

## Errata

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### HP References in this Application Note

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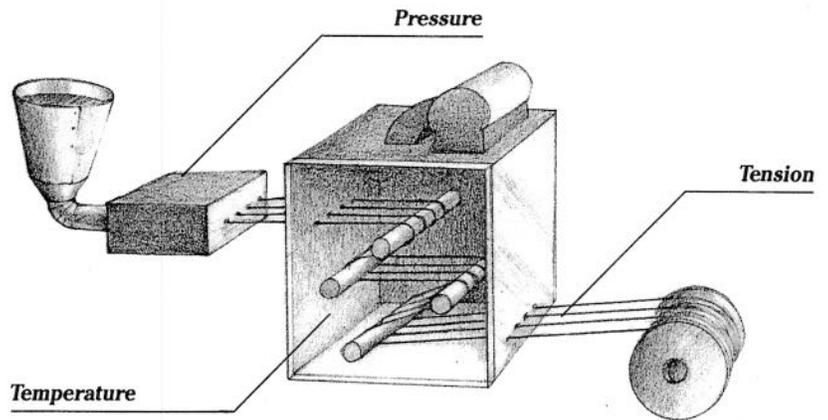
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# Materials Development



**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.

## Applications

Research  
Plastics  
Fiberglass  
Fireproofing  
Semiconductor  
Steel  
Aluminum  
Aerospace  
Chemical

## Departments

Research & development  
Quality assurance

## 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

<b>Data Acquisition System</b>	<b>Qty</b>
HP 3852A .....	1
HP 3853A .....	1
Integrating DVM .....	1
Relay multiplexer channels .....	10-40
Strain gage multiplexer channels .....	10-20
Counters .....	2-8
Stepper motor controller channels .....	2-6
Actuators .....	5-30

## 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**

## INSTRUMENTATION

**Integrating DVM  
Relay multiplexer  
Actuator**

**Integrating DVM  
Relay multiplexer with  
thermocouple compensation  
Voltage D/A converter  
Actuator**

**Integrating DVM  
Strain gage multiplexer  
Counter  
Stepper motor controller  
Voltage D/A converter**