



ISQUARED R ELEMENT CO., INC.



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CALIBRATION PROCEDURE

Our heating elements are calibrated in open air by applying a voltage through them that will cause them to dissipate approximately 15.5 watts/cm² (100 watts/in²). The Starbars are calibrated in amperes rather than ohms, for it is a more convenient unit to use.

Experience shows that a Starbar when being calibrated in open air at a loading of 15.5 watts/sq. cm (100 watts/sq. inch) will come to a surface temperature of 1073°C (1960°F) in anywhere from three to eight minutes, depending upon the size of the Starbar. Then, current will drop slightly and another two or three minutes is required before the Starbar becomes stable at a temperature of approximately 1073°C (1960°F).

If the Starbars that are calibrated in free air are placed in an enclosure or in a semi-enclosure backed by a reflector, the ambient temperature will rise above that of the surrounding room with the result that the resistance of the Starbar will be affected.

It is possible to check the ampere rating of an element while it is at temperature in the furnace. A clamp-on ammeter is required and readings are taken by clamping around the aluminum braided terminal strap. The value is a comparative figure which can be used to relate other elements in the furnace or other elements measured with the same method. To compute the resistance, measure the voltage drop across each element, then divide the voltage by the current. This will give you the resistance in ohms of the element.

It is possible to calibrate used elements on a higher voltage than was originally used, the advantage being a higher voltage will make it easier to detect any unevenness in resistance or to detect any defects or non-uniformities that might have developed during the operation of the elements. If used elements are calibrated on the same voltage as new elements, the elements will not have the same surface temperature because they have increased in resistance, but if the elements are matched in this manner they will still be very close to being matched at a higher voltage.

If you elect to calibrate used elements at a higher voltage, the simplest way to select a voltage for recalibration is to multiply the initial nominal resistance of the element by the estimate of the increase in resistance. If you had an element that had doubled in resistance multiply the nominal resistance by two. If the element has tripled in resistance, multiply the nominal resistance by three. The recalibration voltage can be determined by using the equation $E = \sqrt{WR}$. Where W equals the surface area of the element (square centimeters or square inches) times 15.5 (watt/cm²) or 100 (watts/in²) and R is the used element resistance.

The crayoned markings on the Starbar indicate the calibration amperage, month and year the Starbar was manufactured. Holding the Starbar so that the markings are right side up and reading from left to right, the first letter indicates the month. The letter A through L appear in this space (A is for January, B for February, etc.). The second is a number 0 through 9. This is the year the Starbar was manufactured (e.g. A-5 is January 2005). The next mark on the Starbar would appear near the other end and will be the calibrated amperage.