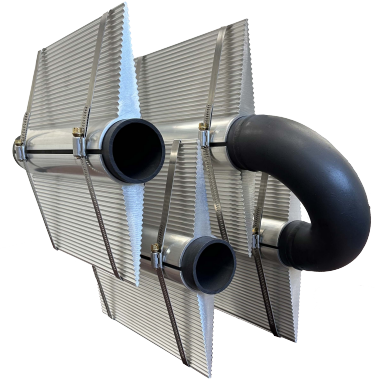




## Standard Specification

**MakoFin** maximizes the heat input of carbon or stainless steel internal heating coils and it is fully removable and replaceable. MakoFin is a bolt-on heating fin that attaches to any size pipe. The highly conductive aluminum material of MakoFin increases the heating surface area which allows for greater heating capabilities or decreased total footage of the internal coil. MakoFin is specifically designed for high viscosity fluids such as Asphalt, Bitumen and Heavy Oils to allow for easy removal and reinstallation of fins if the product cokes on the fins.



### 1) MakoFin Selection:

QMax Industries does not use charts or graphs showing how many linear feet of MakoFin to use for a given pipe size, process, or heating duty. Instead, each MakoFin system is specifically designed for each application using QMax Industries' proprietary thermal modeling software. We ask our customers to complete a system evaluation questionnaire for every application.

The profile of MakoFin is also unique for each pipe and tube size. Before installation of any system, the fit of the MakoFin should be verified. Below is the specification for the standard profile of MakoFin. Other sizes are available upon request:

<u>Nominal</u> <u>Pipe Size</u> (inch)	<u>Pipe</u> <u>Outside</u> <u>Diameter</u> (inch)	<u>Fin</u> <u>Height</u> (inch)	<u>Fin</u> <u>Thickness</u> (base) (inch)	<u>Weight</u> (lb/in)	<u>Weight</u> (lb/ft)	<u>Surface</u> <u>Area</u> <u>Increase</u> (%)
2	2.375	4.175	1.034	0.271	3.258	225%

### 2) MakoFin Installation

The simplicity of MakoFin is one of its many benefits. As with any system, if the system is not installed properly, it may not function as intended. It is important to review and follow the MakoFin Installation Procedures (MakoFin-Install) and inspect the system to ensure a successful installation.

### 3) MakoFin Product Information:

- Dimensions:
  - MakoFin is offered in 4-ft 9-in lengths (other lengths available)
- Material: 6063-T6 Aluminum (mill finish)
  - Thermal Conductivity: 1450 BTU(in)/hr ft<sup>2</sup> °F (209 W/m-°K)
  - Maximum Temperature Limitation: 750 °F (399 °C)
  - Density: 0.0975 lb/in<sup>3</sup> (2.70 g/cc)
  - Hardness, Brinell: 60
  - Tensile Yield Strength: 21,000 psi (145 MPa)
  - Ultimate Tensile Strength: 27,000 psi (186 MPa)
  - Modulus of Elasticity: 10,000 ksi (68.9 GPa)
  - Poisson's Ratio: 0.33
  - Shear Strength: 17,000 psi (117 MPa)
- Weight: See chart above (*without pipe, tube, HTC or Banding*)
- Standard tube/pipe sizes: See chart above (*custom designs are available upon request*)