



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G05D 23/24		A1	(11) International Publication Number: WO 96/05545
			(43) International Publication Date: 22 February 1996 (22.02.96)
(21) International Application Number: PCT/US95/08968		(81) Designated States: BR, CA, CN, JP, KR, <u>SG</u> European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 21 July 1995 (21.07.95)			
(30) Priority Data: 08/289,554 / 12 August 1994 (12.08.94) US		Published With international search report.	
(71) Applicant: E.I. DU PONT DE NEMOURS AND COMPANY [US/US]; 1007 Market Street, Wilmington, DE 19898 (US).			
(72) Inventor: MOESSNER, Richard, Crosby; 13907 Beechwood Point Road, Midlothian, VA 23112-2534 (US).			
(74) Agents: TULLOCH, Rebecca, W. et al.; E.I. Du Pont de Nemours and Company, Legal Patent Records Center, 1007 Market Street, Wilmington, DE 19898 (US).			

86 9700678-7 RTMP
COPY{ ① SR
② IPER + Annexes

(54) Title: TEMPERATURE CONTROL OF NEAR-INFRARED ANALYZER

(57) Abstract

A preferred temperature control strategy was devised to remove heat from the analyzer and control the optical bench temperature continuously at aim. A foil-type RTD temperature detector is fastened to the optical bench to serve as a measurement input device for a PID control strategy, which is truly aim-seeking. The control strategy employs a heat pipe technology to remove heat from the analyzer enclosure. A heat pipe utilizes a fluid (such as an alcohol) to remove heat by evaporation of the fluid at an internal air circulation heat exchanger and then recondensing the fluid at an external air circulation heat exchanger. The PID temperature controller achieves the desired temperature setpoint by manipulation of heat exchanger fan speeds. The heat removal rate can be very precisely controlled. In practice, both heat exchanger fans could be controlled together; however, to achieve optimal internal temperature uniformity, the internal heat exchanger fan is maintained at full speed and just the external fan is controlled to adjust heat removal rate. Optical bench temperature control is maintained to plus or minus 0.1 degree C vs. a typical temperature control band of plus or minus 2 degrees C.

