

# Time Pressure Test Apparatus



*Some powders are deliberately manufactured to possess highly energetic behaviour, but occasionally it is an unexpected property of a new material. For regulatory compliance there are a number of prescribed tests which have to be performed on new materials in order that the characteristics of the materials are understood and that they can be handled and safely transported. One such procedure is the Time/Pressure test, which examines how a material behaves when it is ignited in a confined enclosure.*

## TEST APPARATUS FOR REGULATORY COMPLIANCE

The Time/Pressure Test apparatus is used to examine how solids (including paste-like and gel-type) substances or liquids behave when it is ignited under confinement. The objective is to determine if the ignition leads to deflagration with explosive violence at pressures which can be reached with substances in normal commercial packages.

The test apparatus complies with the UN Transport of Dangerous Goods Manual of Tests and Criteria 2003 (4th revision) and also to the Classification, Packaging and Labelling of Dangerous Substances in the EU Part 2- testing methods. The method employed in both standards is used in conjunction with data from the Heating Under Confinement Test (Koenen Tube Test) and the Shock Sensitivity Test (UN Gap Test) to answer the question 'Is the material an explosive substance' or 'Is the substance too insensitive for acceptance into Class 1'.

Additionally, deflagration propagation rate data is also generated which, in the case of self-reactive substances and organic peroxides, enables the question 'does the material propagate a deflagration?' to be answered. Again the data, when combined with that from the Koenen Tube test enables package size, the choice of symbol, indications of danger and choice of risk phrases associated with new and existing products to be assigned.

## TIME PRESSURE TEST APPARATUS DESCRIPTION

The testing is conducted according to the UN Transport of Dangerous Goods Recommendations Tests and Criteria, Test 1 (c) (i), Test 2 (c) (i) or Test C.1. This apparatus has been developed further during 2004 and now incorporates an integral fuse-head ignition control and high speed USB acquisition card, all housed within a single unit. The equipment comprises the following parts:

**Pressure Vessel:** The unit comprises a cylindrical steel pressure vessel equipped with a pressure take off in the form of a side-arm and pressure transducer (5khz response). One end of the pressure vessel is closed with a firing plug which is fitted with two electrodes for the firing mechanism. The other end is closed by an aluminium bursting disk held in place with a retaining plug. A support stand holds the assembly at the correct angle during use.

**Control Unit (NEW):** The control unit contains the fuse-head ignition power supply and control circuitry, the pressure monitor and data acquisition (via USB connection).

**Software (NEW):** The bespoke software ensures that experimental configuration is easy. Conducting the test is simple, with fuse head activation and data acquisition being performed automatically at the single press of a button. Experimental data input is via a standard pc offering a number of fields for experimental identification. Graphical data manipulation is also available with facilities for printing hard copy.

# Time Pressure Test Apparatus

## APPARATUS SUPPLIED AND SPECIFICATION

- Pressure vessel, side arm and stand
- Pressure transducer (0-10v, 0-500psi, 5khz response time)
- Control unit (fuse head activation and data acquisition hardware) + pressure monitor calibrated in psi
- Set of lead washers
- Set of aluminium rupture discs
- Personal computer (current up to date specification)
- LCD monitor
- Time Pressure test software program (1khz acquisition rate as per UN requirements)

Consumables such as fuse heads and primed cambric, used as the ignition source will normally be obtained locally by the user. However in the event that this is not possible please contact Chilworth Technology Ltd who may be able to assist subject to national restrictions.

## THE BENEFITS

- Very simple to use
- Automatic single push button operation of igniter and software program initialisation
- Minimal laboratory space required
- Robust
- Competitively priced
- Full 12 month warranty covering all parts (excludes primed cambric, fuse heads, rupture discs, lead washers and other consumables).

## CONTACT

### Chilworth Technology Ltd

Beta House,

Southampton Science Park,

Southampton, SO16 7NS, UK

Tel: +44 (0)23 8076 0722

Fax: +44 (0)23 8076 7866

Email: [info@chilworth.co.uk](mailto:info@chilworth.co.uk)

Web: [www.chilworth.co.uk](http://www.chilworth.co.uk)

**France:** Chilworth SARL, Saint Vulbas

Tel: +33 (0)4 74 46 23 51 Email: [info@chilworth.fr](mailto:info@chilworth.fr) Web: [www.chilworth.fr](http://www.chilworth.fr)

**India:** Chilworth Safety & Risk Management (Pvt) Ltd,

Chennai Office; Tel: +91 (0)44 4212 5445

Mumbai Office; Tel: +91 (0)22 6694 2350

New Delhi Office; Tel: +91 (0)11 2613 6979

Email: [info@chilworth.co.in](mailto:info@chilworth.co.in) Web: [www.chilworth.co.in](http://www.chilworth.co.in)

**Italy:** Chilworth Vassallo Srl, Valmadrera

Tel: +39 0341 583 475 Email: [info@chilworth.it](mailto:info@chilworth.it) Web: [www.chilworth.it](http://www.chilworth.it)

**USA:** Chilworth Technology Inc, New Jersey

Tel: +1 609 799 4449 Email: [safety@chilworth.com](mailto:safety@chilworth.com) Web: [www.chilworth.com](http://www.chilworth.com)

Chilworth Pacific Fire Laboratories Inc, Kelso

Tel: +1 360 423 1220 Email: [fire@chilworthpacific.com](mailto:fire@chilworthpacific.com) Web: [www.chilworthpacific.com](http://www.chilworthpacific.com)

## Testing to GLP Standard



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**For further information telephone +44 (0)23 8076 0722**