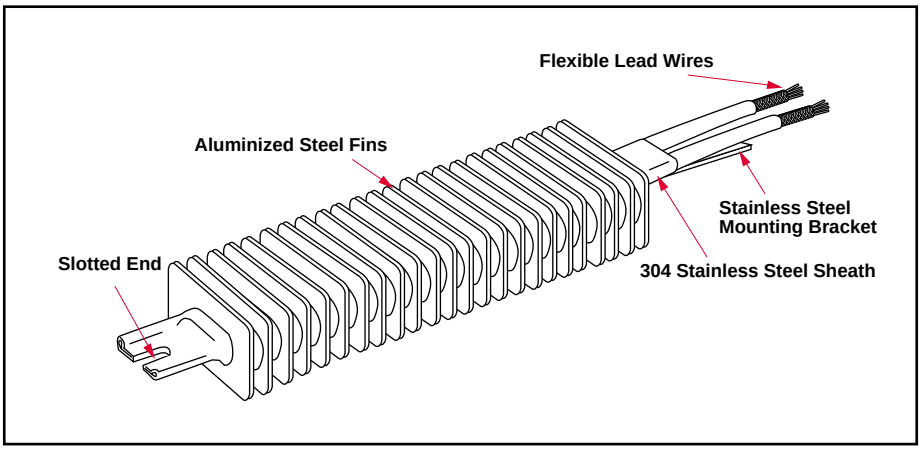
FIREBAR Heating Elements

FINBAR

Composed of aluminized steel fins press fitted to a one inch single-ended FIREBAR element. The FINBAR is designed to improve heat transfer to the air and permits putting more power in tighter spaces—like forced air ducts, dryers, ovens and load bank resistors.

Heat transfer, lower sheath temperature and element life are all maximized by its finned construction.

Installation is simplified by terminations exiting at one end and mounting accommodations on both ends.



Performance Capabilities

- Watt densities to 50 W/in^2 (7.7 W/cm^2)
- 304 stainless steel sheath temperatures to 1200°F (650°C)
- Voltages to 480V~(ac)
- Amperages to 48 amps per heater or 16 amps per coil

Features and Benefits

- **Rugged aluminized steel fins** effectively increase surface area to approximately 16 square inches for every linear inch of element length. Fins press fitted to the heating element improve heat transfer to the air.
- **Single-ended termination** simplifies wiring and installation.
- **Stainless steel mounting bracket**, welded to the terminal end, is supplied with a slotted end for ease of installation.
- **Lavacone seals** provide protection against humid storage conditions. Moisture retardant to 392°F (200°C).

Applications

- Forced air heating for dryers, ovens, ducts
- Still air heating for ovens, comfort heating
- Incubators
- Ink drying
- Load bank resistors

Construction Features

Construction features are detailed for assembly stock products only. Optional materials, sizes, terminations and ratings may be available at additional cost. For availability and ordering information on options, see **pages 307 to 312**.

Watt Density: Stock; up to 40 W/in^2 (6.2 W/cm^2), made-to-order; up to 50 W/in^2 (7.7 W/cm^2)

Fin Surface Area: 16 in^2/linear inch (40.5 cm^2/linear cm)

Fin Cross Section: 2 X 1 inch (50 X 25 mm)

Maximum Operating Temperature: Sheath material: 304 Stainless Steel, 1200°F (650°C), Fin material; Aluminized Steel; 1100°F (600°C)

Heater Length: Stock; 10 to 48 inches (260 to 1210 mm), made-to-order; 6 to 120 inches (150 to 3050 mm)

No-Heat Length: 1 inch minimum, 12 inch maximum (25/305 mm)

Voltages: Up to 480V~(ac)

Phase: Stock; 1-phase parallel made-to-order; 1-phase parallel or 3-phase wye

Resistance Coils: Stock; 1 made-to-order 1 or 3

Terminations: Flexible lead wires, quick connect (spade), screw lug (plate) and threaded stud

Seal Material: Lavacone, rated to 392°F (200°C)

Optional Internal Thermocouple: made-to-order only; ASTM **Type K**

Single-End Configuration: Stock: slotted, made-to-order; slotted, no-slot or sealed

Agency Recognition: refer to FIREBAR UL file # E52951 and CSA file # 31388 under ***Agency Recognition*** on **pages 268 to 271**.

Tubular and Process Assemblies

FIREBAR Heating Elements

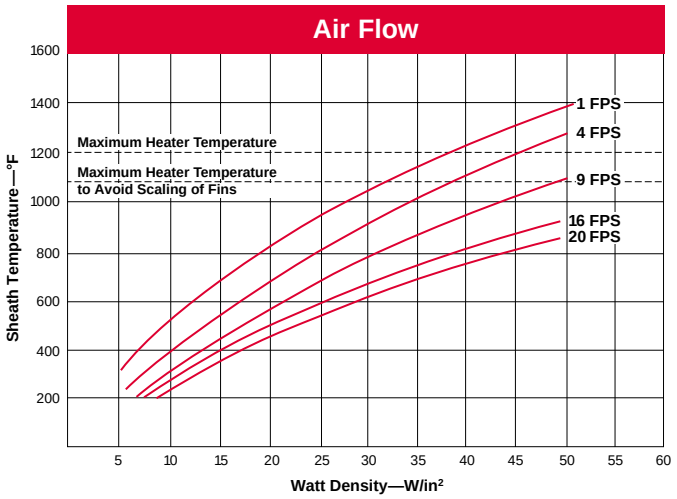
Air Heating

The *Watt Density, Air Flow and Sheath Temperature* graph shows the relationship between watt density, air flow velocity and sheath temperature, along with a recommended temperature to avoid deteriorating the fins. Be aware that **lower sheath temperature yields longer heater life**.

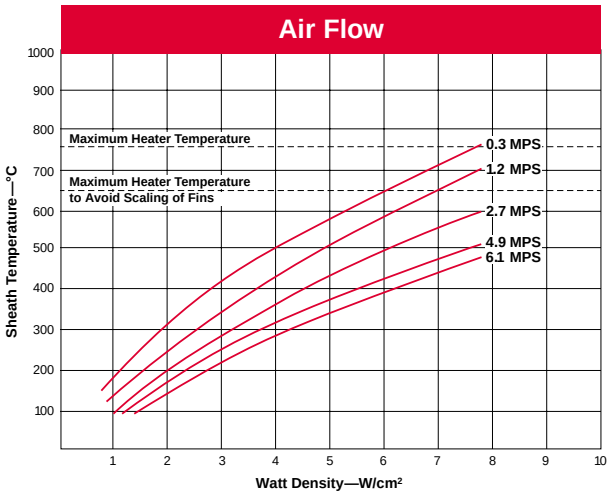
The graphic representation is based on a a single-ended FINBAR, various air velocities (at 68°F/20°C inlet temperature) and different watt densities.

To determine, from the graph, the operating temperature of the FINBAR's sheath, identify the air velocity curve that approximates your application in feet per second (meters per second). Then look at the vertical line that most closely approximates the FINBAR's watt density. From the intersecting point, read over to the temperature column to determine the sheath's operating temperature.

Watt Density, Air Flow and Sheath Temperature (°F)



Watt Density, Air Flow and Sheath Temperature (°C)

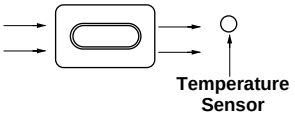


Application Hints

- Avoid deteriorating the fins by not exceeding the recommended maximum fin temperature of 1100°F (600°C).
- Ensure proper air flow to prevent premature heater failure.
- Locate the temperature sensor downstream from heater(s) for process temperature sensing.

The following mounting parameters are recommended:

- Air flow over element must be parallel with the flat side.
- Element center line to element center line spacing must be a minimum of 1½ inches (38 mm).



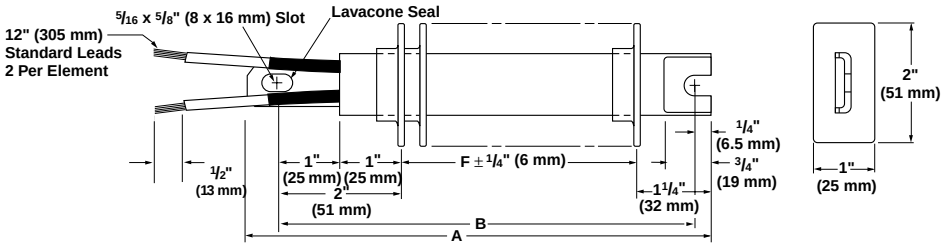
Proper air flow relative to the heater's sheath is parallel with the longer cross sectional axis.

Dual Ended FINBAR

FINBAR elements are typically terminated at one end. Upon request, however, dual ended FINBAR heaters can be ordered. To order, specify **dual ended FINBAR** and lead length.

FIREBAR Heating Elements

FINBAR



FINBAR Description	Overall A Dimension		Overall F Dimension		Mounting B Dimension		Watts	Code Number		Est.Net Weight	
	Inch	(mm)	Inch	(mm)	Inch	(mm)		120V~(ac)	240V~(ac)	lbs	(kg)
Application: Forced Air											
20 W/in²	10¼	(260)	6½	(158)	9½	(241)	300	**FSP91WMF**		1.4	(0.7)
304 SS	11¾	(298)	8	(203)	11	(279)	375	**FSP101WMF**		1.4	(0.7)
(3.1 W/cm²)	13¾	(349)	10	(254)	13	(330)	450	**FSP121WMF**		1.5	(0.7)
	15	(381)	11¼	(285)	14¼	(362)	500	**FSP141WMF**		1.5	(0.7)
	17⅝	(447)	13⅞	(352)	16⅞	(428)	650	**FSP161WMF**	**FSP1610WMF**	1.6	(0.8)
	19¼	(489)	15½	(393)	18½	(469)	725	**FSP181WMF**	**FSP1810WMF**	1.7	(0.8)
	20¾	(527)	17	(431)	20	(508)	800	**FSP191WMF**	**FSP1910WMF**	1.7	(0.8)
	23½	(597)	19¾	(501)	22¾	(577)	900	**FSP221WMF**	**FSP2210WMF**	1.8	(0.9)
	25¼	(641)	21½	(546)	24½	(622)	1000	**FSP241WMF**	**FSP2410WMF**	1.9	(0.9)
	26½	(673)	22¾	(577)	25¾	(654)	1050	**FSP251WMF**	**FSP2510WMF**	1.9	(0.9)
	30⅛	(765)	26⅜	(669)	29⅜	(746)	1250	**FSP291WMF**	**FSP2910WMF**	2.1	(1.0)
	33⅛	(841)	29⅜	(746)	32⅜	(822)	1350	**FSP321WMF**	**FSP3210WMF**	2.2	(1.0)
	35⅝	(905)	31⅞	(809)	34⅞	(885)	1500		**FSP3410WMF**	2.3	(1.1)
	38⅜	(975)	34⅝	(879)	37⅝	(955)	1600		**FSP3710WMF**	2.4	(1.1)
	42⅛	(1070)	38 ⅜	(974)	41⅜	(1050)	1800		**FSP4110WMF**	2.5	(1.2)
	47¾	(1213)	44	(1117)	47	(1193)	2000		**FSP4610WMF**	2.7	(1.3)
40 W/in²	10¼	(260)	6½	(158)	9½	(241)	600	**FSP91WKF**		1.4	(0.7)
304 SS	11¾	(298)	8	(203)	11	(279)	750	**FSP101WKF**		1.4	(0.7)
(6.2 W/cm²)	13¾	(349)	10	(254)	13	(330)	900	**FSP121WKF**	**FSP1210WKF**	1.5	(0.7)
	15	(381)	11¼	(285)	14¼	(362)	1000	**FSP131WKF**	**FSP1310WKF**	1.5	(0.7)
	17⅝	(447)	13⅞	(352)	16⅞	(428)	1300	**FSP161WKF**	**FSP1610WKF**	1.6	(0.8)
	19¼	(489)	15½	(393)	18½	(469)	1450	**FSP181WKF**	**FSP1810WKF**	1.7	(0.8)
	20¾	(527)	17	(431)	20	(508)	1600		**FSP1910WKF**	1.7	(0.8)
	23½	(597)	19¾	(501)	22¾	(577)	1800		**FSP2210WKF**	1.8	(0.9)
	25¼	(641)	21½	(546)	24½	(622)	2000		**FSP2410WKF**	1.9	(0.9)
	26½	(673)	22¾	(577)	25¾	(654)	2100		**FSP2510WKF**	1.9	(0.9)
	30⅛	(765)	26⅜	(669)	29⅜	(746)	2500		**FSP2910WKF**	2.1	(1.0)
	33⅛	(841)	29⅜	(746)	32⅜	(822)	2700		**FSP3210WKF**	2.2	(1.0)
	35⅝	(905)	31⅞	(809)	34⅞	(885)	3000		**FSP3410WKF**	2.3	(1.1)
	38⅜	(975)	34⅝	(879)	37⅝	(955)	3200		**FSP3710WKF**	2.4	(1.1)
	42⅛	(1070)	38⅜	(974)	41⅜	(1050)	3600		**FSP4110WKF**	2.5	(1.2)
	47¾	(1213)	44	(1117)	47	(1193)	4000		**FSP4610WKF**	2.7	(1.3)

All stock units are Assembly stock.
Availability
Assembly Stock: Three working days

F.O.B.: Hannibal, Missouri

How to Order

To order a stock FINBAR heating element, specify:

- Watlow Code number
- Volts/watts
- Termination options
- Options
- Quantity

For **made-to-order** FINBAR heating elements, specify:

- Type of application, including air flow velocity, volume, etc.
- Single- or double-ended element
- Volts/watts
- Heated length
- No-heat length
- Terminal pin length or termination options, including moisture seal type
- Quantity
- Options, including thermocouple, sealed end, no mounting bracket, etc.

Availability

Assembly Stock: Three working days

Modified Stock①: Five to seven working days

Made-to-Order: Four to five weeks

Options, complexity and quantity may affect availability and lead times. Consult factory.

① Assembly Stock units with catalog options.