Errata

Document Title: Materials Development (AN 421-12)

Part Number: 5954-9642

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HP References in this Application Note

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Materials Development

Description  Man-made materials are becoming more prevalent in a variety of applications. Specialized materials for sound absorption, fireproofing, rust resistance, electrical conductivity, electrical insulation, and strength are being developed for specialized applications. These new materials require special test systems for development testing and quality assurance testing.

Problem  New man-made materials need to be tested thoroughly under a variety of conditions to determine if they can fulfill intended applications. The same types of tests used during development will often be used in final quality control after the material has been released to production. Precise measurements and process control are needed to ensure that the material is developed properly.

Solution  Data acquisition and control equipment from Hewlett-Packard provide accurate measurement capability and basic process control functions for man-made materials development applications. The same equipment used in development of a new material can also be used in production to ensure that the developed process is accurately maintained.
IMPLEMENTATION

Pressure  Man-made materials are normally created in a controlled environment of constant pressure. Using pressure transducers that output voltage or current to monitor pressure and actuators to turn pressure pumps on and off, the process pressure can be precisely controlled to produce quality material.

Temperature  When developing materials, temperature is a critical parameter in the process. Combining chemicals, fluids, and powders at the wrong temperatures can be disastrous. Accurate monitoring and control of temperature is vital. Thermocouples, RTDs, or thermistors can be used to monitor temperature. Voltage D/A converters or actuators can be used to control heaters or air conditioners.

Tension  Some man-made materials are pulled through a series of rollers in the development process. The tension on the material and the rollers must be controlled to set the proper tensile strength of the material being developed. Tension can be measured with strain gages, LVDTs, or load cells. The roller position can be controlled with stepper motors or hydraulics. The speed of the material through the rollers can be measured with a counter.

KEY SYSTEM FEATURES

Subroutines
Alarm servicing
Timers
Strain gage linearization
Temperature linearization
Interrupt handling

TYPICAL CONFIGURATIONS

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<td>HP3853A</td>
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Computer/Software

HP Series 300 computer
Disc drive (HP 9153B)
Printer (HP Quietjet)
Plotter (HP 7475A)
Software — HP BASIC and HP DACQ/300 (data base, graphics, analysis)

TYPICAL SYSTEM PRICE:

$40,000