

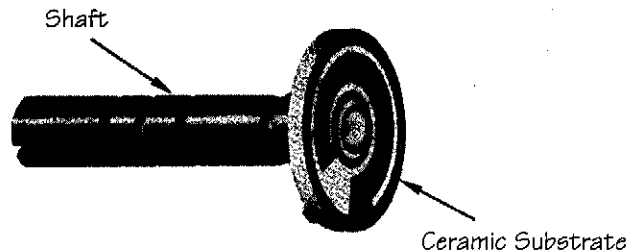
RESISTIVE ELEMENTS (Cont'd from previous issue)

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FREE
Info in Any Catalog!

PRINTING AND FIRING OF THE INKS IS PREFERABLY DONE IN A HUMIDITY AND TEMPERATURE CONTROLLED ENVIRONMENT. A CONTROLLED TEMPERATURE KILN WITH VARIOUS TEMPERATURE ZONES BETWEEN 800°C AND 1200°C IS USED TO BURN OFF THE ORGANIC VEHICLE AND CAUSES A FUSION OF THE GLASS PARTICLES WITH THE CERAMIC SUBSTRATE. THE METALLIC PARTICLES PROVIDE A RESISTIVE FILM WHICH IS BONDED TO THE SUBSTRATE.

A VERY WIDE RANGE IN RESISTANCE VALUES CAN BE ACHIEVED BY VARYING:

- 1) THE COMPOSITION OF THE RESISTIVE INK.
- 2) THE FIRING PARAMETERS (TIME AND TEMPERATURE).
- 3) THE PHYSICAL SIZE OF THE ELEMENT.



In this design, a ceramic substrate is attached directly to the shaft in order to increase power dissipation capability

SELECTION FACTORS. POTENTIOMETERS HAVING A TOTAL RESISTANCE FROM 10 OHMS TO 10 MEGOHMS ARE PRACTICAL. HOWEVER, THE ENTIRE RESISTANCE RANGE IS NOT AVAILABLE IN ALL POSSIBLE SIZES AND CONFIGURATIONS.

CERMET ELEMENTS OFFER VERY LOW (INFINITISIMAL) RESOLUTION AND GOOD STABILITY. THEIR NOISE PERFORMANCE IS GOOD IN BOTH THE STATIC AND DYNAMIC (CRV) CONDITION.

FREQUENCY RESPONSE OF CERMET MATERIALS IS VERY GOOD AND THE PRACTICAL APPLICATION RANGE EXTENDS WELL BEYOND 100MHZ. THE LOWER RESISTIVITY MATERIALS EXHIBIT AN EQUIVALENT SERIES INDUCTANCE, WHILE THE HIGHER RESISTANCE CERMETS DISPLAY AN EQUIVALENT SHUNT CAPACITANCE.

OPERATIONAL LIFE OF CERMET ELEMENTS IS EXCELLENT. THE ELEMENT SURFACE IS HARD AND VERY DURABLE. FAILURES OF CERMET POTENTIOMETERS, AFTER EXTENDED MECHANICAL OPERATION, ARE MORE OFTEN WIPER FAILURES DUE TO WEAR THAN PROBLEMS IN THE ELEMENT.

FOR TRIMMING APPLICATIONS, CERMET ELEMENTS USUALLY OFFER THE BEST PERFORMANCE PER DOLLAR PER UNIT SPACE. EVEN THOUGH CERMET ELEMENTS ARE MORE ABRASIVE THAN CONDUCTIVE PLASTIC, WIPER WEAR IS LOW ENOUGH THAT MECHANICAL LIFE FAR EXCEEDS TRIMMER REQUIREMENTS.

CARBON ELEMENTS. EARLY CARBON FILM POTENTIOMETERS WERE USUALLY MADE WITH A MIXTURE OF CARBON POWDER AND PHENOLIC RESIN APPLIED TO A PHENOLIC SUBSTRATE AND CURED. DRAMATIC IMPROVEMENTS IN MATERIALS TECHNOLOGY OVER THE YEARS HAVE RESULTED IN AN UPGRADING OF SUBSTRATES AND CARBON-PLASTIC RESIN COMPOUNDS. ONE EARLY IMPROVEMENT WAS THE USE OF CERAMIC AS A SUBSTRATE FOR ELEMENTS MADE OF CARBON AND PHENOLIC RESIN.

DEPENDING ON DESIRED END RESULTS, A CARBON COMPOSITION ELEMENT MAY BE SCREENED ON (AS WITH CERMET), BRUSHED ON, SPRAYED ON, APPLIED WITH A TRANSFER WHEEL, OR DIPPED ONTO AN INSULATIVE SUBSTRATE. WHEN SPRAYED ONTO A SUBSTRATE, AN AUTOMATICALLY CONTROLLED SPRAY GUN IS SWEEPED BACK AND FORTH. CONTROLLING THE SWEEP SPEED DETERMINES THE THICKNESS OF THE RESISTIVE MATERIAL WHICH INFLUENCES THE RESISTIVITY OF THE ELEMENT. A MASK (STENCIL) MAY BE USED TO CONTROL THE RESISTIVE PATTERN.

THE PROCESSING OF ALL NONWIREWOUND ELEMENTS REQUIRES A MANUFACTURING ENVIRONMENT WHICH IS FREE FROM DUST AND OTHER FOREIGN PARTICLES. FOREIGN PARTICLES SETTLING ON A WET RESISTIVE FILM WILL INTERFERE WITH STABILITY, CONTACT RESISTANCE VARIATION AND THE ELEMENT'S TOTAL RESISTANCE.

To be continued

Here's How to Participate:

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