MATERIALS NEWS

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INTRODUCTION

In line with the philosophy of Materials News being representative of the Field of Materials Science as throughout *TEKTRONIX* and not from any one department, we will publish from time to time editorials by concerned persons. These editorials reflect the views of the author and not necessarily *TEKTRONIX, INC.* or the other contributors to Materials News.

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EDITORIAL

The first issue of Materials News is now out and we are pleased with the positive response received from many directions within the company. This response emphasizes the broad influence of materials technology in a manufacturing environment, the goal of which is to provide a better product, cheaper.

Materials News is designed to exchange information among the widening group of those participating in materials selection and utilization within *TEK*. As an indication of the growth of a materials technology orientation, increasing numbers of companies (88 percent of a 101-company group according to Materials Today, June, 1968) have adopted the "materials engineering concept" in manufacturing, and in the extreme, *CHRYSLER CORP.* goes so far as to proclaim ". . . only materials engineers are responsible for selecting materials and processes for automotive products. This authority is absolute . . ." (Materials Engineering, December, 1968).

People working in the area of materials technology owe it to the company to exercise competent, well-informed materials decisions. Joseph Preisler of *SPERRY RAND CORPORATION* points out that ". . the variety of materials available today makes it easy for a less knowledgeable engineer to select a material that will work. But this material may be far from optimum." (Materials Engineering, May, 1968.)

We hope that 'best-result engineering' can be furthered through an internal, up-to-date materials information exchange forum for designers and utizers.

-Jerry Turnbaugh, Ext. 6330
Ceramics

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In keeping with the statement in the last paragraph above, Materials News welcomes contributions from all areas; interested contributors should contact any of the Editorial Board named below:

Peter Burke Dale Grimes Jerry Turnbaugh
Tom Currans Don Swickard

MEETING NOTICE

Morgan Pope (3D, Advance Materials) has been invited to deliver a paper at a symposium on modern methods in ceramics sponsored by the combined Washington and Oregon sections of American Ceramic Society, April, 1969 at Richland, Washington.

His discussion will cover materials analysis by electrons in general and by AUGER electron spectroscopy in particular.

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FLAMMABILITY TESTS OF PLASTICS

As part of our program to meet safety requirements of various national and international organizations, we have investigated the flammability of various plastics presently in use at *TEK* or available on the market. These tests were performed according to a procedure published by the *CANADIAN STANDARDS ASSOCIATION*, so that we might meet certain of their requirements for the 410 instrument. It should be understood that the flammability test requirements do not apply to all plastic parts used in our instruments, but only to a minority. Only certain parts used to support electrically live parts in primary circuits must meet *CSA* flammability standards; these tests were done to provide the information necessary to select suitable materials for these applications in new products. We don't expect to modify parts in current products except as the need arises to respond to specific inputs from *CSA, UNDERWRITERS' LABORATORIES* or other safety authorities.

A brief description of the test is as follows: A flame of specified temperature shall be applied to the part in question for 15 seconds and then removed for 15 seconds until 5 such applications have been made. The flame shall not be reapplied while the material is still burning. If the material burns for more than 30 seconds after any of the first 4 applications, the test shall be discontinued.

The parts tested shall not flame or glow red for more than one minute after the fifth application of the standard test flame. Parts that meet this requirement shall be deemed rated noncombustible per *CSA* flame test.

In an attempt to generate generalized data on flammability in regard to *CSA* requirement, a standard test sample (7" x 3-1/2" x 1/8") was utilized. Care should be exercised when using the following material ratings for parts less than 1/8 inch thick. These results are given by material and are only intended to be used as indicators for part flammability.

(Cont'd on back)

The following materials have been rated noncombustible per *CSA* in tests conducted by *TEK:*

Material	Availability
Epoxy-glass EC Board G-10-FR	Commercial, sample in-house
Nylon 6/6 Zytel(P)101	254-0940-00
Nylon (33% glass) Zytel(R) 7010	Commercial, black and natural only
Nylon (40% glass) Nylafil(R) G-12/40	255-0172-00
Polycarbonate Lexan(R) 2014	Commercial, sample in-house
Polycarbonate Lexan(R) NB-155	255-0317-00
Polycarbonate (20% glass) Thermo-Comp(R) DF-1004	255-0235-00
Plysulfone Union Carbide P-1747	Experimental - not available
Polysulfone, Union Carbide PX MD-3767	Experimental - not available

For further information contact:

Coordinator for Flammability Evaluation - Dwane Romine, Ext. 7138.

Complete *CSA* Test Procedure and Testing - Norm Deming, Ext. 7889.

Safety Requirements - Jess Gard, Ext. 296.

-Dale Grimes, Ext 6556
Materials Appli. Group

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CASTING

The prototype plaster casting area in the Engineering Model Shop has developed a blended alloy composed of commercial alloys #356 and #380.

The blended alloy has been cast with very good results. The as-cast surface has a smaller number of defects (plaster pits, mold fracture lines and surface porosity) than are found with the #356 or #380 alloys.

The blended alloy is easier to machine and appears to plate as well as the unblended alloys.

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The *TEK* pilot die casting area is currently going into operation. In Week 12 the first *TEK*-made die will be in the machine for proof shots and pilot run.

-William L. Sharp, Ext. 6573
Cast Metals Products

IMPROVED CERAMIC FOR CRT FUNNEL

The Ceramics Department has had for the past year a development program for the replacement of our present funnel material, designated B-2, with an improved version, B-3. The accompanying table summarizes the general characteristics of each material.

Primarily, B-3 is designed to be stronger, denser, and less chemically reactive, and to facilitate ceramic manufacturing by permitting a broader temperature tolerance during firing of approximately 20 C° as opposed to the current range of approximately 5 C°

Additional advantages are the use of interchange--able raw materials and a simplified mineral phase content after firing which should reduce property variablility. Further information will be provided as testing proceeds.

Comparison of B-2 and B-3

Raw Materials

	B-2	B-3
Talcs	33.4	54.0
G.E. MgO	12.3	-
Kaiser MgO	10.5	15.5
Nepheline Syenite	22.6	12.0
A-14 Al_2O_3	7.8	11.3
Dolomite	10.2	-
ZnO	-	5.0
$Mg(OH)_2$	-	3.2
Organic Additives	3.6	4.5

Fired Comnosition as Pure Oxides (%)

SiO_2	38.6	41.5
MgO	38.8	36.2
Al_2O_3	14.4	15.2
Na_2O	2.6	1.3
K_2O	1.2	0.6
ZnO	-	5.2
CaO	3.8	-
Fe_2O_3	0.6	0.6

Phase Composition After Firing

$2MgO.SiO_2$	-	-
$MgO.Al_2O_3$	-	-
MgO	-	-
$MgO.SiO_2$	-	-
Variable	-	-

Some Fired Properties

	B-2	B-3
Color	Buff	Off White (Colored if Desired)
Density	≈2.7 g/cm^3	≈2.85g/cm^3
Strength(MOR)	16,000 psi	20,000 psi
C.T.E. (50-500°C)	9 7-9.8x10^{-6}/°C	9.4-9.5x10^{-6}/°C
Absorption	0.0%	0.0%
Total Porosity (app.)	7.6%	3.6%

-Jim McAlpin, Ext. 6352
Ceramics

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