



## Tantalum Capacitors

*"We are dedicated to partnership with our customers...assuring continuously improved quality of the products and services we offer..."*

About the manufacture of tantalum capacitors at Vishay Sprague...

Attention to customer requirements — to your requirements — keeps us on the leading edge of the quality revolution. We maintain total quality commitments throughout our operations.

The scope of our Quality System encompasses:

1. Product and Materials Development
2. Process Control
3. Training
4. Outgoing Quality Improvement
5. Customer Partnerships
6. Ship-To-Stock Programs
7. Our Quality System is Registered to ISO/QS 9000

### PRODUCT AND MATERIALS DEVELOPMENT

The work in our research and development facilities is focused on new materials and designs. Our scientists and engineers are recognized for their experience in this technology. Vishay Sprague, a pioneer in the field of tantalum capacitors, has introduced many important advances over the years.

### SUPPLIER PARTNERSHIPS

We are continuously working with suppliers to assure a thorough understanding of our quality requirements and the use of statistical methods as a tool for process control. We

expect our suppliers to be dedicated to the improvement of quality of our incoming materials, taking rigorous action to investigate and correct non-conformance whenever required.

Our suppliers are considered extensions of our tantalum processes.

### PROCESS CONTROL

Vishay Sprague ships millions of tantalum capacitors each month for aerospace and defense electronics, for computers and communications as well as for a virtually unlimited range of high-performance military, industrial and commercial equipment.

We are dedicated to defect prevention in all aspects of design and manufacturing. Rigorous action is taken to investigate the root cause of non-conformances and/or variation and to correct such situations.

Vishay Sprague is committed to the use of statistical techniques to reduce variation, independent of specification limit. This is one of the tools used to improve performance.

We perform a thorough analysis of critical process elements using statistical methods at key points. More and more process steps are being automated to assure consistency in manufacturing and conformance to design specifications.

### TRAINING

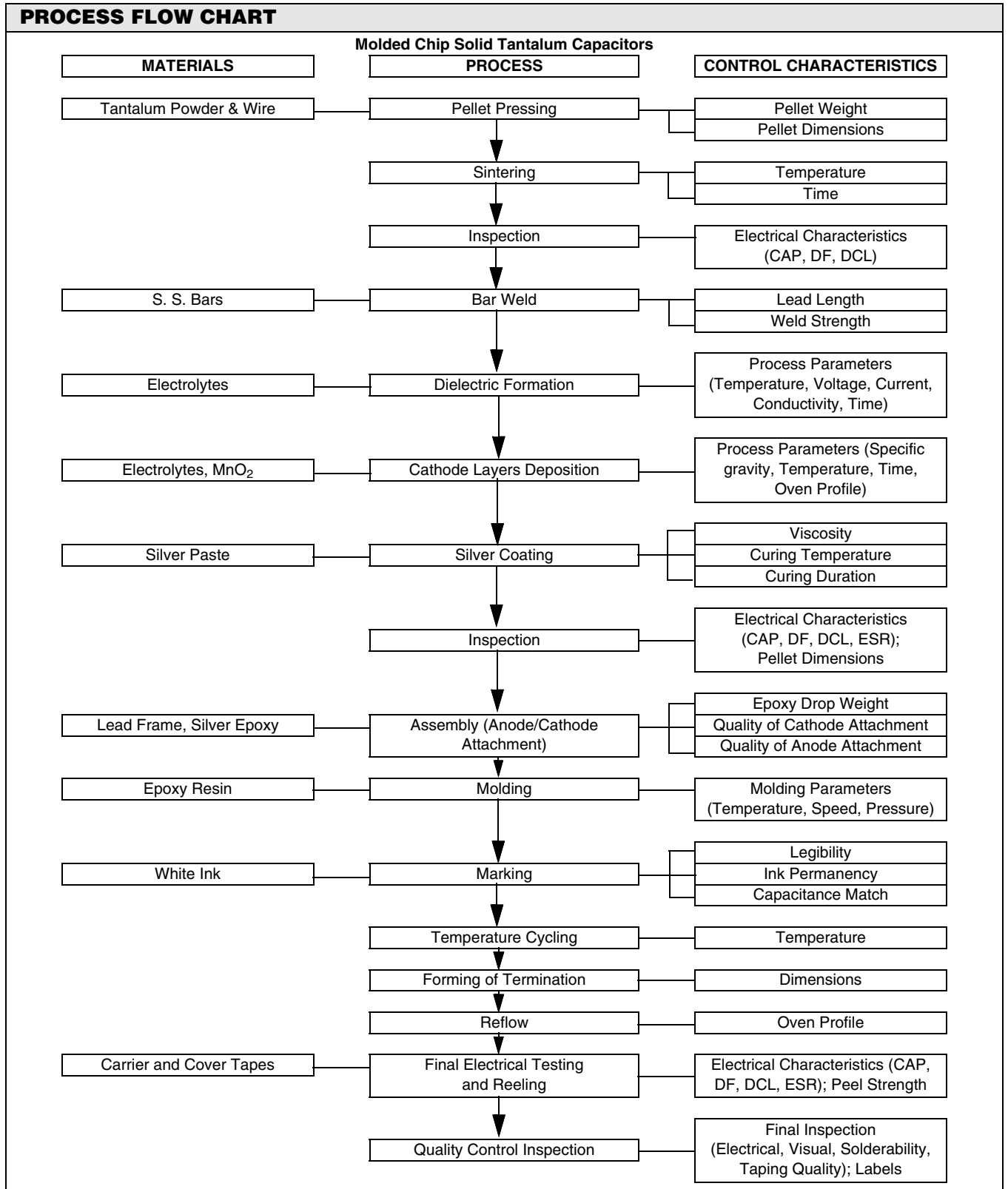
A disciplined procedures approach is an essential part of our quality improvement program. This requires a commitment to provide all personnel with the skills and tools necessary to produce quality at the source. Employees are trained in company philosophy, statistical process control, capability studies, application of procedures and equipment operation.

Our training includes the analysis of statistical data from our processes to help us understand and control variations. As we train our operators in SPC and automate our processes, the rate of quality improvement accelerates accordingly.

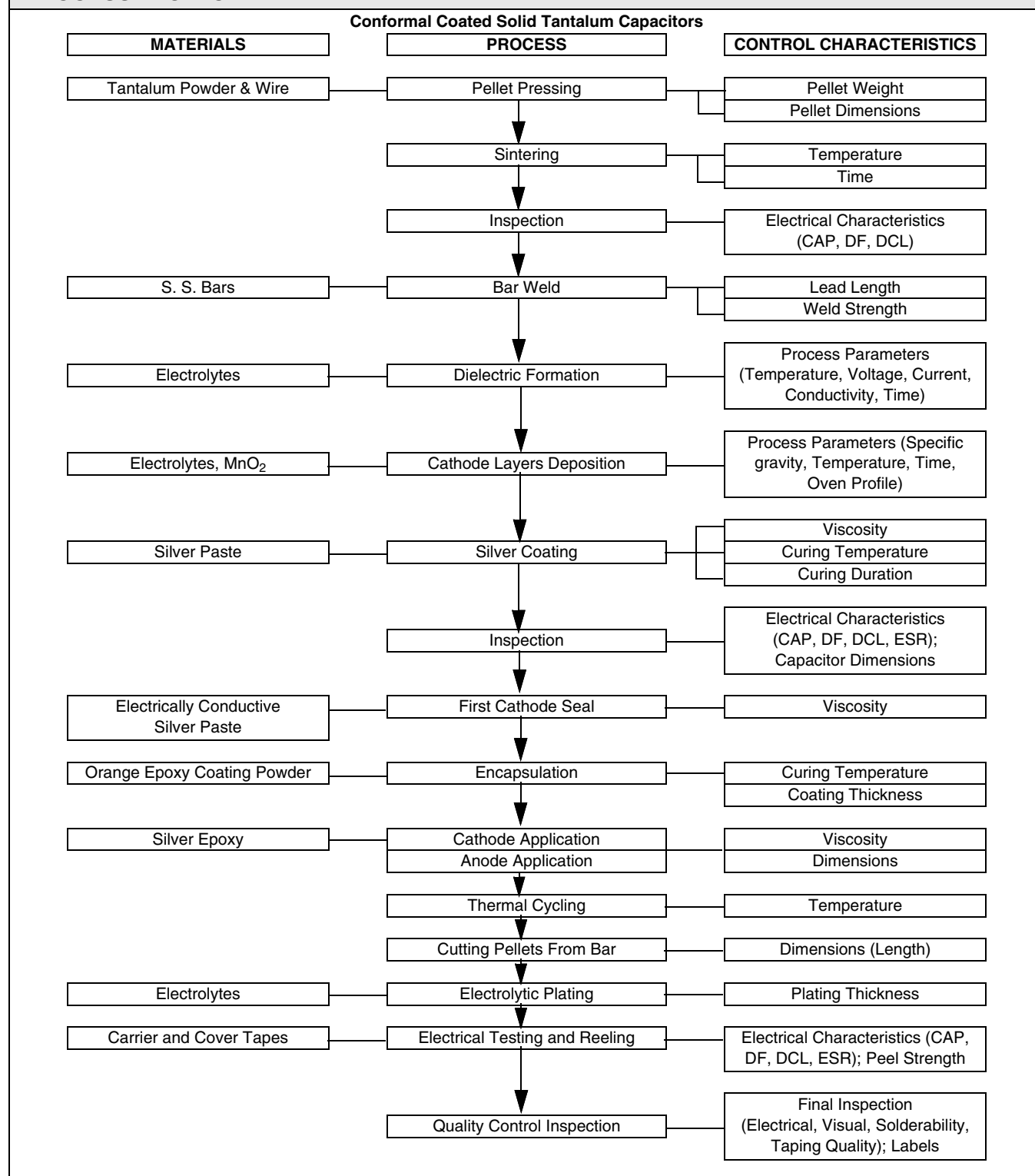


### PROCESS FLOW CHARTS

These charts identify basic manufacturing processes including the quality control points, where inspection is performed and SPC is used.



## PROCESS FLOW CHART





### PARTS PER MILLION (PPM) PROGRAMS

The collection of quality data and reporting of outgoing quality in PPM is not new to Vishay Sprague. In fact, Vishay Sprague provided leadership for the committee developing the EIA Standard for PPM measurement. And long before reporting outgoing quality in "Parts Per Million" was fashionable, Vishay Sprague had defined a program, was collecting data and reporting internally to assure quality improvement.

PPM performance, by product, is calculated by Quality Assurance from end-of-the-line electrical performance data. These data include all variations, whether minor or catastrophic, from internal standards that are stricter than those used by our customers. The result is that our customers' measurement of as-received quality in PPM is always more favorable than our own measurement.

Today, not all suppliers are using a standard method of PPM calculation. Consequently, when comparing reported PPM levels, it is essential that the method of calculation be understood. For example, calculations that include only catastrophic failures may produce very low reported PPM levels.

### CUSTOMER PARTNERSHIPS

We are currently involved with many major Ship-to-Stock programs. These programs rely on our history of providing materials that meet customer quality expectations, are delivered on time and at competitive prices.

This history, plus our proven dedication to continuous quality improvement and the use of statistical techniques to identify and reduce variation in our processes, provides customer confidence to eliminate incoming inspection, thereby reducing costs.

Our partnership also extends to in-depth applications engineering support. Our engineers work with customers to review their designs and in the selection of the most appropriate Vishay Sprague tantalum capacitors.

### SHIP-TO-STOCK PROGRAMS

Vishay Sprague provides a program for those customers who may not have identified their own Ship-to-Stock program. This program may be modified to suit specific needs.

### QUARTERLY PPM REPORTS

These reports express outgoing quality of each product type purchased and may be used for monitoring quality improvement.

### SHIPPING CONTAINER ID

We identify each container to assure that material proceeds directly to your stockroom and is not inspected when received. Vishay Sprague is responsible for its quality.

**VISHAY SPRAGUE  
SHIP TO  
STOCK  
INSP. BY DATE**

### VISHAY SPRAGUE TANTALUMS SET NEW WORLD STANDARDS

An extended family of Vishay Sprague solid tantalum chip capacitors sets new world performance standards! Vishay Sprague chips feature: extended ratings in conformal-coated and molded case lines; the highest capacitance in the smallest chip size; a fused chip and the highest temperature capability in the industry.

Extended ratings permit designers to specify smaller case codes -producing significant cost savings!

TANTAMOUNT® conformal-coated chips offer the highest capacitance in the smallest case codes.

TANTAMOUNT® molded-case tantalum chips conform to EIA 535BAAC. Type 293D extended ratings replace standard values with smaller case codes. Resistance to solder heat is specified at + 260 °C for 10 seconds.

CWR06 and CWR11 chips meet MIL-C-55365. Vishay Sprague tantalum chips are supplied taped and reeled to EIA-481 and IEC 286-3.