



BIRK

Engineering Thermal Solutions

STANDARD HEATER SPECIFICATIONS, STACK UP AND FAQs

Frequently Asked Questions

OHM'S LAW:

➤ V: VOLTAGE (VOLTS)

➤ I: AMPERAGE/CURRENT (AMPS)

➤ R: RESISTANCE (OHMS)

➤ W: WATTAGE (WATTS)

$$V = IR \quad W = \frac{V^2}{R}$$

$$R = \frac{V^2}{W} \quad V = \sqrt{RW}$$

➤ Standard heaters are RoHS Compliant.

➤ There is no maximum voltage or wattage. The limiting factor is the amperage and thus the lead wire.

➤ AMPERAGE = WATTAGE / VOLTAGE

➤ 30 awg MAX AMPERAGE: 2 AMPS

➤ 24 awg MAX AMPERAGE: 5.5 AMPS

➤ Thickness of each heater: silicone, kapton, lead area

➤ No max watt density. The higher the watt density, the hotter the heater will get in a shorter amount of time. Customer needs to monitor temperature to not go over max temp (200°C).

Frequently Asked Questions Cont.

Temperature Capabilities:

Kapton standard heaters can go up to 240°C

Kapton with PSA and silicone heaters with and without PSA can go up to 200°C

Foil Backing

Type of foil backing:
Aluminum, the thickness depends on your choice of backing option

This option disperses heat more evenly.

PSA – Pressure Sensitive Adhesive

We use 3M 9755.

Temperature capabilities of a heater with PSA 200°C

Minimum temperature capability is -40°C

Frequently Asked Questions Cont.

Lead Locations

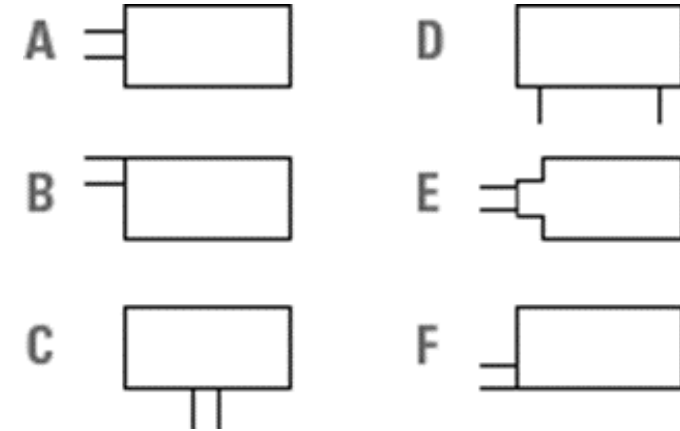
Lead Location A: 3500-3518, 3520-3540, 3547-3553, 3555-3558

Lead Location B: 3519

Lead Location D: 3554, 3559

Lead Location E: 3542-3546, 3561

Lead Location F: 3563



Leads are done under the kapton cover and there is no epoxy.

Standard lead color is red.

Available lead lengths: 12" or 24"

Lead area thickness: In general, add 0.060" to heater thickness.

Lead gauges are 30AWG or 24AWG depending on max amperage.

There is no maximum voltage or wattage. The limiting factor is the amperage, and thus the lead wire.

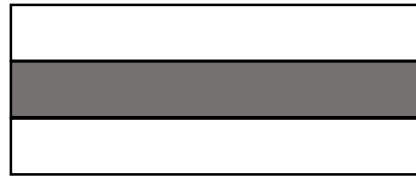
To calculate amperage (not max):

$$\text{AMPERAGE} = \text{WATTAGE} / \text{VOLTAGE}$$

Birk Standard Heaters Build up: Resistance Option 1



Kapton Heater:



Kapton: 0.0025"

Foil: 0.0005"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.0005"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

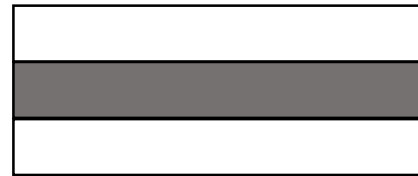
> 24" +/- 0.080"

Quality Policy: Birk Manufacturing, Inc. is dedicated to continual improvement of quality and service, and assures our heaters and thermal systems consistently meet the requirements, expectations and industrial standards of our customers

Birk Standard Heaters Build up: Resistance Option 2



Kapton Heater:

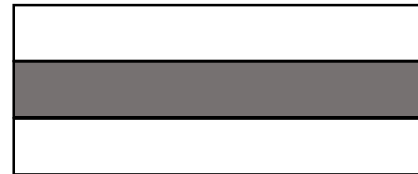


Kapton: 0.0025"

Foil: 0.001"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.001"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

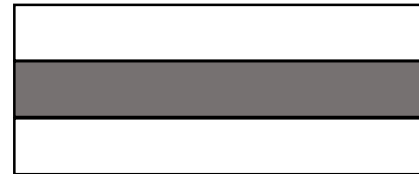
> 24" +/- 0.080"

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Birk Standard Heaters Build up: Resistance Option 3



Kapton Heater:

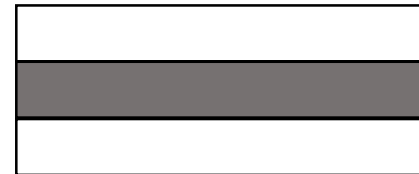


Kapton: 0.0025"

Foil: 0.0015"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.0015"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

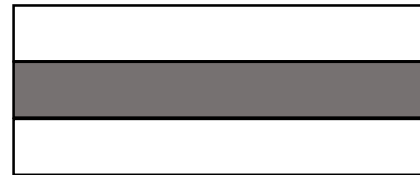
> 24" +/- 0.080"

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Birk Standard Heaters Build up: Resistance Option 4



Kapton Heater:

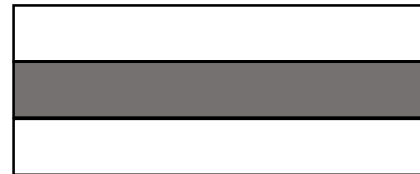


Kapton: 0.0025"

Foil: 0.00125"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.00125"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

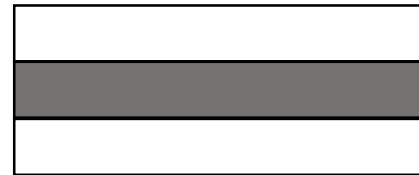
> 24" +/- 0.080"

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Birk Standard Heaters Build up: Resistance Option 5



Kapton Heater:

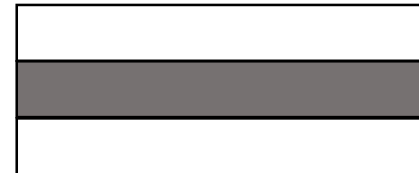


Kapton: 0.0025"

Foil: 0.002"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.002"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

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Birk Standard Heaters Build up: Resistance Option 6



Kapton Heater:

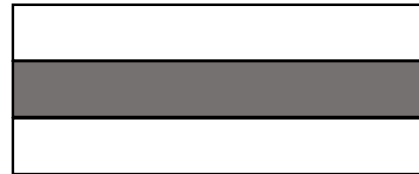


Kapton: 0.0025"

Foil: 0.001"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.001"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

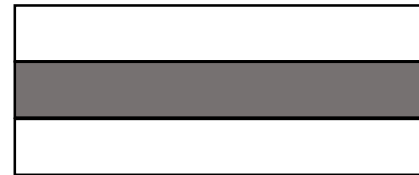
> 24" +/- 0.080"

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Birk Standard Heaters Build up: Resistance Option 7



Kapton Heater:

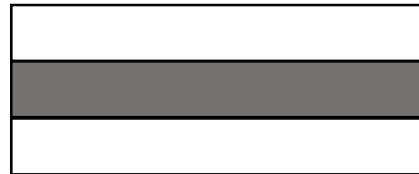


Kapton: 0.0025"

Foil: 0.0005"

Kapton: 0.0025"

Silicone Heater:



Silicone: 0.015"

Foil: 0.0005"

Silicone: 0.015"

Birk Mfg. Standard Tolerances

Resistance: +10%/-5%

Min. Dist. Edge to Conductor:

Sil. 0.060" Kap. 0.020"

Stripped Lead Wire length +/- 0.062"

Die Cut Kapton

<12" +/- 0.020"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

Die Cut Silicone

< 12" +/- 0.030"

12 < 24" +/- 0.040"

> 24" +/- 0.080"

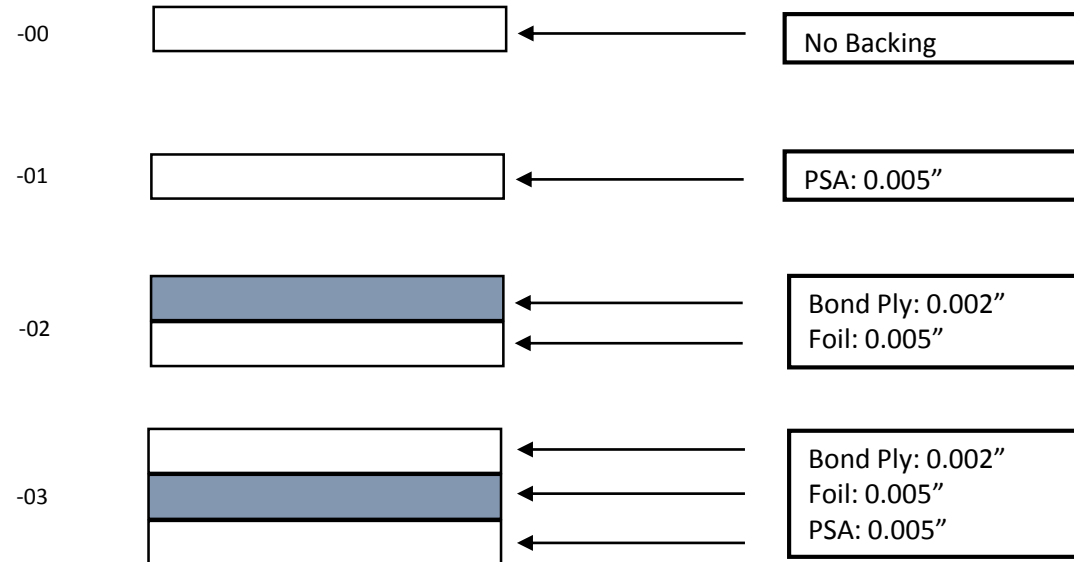
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Birk Kapton Standard Heaters

Backing Options Build up



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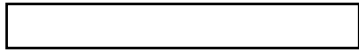
Birk Silicone Standard Heaters

Backing Options Build up



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-20



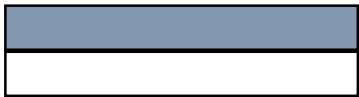
No Backing

-21



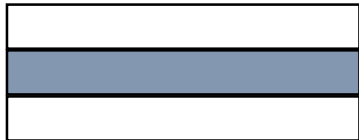
PSA: 0.005"

-22



Bond Ply: 0.0085"
Foil: 0.005"

-23



Bond Ply: 0.0085"
Foil: 0.005"
PSA: 0.005"