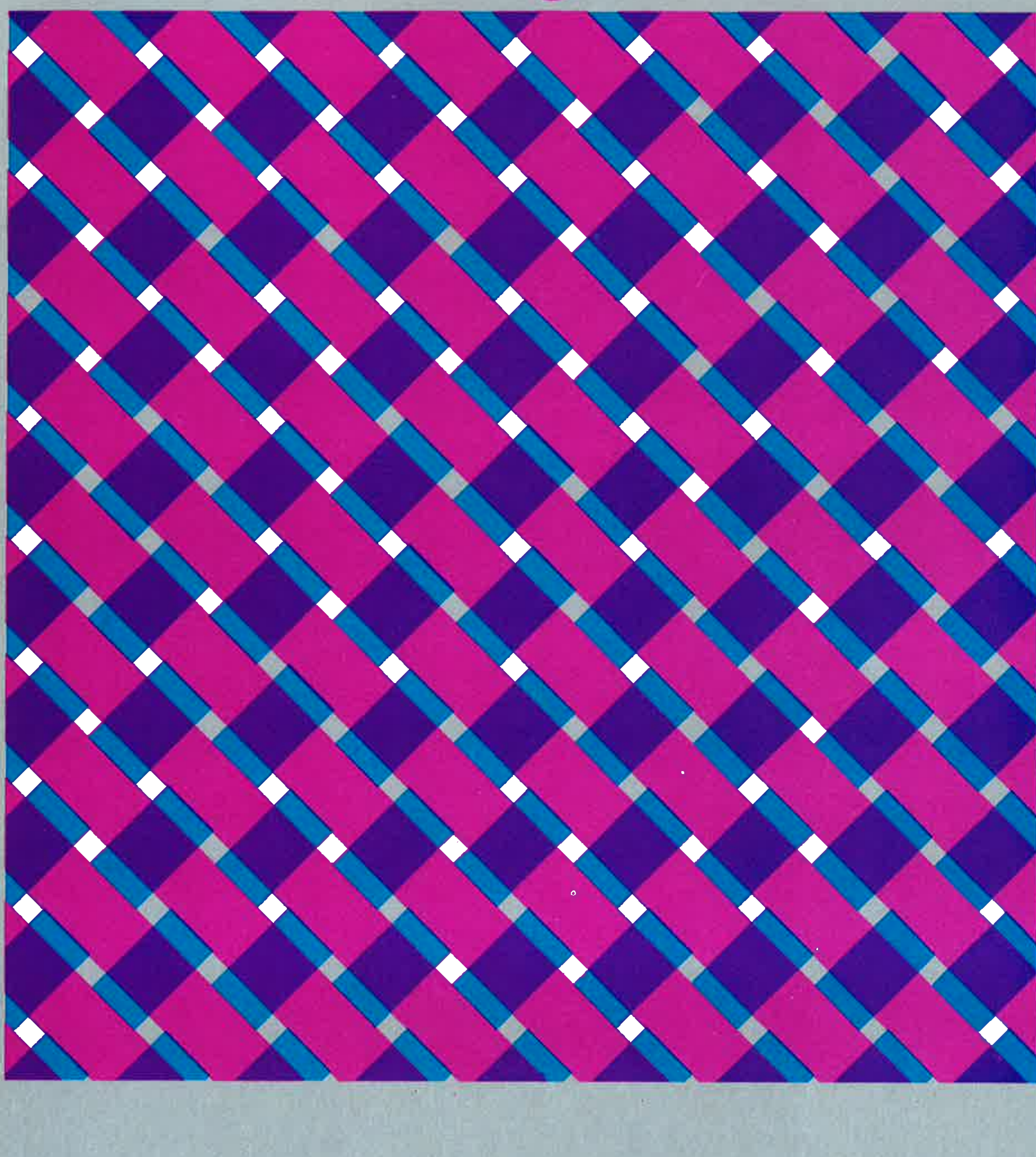
Mesh Furnace Elements From Sylvania



1. The development of MESH furnace elements by Sylvania has literally revolutionized high temperature vacuum and atmosphere electric furnace design and operation.

2. This important advance makes possible lower costs through the significantly longer life of every MESH element - up to 10 times the life of sheet type elements.

3. Quality control is vastly improved because production is more dependable and yields more consistent from cycle to cycle.

4. Special applications or higher temperature operation are possible using MESH. Working temperatures of up to 3000° C are now practical for the furnace operator or designer.

5. Much greater flexibility in vacuum or atmosphere furnace design and use is made possible by the variety of MESH element configurations, sizes and materials.

MESH FURNACE ELEMENTS

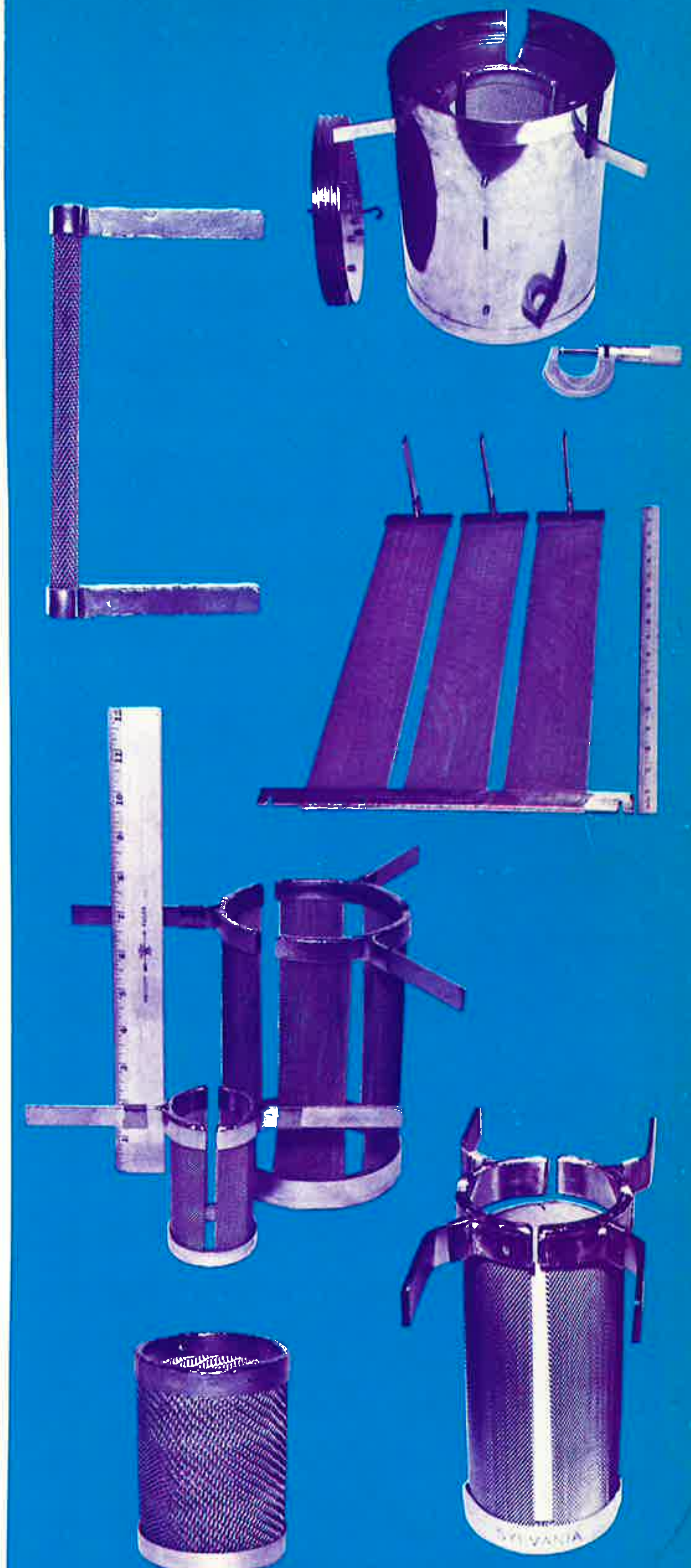
One: The unique capabilities of MESH elements are based on the use of specially designed interlocking wire coils. This interlocking design results in minimal warpage or distortion in use, thus providing a substantial increase in trouble free heating and cooling cycles. The assurance of hundreds of dependable heating cycles is a practical reality while frequent and costly element changes are reduced significantly. Over one hundred separate manufacturing operations control element wire size, structure and strength. Wire diameters are controlled to less than 1% variation. Material uniformity together with the flexible construction produce superior element performance.

Two: Downtime is a costly penalty in modern technical processes. Sylvania MESH elements prove their value by reducing the number of element changes necessary during actual production. Stress is inherent in the broad temperature changes experienced by furnace elements. This is handled much more effectively through the ability of each MESH coil to move individually and still maintain the basic dimensional stability of the element. MESH elements have been cycled many hundreds of times without the warpage or distortion so common with sheet type elements; no small consideration in these times of high labor and material costs.

Three: Even the most demanding and difficult furnace design or operating problems are made simpler and more dependable with MESH elements. The variety of configurations and power carrying capacity of MESH with its choice of wire sizes and current delivery design to the element makes operation more consistent within each cycle and between cycles. The improvement in quality is quickly obvious. MESH elements have proven their importance and advantages over sheet type elements time and again. The opportunity for design and use of higher temperature furnaces on an economical basis is now assured.

Four: One look at the variety of physical configurations, materials, sizes and electrical specifications demonstrates the wide choice available to the furnace designer or user. Sylvania MESH heating elements are available for single phase or three phase operation. Shapes vary from complete cylinders to flat panels, with vertical or horizontal leads. Elements are available in standard size increments as well as an almost unlimited range of custom shapes and sizes. Yields are more consistent and emphasis can be put on improving the cost/quality ratio.

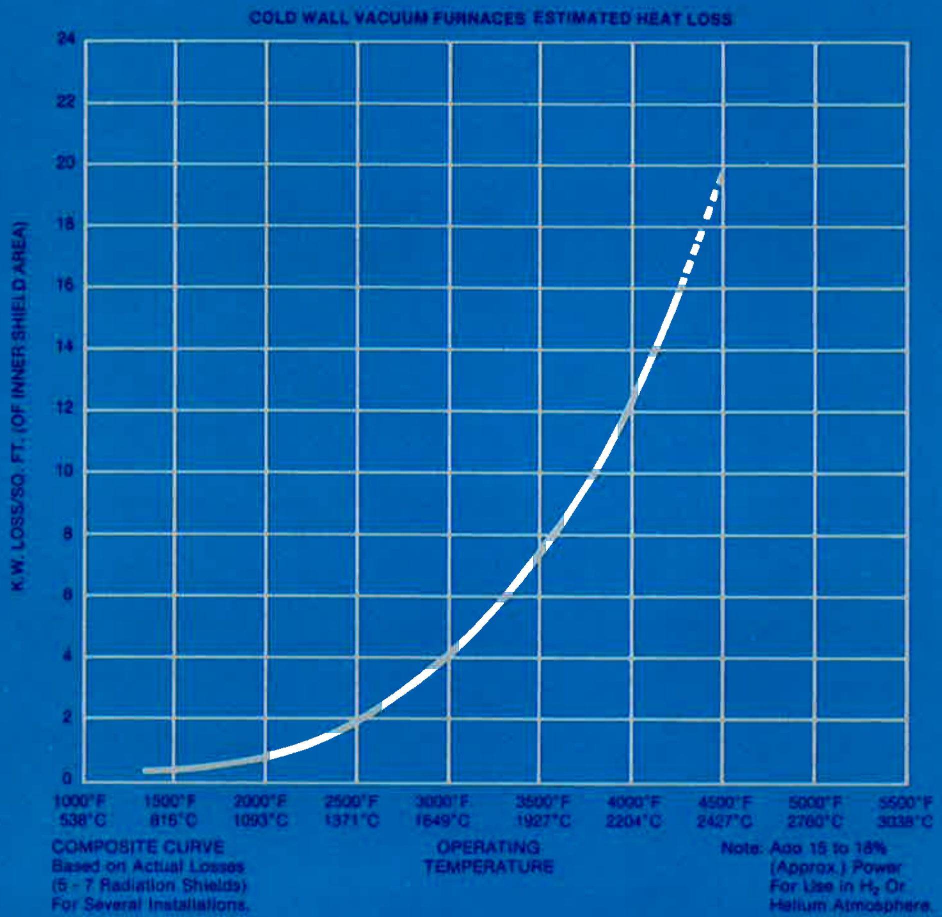
Five: For furnace use standard cylindrical elements are offered in single phase sizes from 1″ diameter by 2″ high to 6″ diameter to 12″ high in ½″ increments of each dimension. Standard three phase elements vary from 2″ diameter by 2″ high to 12″ diameter by 12″ high in ½″ increments of diameter and height. Standard flat panels are offered in 6″ to 12″ widths up to 60″ long. In addition to furnace use, MESH is also preferable for susceptor applications and as hearth plates or special heating panels. MESH is available in refractory metals including tungsten, tantalum, molybdenum and, for atmosphere type furnaces, Kanthal.



This array of Sylvania MESH elements clearly shows the variety and broad applicability of heating elements available. Their range is limited only by the ingenuity of the user. Elements up to 2 feet by 4 feet have been designed and used successfully. MESH has made possible many hundreds of cycles, many at temperatures up to 3000°C without failure, a major contribution to high temperature technology and dependable production processes.

MESH TECHNICAL DATA

KW REQUIREMENTS FOR COLD WALL VACUUM FURNACES



POWER FORMULAS

Single Phase

$$I_L = \sqrt{\frac{\text{POWER}}{R_T}} \qquad V_L = \frac{\text{POWER}}{I_L}$$

Three Phase

$$I_L = \sqrt{\frac{\text{POWER}}{3 \times R_T}} \qquad V_L = \frac{\text{POWER}}{1.732 \times I_L}$$

To determine the power required to reach a given temperature, one should find the KW/FT^2 of inner shield on the above curve. Then multiply this figure times the total area (FT^2) of inner shield (not including top and bottom).

The resistance of each element is given in the tabulation listed on separate data sheet available on request. If the resistance is required at a temperature other than that listed, it must be calculated from the given R in proportion to the change in resistivity with temperature.

With the power and resistance now known, the current and voltage can be calculated using the formulas above .

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