

COMPARISON OF TWO SYSTEMS FOR THE INSTRUMENTATION OF ROTARY TABLET MACHINES

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Two systems of instrumentation have been applied to a Manesty D3 rotary tablet machine.

- A) A piezo-electric transducer mounted on the top roll-pin support. A sensing probe was fitted between the transducer surface and the roll pin so that the vertical component of the compression force was transmitted to the transducer. (British Patent No. 1216399)
- B) Strain gauges bonded to the top punch close to the tip. The output was transmitted by a telemetry system (Shotton 1963) (Wray 1969). The power supply pack and aerial were mounted on the outside of the turret head top punch carrier and rotated with it. The pick up unit was fixed to the vertical support column so that with the machine in motion, the distance between the transmitter aerial and the unit was a constant 5 cm.

Both methods of instrumentation permit operation of the compression machine at normal speed with a full set of punches.

Both systems allow measurement of:-

- A) Overall duration of pressure cycle (contact time)
- B) Duration of maximum applied force (Dwell time)
- C) Rate of increase of applied force.

In order to measure the changing forces at the punch tip during a complete compression cycle, it is essential that a constant scaling factor exist between the punch tip force and the output of the measuring system. To investigate this point, calibration was carried out by compression of a standard load-cell placed between the tips of the upper and lower punches and recording the outputs on U.V. sensitive paper. The response of each system was then examined by statistical comparison of its amplitudes with that of the standard load-cell at nine equally spaced time intervals over a complete compression cycle.

TABLE 1

Results of the statistical analysis of the amplitude of the output of the systems as compared to the standard load cell.

r = correlation coefficient, b = Regression coefficient

Applied Force Newtons	Piezo-Electric Transducer system			Strain gauge telemetry system		
	r	b	% Fit	r	b	% Fit
10000	0.951	2.549	90.4	0.998	0.674	99.5
15000	0.923	1.545	85.1	0.999	0.656	99.8
25000	0.965	0.930	90.4	0.999	0.648	99.7

The results in Table 1 show that the system of a strain gauge coupled to the radio telemetry system is a more accurate indicator of the output of the standard load-cell and is thus a better method for the measurements intended. This technique is applicable to studies of compression characteristics of granules on all types of tablet machines.

Shotton E, Deer J J, Ganderton D, J Pharm. Pharmacol., 15 (1963), 106T
Wray P E., (1969) St. John's University Pharmacy Congress