

LABORATORY / PRODUCTION

CALEVA

THE MIXER TORQUE RHEOMETER

TECHNICAL SPECIFICATION



CALEVA THE MIXER TORQUE RHEOMETER

DESCRIPTION

The Caleva MTR is well-established as a valuable formulation development, formulation research and production quality control tool. It provides a quantitative and reproducible measurement of the wet mass in terms of the torque produced when shearing the granulation within the pivoted mixing bowl. This ability allows formulations to be optimised and product and excipient quality issues to be identified.

MAIN USES

The MTR-3 is designed to enable the user to quantify the consistency properties of a wet mass. This has important implications as shown below.

• Formulation development:

The speed of pharmaceutical formulation development and testing can be improved. The relationship between both simple and complex formulations with different binders and mixing times can be described with quantitative results facilitating investigations into the problems surrounding the development of formulations. Formulations can be



optimised to compensate for batch variations between formulation excipients

Scale up

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Quantitative data is generated that can be used in a structured scale-up program for process development.

O Production

Product batches can be routinely tested for consistency in a few minutes (as a predictor of final product quality). Thus eliminating the need to have lengthy routine production stoppage thus increasing the effective use of capital equipment.

Easy to dismantle and clean, the MTR-3 uses a limited amount of bench space whilst being a powerful work horse for product development

MODES OF OPERATION

The functions of the MTR-3 are divided into three experiment types;

O Multiple Addition

Multiple addition is used to rapidly determine rapidly an estimate for the optimum binder ratio for a given formulation. Optimum meaning the binder ratio at which the Mean Line Torque and therefore the consistency is at a maximum value.

Materials studied using the Mixer Torque Rheometer exhibit an increase in measured torque values with increasing water content, rising to a maximum thereafter decreasing as a slurry is produced.

O Variable Mix Time

The multiple addition experiment described above is valuable as a rapid means of estimating binder ratio. It does, however give only a limited description of the mixing kinetics of a formulation. The reason for this is that the effect of increasing binder ratio is superimposed on the effects of the combined mixing time. By the end of a 20 step multiple addition experiment the mass has been worked considerably and more importantly the mass has been worked for a different length of time at each addition. In some instances the length of time for which a formulation is mixed is vital.

Within a variable mix time experiment the torque figure for the empty bowl is measured then the dry powder is added and again the torque is logged. Then all the binder is added at once and the mixture is logged at user defined intervals, say every minute for ten minutes.

Once a series of experiments have been carried out at various binder ratios a three dimensional plot can be produced (as shown) giving an indication of the torque response of a formulation with respect to both binder ratio and mixing time.



Consistency

The consistency test is used to verify

the properties of wet powder masses produced in larger scale mixer/granulator systems. It may be used simply as a quality control tool or as part of a scale up strategy to predict mixing end-points.

The torque figure for the empty bowl is measured and then the wet powder mass is added to the bowl. The material is mixed for a short time to ensure homogeneity before the torque measurement is taken.

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MECHANICAL

- Size: Approximately 670 mm d x 400 mm w x 400 mm h. Space for a laptop computer is also required
- O Weight: Approximately 35 kg
- O Cabinet: Brushed 304 stainless steel
- O Product contact parts: 316L stainless steel and approved plastics

SUPPLIED STANDARD WITH:

- O Installation and operating manual
- Product contact parts list
- O Plain mixing bowl (water jacketed option available) with one set of mixing blades
- O Automatic dosing pump and accessories
- O Laptop computer with software installed
- Additional full copy of the necessary software

OPERATIONAL AND DATA COLLECTION

- O Single Phase 220/240v (or 110/120) according to customer requirement
- O Load transducer to 5 kg as standard
- O Electronic motor drive and speed control
- O Primary shaft speed 10 rpm to 250 rpm
- O Emergency Stop
- O Safety interlocked polycarbonate safety cover
- O Standard torque range from 0 to 5Mn

DATA COLLECTION AND MANIPULATION

Data generated can be retrieved as "csv" files for import into a database or spreadsheet program. Data from different experiments can be overlaid on a single screen allowing visual **comparisons to be made easily**. Intuitive operating system with easy storage and management of data files.

TALK TO US

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Cert No. 1503 ISO 9001