

---

Method of test for

# Determination of the punking behaviour of phenol-formaldehyde foam

---

Méthode d'essai pour déterminer le potentiel de brûler sans flamme de la  
mousse de phénol-formol

Prüfverfahren zur Bestimmung des Glühzündverhaltens von Phenol-Formaldehydschaum

<b>Contents</b>		<b>Page</b>		<b>Page</b>
Foreword	Inside front cover		7. Conditioning	1
Cooperating organizations	Back cover		8. Procedure	1
			9. Expression of results	2
<b>Method of test</b>			10. Test report	2
0. Introduction		1	<b>Figures</b>	
1. Scope		1	1. Cubical wire case to contain test piece	2
2. References		1	2. Arrangement of test assembly	3
3. Reagent		1	3. Typical graph showing non-punking behaviour	4
4. Apparatus		1	4. Typical graph showing punking behaviour	4
5. Test pieces		1		
6. Number of test pieces		1		

## Foreword

This British Standard has been prepared under the direction of the Plastics Standards Committee and the Rubber Standards Committee.

The standard provides a method of test for the determination of the punking behaviour of phenol-formaldehyde foams intended for use in thermal insulation.

British Standard Method of test for

# Determination of the punking behaviour of phenol-formaldehyde foam

## 0. Introduction

The incidence of punking is observed in some phenol-formaldehyde foams and consists of a slow combustion (smouldering) initiated by the localized application of a source of heat. Propagation of the combustion front continues without the further outside application of heat until the foam is reduced to a carbonaceous char.

The phenomenon of punking is not well understood and further research into the factors involved is required. This standard method of test is therefore only empirical, but it provides the best guide at present available on the punking behaviour of any given phenol-formaldehyde foam formulation. Reproducibility of results has been confirmed by interlaboratory comparison.

## 1. Scope

This method of test is applicable to slab stock phenol-formaldehyde foams for use in thermal insulation. It provides a means of distinguishing between punking and non-punking foams.

The test method described in this standard is primarily for the purposes of monitoring the consistency of production of phenol-formaldehyde foams. Its use gives an indication of the punking or non-punking behaviour of the material. **In no circumstances should the test results thus obtained be considered as an overall indication of the potential fire hazard presented by the foam under actual conditions of use.**

## 2. References

The titles of the standards publications referred to in this standard are listed on the inside back cover.

## 3. Reagent

**3.1 Commercial grade propane**, complying with the requirements of BS 4250.

## 4. Apparatus

**4.1 Wire cage.** A cubical wire cage of side 125 mm and mesh 25 mm with open top (see figure 1).

**4.2 Temperature indicator.** Two temperature indicators,  $T_1$  and  $T_2$ . These may be either mercury-in-glass thermometers with ranges 0 °C to 360 °C or thermocouples connected to a chart recorder.

NOTE. If thermocouples are used, they should have the same thermal capacity as mercury-in-glass thermometers.

**4.3 Bunsen burner**, 9 mm internal bore, capable of being fuelled with commercial grade propane (3.1).

**4.4 Stop-watch.**

## 5. Test pieces

The test piece shall be a cube of side  $120 \pm 5$  mm and shall be cut, without deformation of the original cell structure, to give surfaces free from skins, voids or blemishes. The dimensions shall be determined by method 1 of BS 4370 : Part 1 : 1968.

## 6. Number of test pieces

Two test pieces shall normally be tested from each sample of foam. For material suspected of being grossly anisotropic, one set of two test pieces shall be tested with the vertical faces parallel to the suspected direction of anisotropy and a second set of two test pieces shall be tested with the horizontal faces parallel to the suspected direction of anisotropy.

## 7. Conditioning

Test pieces shall be conditioned for a period of not less than 16 h at  $23 \pm 2$  °C and  $50 \pm 5$  % r.h. immediately before testing.

## 8. Procedure

Place the test piece in the wire cage (4.1) avoiding any significant deformation of the cell structure. Insert the temperature indicators (4.2) into the test piece in the positions indicated in figure 2. Support the assembly in a draught-free environment in such a position that the top of the bunsen burner (4.3) is 25 mm below the centre of the test piece. Remove the burner and connect it to a source of commercial grade propane (3.1). Adjust the flame until it is just non-smoky and is 50 mm in length. Re-position the ignited burner underneath the test assembly and start the stop-watch (4.4). Monitor and record the test piece temperatures either autographically if using thermocouples, or at appropriate intervals if using thermometers and the stop-watch.

Remove the bunsen burner when the temperature indicator ( $T_1$ ) nearest to the heating source registers 180 °C. Continue to record the temperature at each of the temperature indicators ( $T_1$  and  $T_2$ ) either until each exceeds 360 °C or until a fall in temperature to below 100 °C is registered at  $T_1$ .