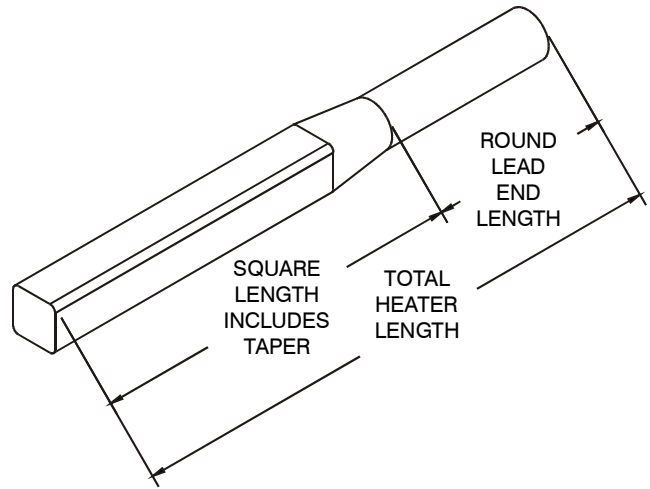


## Square Cartridge Mechanical Construction Options

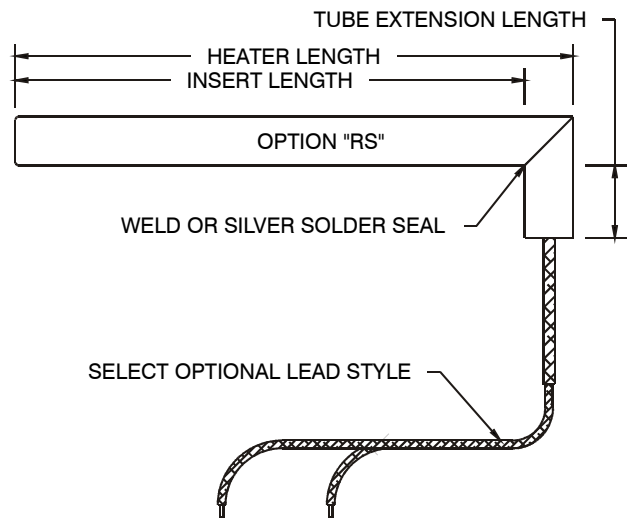
### Option "RL" Round Lead End

The round lead end option allows easy installation of standard compression, hex head pipe and bulkhead type fittings at the lead end of the cartridge for liquid and gas heating applications. This option is also useful in cases where special lead fittings and electrical boxes are required. The round lead end is formed by swaging an unheated section of the cartridge lead end to a nominal diameter less than or equal to the square cartridge cross sectional dimension. The swaging process does create a short taper length of approximately 1/2" that is not considered part of the round lead end length. The round lead end option can be used in conjunction with all lead construction options. To order, specify "RL" option and include the required length of the round end.



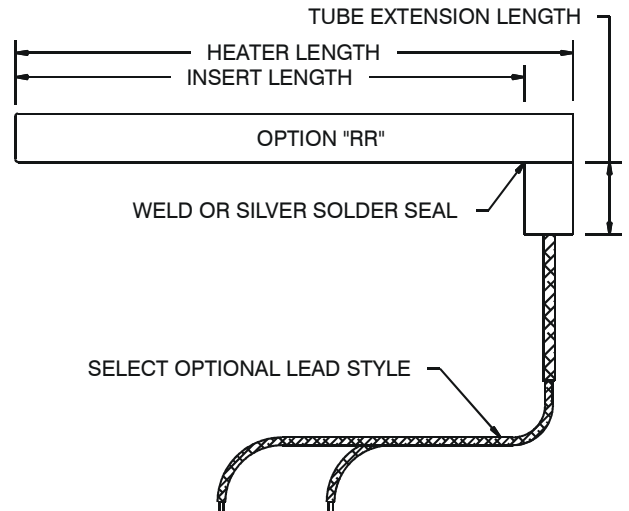
### Option "RS" Right Angle Square Sheath Extension

The "RS" construction option features a 90 degree square tube extension securely brazed to the main sheath of the heater. This protective, heat resistant extension provides extra durability in applications where the normal lead exit area is exposed to high operating temperature or is subject to extreme abuse. The "RS" right angle extension relocates the lead connection to a cooler, contamination free location of the application. The right angle square extension can be of any desired length and can be used in conjunction with all lead construction options. The extension is constructed of the same alloy as that used for the cartridge sheath and features ceramic internal insulation for temperature resistance. To order, specify "RS" option and note your desired extension length as well as any special features you require. Include the desired lead configuration in your order.



### Option "RR" Right Angle Round Tube Extension

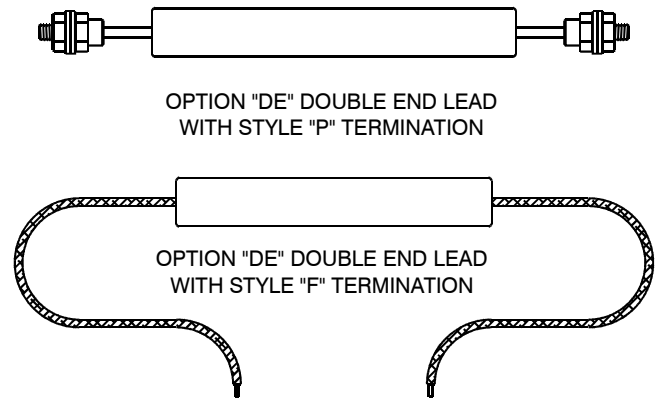
The "RR" construction option features a 90 degree round tube extension at the lead end of the cartridge, which is securely brazed to the heater surface. This protective, heat resistant extension provides extra durability in applications where the normal lead exit area is exposed to high operating temperature or is subject to extreme abuse. The "RR" right angle round extension relocates the lead connection to a cooler, contamination free location of the application and allows easy attachment of special fittings at the extension lead exit. The right angle round extension can be of any desired length and can be used in conjunction with all lead construction options. The extension is constructed of the same alloy as that used for the cartridge sheath and features ceramic internal insulation for temperature resistance. To order, specify "RR" option and note your desired extension length as well as any special features you require. Include the desired lead configuration in your order.



Square Cartridge Mechanical Construction Options

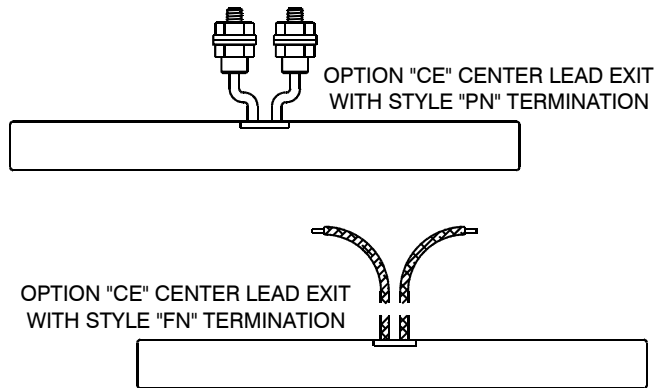
Option "DE" Double End Lead Construction

The double end lead termination provides an alternative lead connection system for heating applications with special wiring requirements. Common applications for the double end lead system include the retrofit of tubular elements utilizing existing wiring and multiple heater assemblies requiring combinations of series and parallel wiring to bus bar systems in applications where space is limited. The double end termination system is particularly useful on larger square heater with post terminal style terminations but can be supplied with any desired lead configuration and protection system on any square cartridge size. The full range of electrical and thermal construction options can be supplied in the double end termination configuration. Please specify option "DE" and include the desired lead style and lead length in your order.



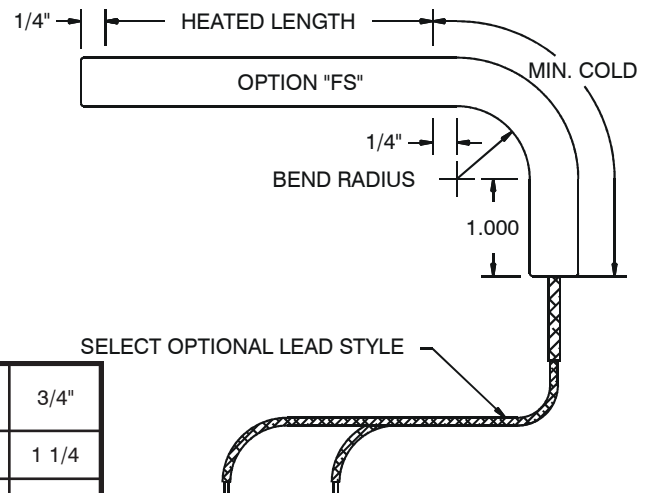
Option "CE" Center Lead Construction

The center lead construction is particularly useful in tooling applications where the preferred lead exit location is at some point along the length of the square cartridge other than the end. This option improves the ability to isolate the leads from potential sources of contamination and physical abuse while improving heat uniformity by supplying heat equally to both ends of an application. The center lead construction features weld sealed caps at both ends of the cartridge and can be implemented on any square cartridge size. The construction readily accommodates any standard lead style and can also be used in conjunction with any standard electrical and thermal construction options. Please specify option "CE" and include the desired lead style and lead length in your order.



Option "FS" Formed Sheath

The "FS" formed sheath construction option provides a one piece 90 degree exit formed in a cold zone of the cartridge. The formed sheath construction is useful in liquid heating applications where the heater must make a 90 degree bend inside an enclosure and a fully sealed one piece sheath design is preferred. The formed end can also provide a self supported reorientation of the cartridge leads. The minimum radius of the bend varies in relation to the cartridge cross section. Minimum allowable bend radius for the various common cartridge diameters is indicated in the chart below. The option "RL" round lead end can also be formed in this manner. To order, specify "FS" option noting any special radius, bend angle and cold length requirements. Insure that your order includes the desired lead style.



Cartridge Cross Section (Inches)	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
Min. Bend Radius	3/8	1/2	1/2	1/2	3/4	1	1 1/4
Min. Cold Length	2	2 1/4	2 1/4	2 3/8	2 7/8	3 3/8	3 7/8