MATERIALS NEWS

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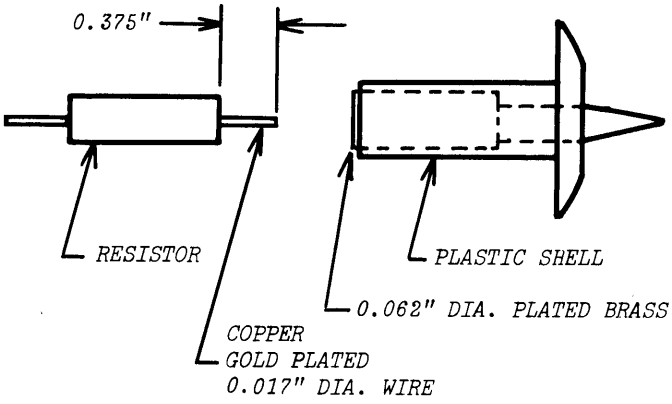
JOINING TECHNOLOGY - PERCUSSIVE WELDING

Problem: to join a small resistor lead to a probe tip with a minimum of heat. Plastic part was being damaged.

Present technique: soldering presented many drawbacks -- excessive heat on plastic parts, difficulty in holding small parts and applying a precise amoung of solder and heat, and long processing time.

Recommendation: percussive welding, a resistive welding process for butt-type joints as is used in stud welding. Advantages: precise control of heat, is fast, can be used with a heat sink to keep heat to a bare minimum, and provides controlled alignment of the two parts.



Percussive welding can offer many advantages in joining small parts and replacing soldering operations.

-Basil Gilman, Ext 7133
Eng. Dev. Suprt.

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DIMENSIONAL STANDARDS LAB SERVICES AVAILABLE

Dimensional Standards Lab is a service group devoted to dimensional, mass, pressure and torque measurement and calibration.

Our calibration program recalls measuring devices and standards for maintenance and calibration at an agreed-upon interval. We help users of this service set realistic, economical calibration intervals for their measuring equipment.

Consulting services include:

1. Evaluate dimensional measurement devices for application to TEKTRONIX job requirements and usage environment.
2. Evaluate proposed purchase of new measuring devices to maintain TEKTRONIX standards of quality and precision.
3. Design gages and measurement fixtures.
4. Help define and resolve measurement problems.

Measurement services include:

1. Inspect incoming new and/or reconditioned machine tools upon request.
2. Perform special measurements which are beyond the capability of secondary standards, equipment and personnel.
3. Assist in conducting machine or process capability studies.
4. Act as liaison between TEKTRONIX and an outside group on dimensional metrology.

Cam switches are a current example of our measurement service. An analysis of the measurements made on problem switches showed that the problem was alignment. The solution was to build a positioning fixture for assembling these devices.

Measurements have been performed to determine the flatness of CRT face plates, the linear dimensions of electro-formed wave guides, the effectiveness of safety air nozzles, the surface finish of ceramic parts, and the X-Y position of mosaic lens centers.

If we can be of service, please call.

-John Erhardt, Ext 588
Physical Standards

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PLATED POLYSULFONE

A recent addition to platable engineering plastics has now been successfully plated in Electrochem. Polysulfone, a development of Union Carbide, is a unique plastic in that its properties are exceptionally stable over a wide temperature range. It begins deformation at temperatures in excess of 340°F. Creep under stress is considerably less than ABS plastics and can be minimized by short-fiber glass filling which is also platable.

For a plastic, the electroplate on polysulfone has excellent adhesion. A surface etchant in the pre-plating process creates a micro-cracked surface that holds the plate with a dove-tail effect, giving adhesion on the order of 12-16 lb./in. (The microcracking has no apparent detrimental effect.) TEK-plated polysulfone has withstood temperatures up to 250° F and better without blistering or peeling of the plate. Thermal cycling tests are planned; however, preliminary tests have shown encouraging tolerance to thermal shock.

Another feature of plated polysulfone is that it can be soldered. Several parts have been tin plated and then soldered. Adhesion tests on the soldered areas revealed no damage to the bond if excess heat was avoided.

Physical properties of plated and unplated ABS, polypropylene and polysulfone are shown below.

For further information on polysulfone plating, call Don Chitwood, Electrochem; and for questions on the plastic, call Bert Hippe, Plastics.

-Don Chitwood, Ext 6584
Electrochem

-Bert Hippe, Ext 7646
Plastics

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PHYSICAL PROPERTIES* OF UNPLATED AND PLATED ABS, POLYPROPYLENE, AND POLYSULFONE

	ABS (Plating Grade)		POLYPROPYLENE (Unmodified)		POLYSULFONE	
	UNPLATED	PLATED***	UNPLATED	PLATED***	UNPLATED	PLATED***
Tensile Strength, lbf/in²	5,900	7,300	4,800	5,400	10,200	(at yield)
Flexual Yield Strength, lbf/in²	9,700	12,000	7,200	13,300-15,800	15,400	20,900
Flexual Modulus, lbf/in²	330,000	600,000	185,000	1,320,000	390,000	1,720,000
Elongation %	5 - 25		100	0.8 - 1.3	50	
Deflection Temp., °F						
@264 lbf/in² Fiber stress	189	213	125-140	NF****	345	363
@66 lbf/in² fiber stress	207	270	235	NF****	358	NF****
Resistance to Heat, °F. Contin.	200		250-320		300-345	
Dielectric Constant						
@60 cycles	2.4-5.0		2.2-2.6		3.07	
@10³	2.3-4.5		2.2-2.6		3.06	
@10⁶	2.4-3.8		2.3-2.6		3.03	
Dissipation Factor						
@60 cycles	0.003-0.008		<0.0005		0.0008	
@10³	0.004-0.007		<0.006-0.0018		0.0010	
@10⁶	0.007-0.015		<0.005-0.0018		0.0034	
Water Absorption 24 hr., 1/8" thick, %	0.40		<0.01		0.22	

* Modern Plastics Encyclopedia, 1968 and Metallic Coating of Plastics, W. Goldie, Vol II, 1969, Electrochemical Publications London, England.

** Cu-Ni-Cr = 1.5 mil

*** 1.5 mil Ni., .01 mil Cr.

**** No Failure - even at melting point.