

MIE III

(Minimum Ignition Energy)

Apparatus

Data from the Minimum Ignition Energy test is employed to determine the smallest quantity of energy as a capacitive spark, which will cause a cloud of powder product, to ignite (explode). A capacitive spark is appreciated internationally as being representative of the kind of electrostatic discharge that could occur on plant. This test method provides sparks of various known energies to be produced through the test sample and permits testing in accordance with IEC 61241-2-3, BS5958, ASTM E2019 and VDI Fortschritt-Berichte Reihe 3 Nr 134.



MIE DEVELOPMENT

Companies who handle many powdered materials whether they are in raw, intermediate or finished form need to perform risk assessments in order to identify the basis of safety for their process plant. One of the requirements under ATEX 137 (EU Directive) and DSEAR 2002 is to consider the likelihood that ignition sources, including electrostatic discharges, will be present and become active and effective. Other risks also have to be considered and Chilworth Technology can supply equipment to provide additional supporting data for flammability of the product, operational procedures within the workplace, etc..

If eliminating ignition sources is established as being the basis of safety then knowledge of Minimum Ignition Energy (MIE) data for your powdered materials is crucial to assessing the safety aspects of their manufacture, handling and storage. Very often such information does not appear on Material Safety Data Sheets.

Chilworth Technology Ltd can supply a Minimum Ignition Energy test apparatus for your process safety or hazardous evaluation laboratories. Purchasing the equipment for in-house testing is a cost effective solution for companies who have numerous sample quantities to assess. Installation is simple and operator training can be completed in one day.

MIE TEST APPARATUS SPECIFICATION

The apparatus comprises two main items a dispersion system and an energy storage / breakdown voltage monitoring unit. The dispersion system consists of a 1 litre glass Hartmann tube mounted on a polished stainless steel housing (for ease of cleaning) containing the air dispersion control system (nominally 7 bar). The dispersion system is designed for operation within a standard laboratory fume extraction cupboard. A remote handset which operates the ignition arc (when option 1 purchased) and air dispersion is connected by cable to the dispersion base. Power requirements = 100-120v 60Hz or 220-240v 50Hz 295 VA

Energy storage / breakdown voltage monitoring unit is housed within a 9U, 19" rack. A 10 – 15kV stabilised high voltage dc power supply delivers EHT to charge a bank of capacitors. The bank of capacitors comprises 29 selectable devices of various values to enable discharge energies of less than 4mJ to 2 Joules, in steps of 1mJ, to be achieved. Power requirements = 100-120v 60Hz or 220-240v 50Hz 120VA. The breakdown voltage monitoring unit permits the high voltage breakdown across the electrodes to be measured. A chart recorder (1.5V = 15kV full scale) is supplied as standard and is connected to the output terminals of this unit for accurately monitoring the breakdown voltage.

The standard dispersion/arc system supplied is based upon the trickle charge method of MIE determination. Please see option 2 overleaf for moving electrode possibilities. The resulting data is very comparable between the two methods.

MIE III Apparatus

Continued from overleaf...

OPTION 1: CONSTANT ARC A/B SCREENING POWER SOURCE

This screening equipment simply connects to the Hartmann tube, with the energy storage/breakdown monitoring unit disconnected, and provides an ideal Yes (Explosive) or No (non explosive) answer for quick screening purposes prior to conducting a full MIE test.

OPTION 2: MOVING ELECTRODE DISPERSION BASE

Permits MIE testing using the moving electrode (acrylic tube) technique of MIE testing. For existing clients, dispersion bases may be modified to incorporate the moving electrode control electronics. Both fixed (trickle charge method) and moving electrode method of Minimum Ignition Energy testing are possible with this optional dispersion base. If moving electrode operation is selected (selectable from the front panel switch), the front panel timer may be adjusted for researching various time intervals between powder dispersion and arc. This feature is particularly beneficial to process research establishments and Universities who require the added flexibility in MIE operation in order to cover a wide range of test scenarios. Both test methods are acceptable internationally and give comparable Niacinamide round robin sample test results.

For clients who wish only to screen products rather than conduct full MIE series tests, a dispersion base and constant arc power source (AB Screening apparatus) can be supplied to permit higher energy screening of products to be performed.

THE BENEFITS

- Competitively priced
- You can identify those powders capable of producing a dust explosion
- You can identify powders at risk of ignition by electrostatic sparks from operators, plastic equipment and metal plant.
- Powders of ignition energy less than 4mJ can be identified, permitting appropriate precautions to be taken on plant
- You have total control of your testing schedules
- Conforms to principal European and US standards
- Easy to operate; minimal training is required
- Chilworth MIE apparatus incorporates added flexibility of high voltage control, electrode gap adjustment to investigate possibilities that a shorter arc gap might be more conducive to ignition, dispersion pressure and fixed or moving electrode testing
- Very fine incremental energy storage selections are possible
- Full 12 month warranty (excludes consumables such as burst discs and Hartmann tubes)
- Annual maintenance contracts available.

Chilworth Technology provide a whole range of test apparatus designed to provide material data to internationally recognised standards

Testing to GLP Standard



Consultancy



Training



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