.2 mm) round (minimum diameter with internal thermocouple)
  - 0.102 in. (2.6 mm) square
  - 0.128 in. (3.3 mm) square
  - 0.102 in. X 0.156 in. (2.6 mm X 4 mm) rectangular

#### Sheath with Straight (Uncoiled) Resistance Wire



Straight resistance wires are positioned inside a large diameter metal tube. The tube assembly is repeatedly pulled through draw dies until the desired diameter is achieved. Though limited to fixed incremental ohms/foot and without no-heat sections, this **straight wire or drawn cable** construction method allows:

- Essentially no limit on cable length
- Thermocouple junction only at the disk end of the sheath
- Grounded or ungrounded thermocouple junction
- Full length of the sheath is heated
- 304 stainless steel
- A variety of diameters and shapes:
  - 0.040 in. (1.0 mm) round
  - 0.062 in. (1.6 mm) round
  - 0.094 in. (2.4 mm) round
  - 0.125 in. (3.2 mm) round (minimum diameter with internal thermocouple)
  - 0.157 in. (4.0 mm) round
  - 0.188 in. (4.8 mm) round
  - 0.128 in. (3.3 mm) square\*
  - 0.102 in. X 0.156 in.\* (2.6 mm X 4 mm) rectangular

\* Maximum length is 140 in. (3556 mm)