

## A.16. RELATIVE SELF-IGNITION TEMPERATURE FOR SOLIDS

### 1. METHOD

#### 1.1 INTRODUCTION

Explosive substances and substances which ignite spontaneously in contact with air at ambient temperature should not be submitted to this test.

The purpose of this test is to provide preliminary information on the auto-flammability of solid substances at elevated temperatures.

If the heat developed either by a reaction of the substance with oxygen or by exothermic decomposition is not lost rapidly enough to the surroundings, self-heating leading to self-ignition occurs. Self-ignition therefore occurs when the rate of heat -production exceeds the rate of heat loss.

The test procedure is useful as a preliminary screening test for solid substances. In view of the complex nature of the ignition and combustion of solids, the self-ignition temperature determined according to this test method should be used for comparison purposes only.

#### 1.2. DEFINITIONS AND UNITS

The self-ignition temperature as obtained by this method is the minimum ambient temperature expressed in °C at which a certain volume of a substance will ignite under defined conditions.

#### 1.3. REFERENCE SUBSTANCE

None.

#### 1.4. PRINCIPLE OF THE METHOD

A certain volume of the substance under test is placed in an oven at room temperature; the temperature/time curve relating to conditions in the centre of the sample is recorded while the temperature of the oven is increased to 400 °C, or to the melting point if lower, at a rate of 0,5 °C/min. For the purpose of this test, the temperature of the oven at which the sample temperature reaches 400 °C by self-heating is called the self-ignition temperature.

#### 1.5. QUALITY CRITERIA

None.

#### 1.6. DESCRIPTION OF THE METHOD

##### 1.6.1. Apparatus

##### 1.6.1.1. Oven

A temperature-programmed laboratory oven (volume about 2 litres) fitted with natural air circulation and explosion relief. In order to avoid a potential explosion risk, any decomposition gases must not be allowed to come into contact with the electric heating elements.

##### 1.6.1.2. Wire mesh cube

A piece of stainless steel wire mesh with 0,045 mm openings should be cut according to the pattern in figure 1. The mesh should be folded and secured with wire into an open-topped cube.

##### 1.6.1.3. Thermocouples

Suitable thermocouples.

##### 1.6.1.4. Recorder

Any two-channel recorder calibrated from 0 to 600 °C or corresponding voltage.

#### 1.6.2. Test conditions

Substances are tested as received.

#### 1.6.3. Performance of the test

The cube is filled with the substance to be tested and is tapped gently, adding more of the substance until the cube is completely full. The cube is then suspended in the centre of the oven at room temperature. One thermocouple is placed at the centre of the cube and the other between the cube and the oven wall to record the oven temperature.

The temperatures of the oven and sample are continuously recorded while the temperature of the oven is increased to 400 °C, or to the melting point if lower, at a rate of 0,5 °C/min.

When the substance ignites the sample thermocouple will show a very sharp temperature rise above the oven temperature.

### 2. DATA

The temperature of the oven at which the sample temperature reaches 400 °C by self-heating is relevant for evaluation (see figure 2).

### 3. REPORTING

The test report shall, if possible, include the following information:

- a description of the substance to be tested,
- the results of measurement including the temperature/time curve,
- all additional remarks relevant for the interpretation of the results.

### 4. REFERENCES

- (1) NF T 20-036 (September 85). Chemical products for industrial use. Determination of the relative temperature of the spontaneous flammability of solids.

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This method can be found in Dir 92/69/EEC (O.J. L383 A)  
A complete list of Annex V Testing Methods and the corresponding OJ can be downloaded from a previous page in this site.

Figure 1  
Pattern of 20 mm test cube

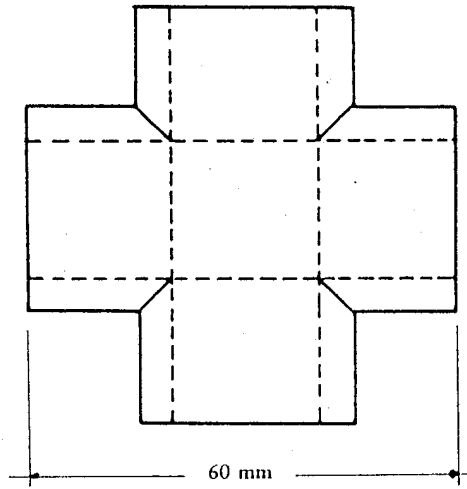


Figure 2  
Typical temperature/time curve

