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Attention Mr M Backham

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18 May 2000

Dear Sir

Re: Fire resistance test TE 94134

I am writing to briefly report the results of a fire resistance test carried out in accordance with European Standard BS EN 1366-2:1999 on an ActionAir multi-blade fire damper, nominally 1000mm x 1000mm, model Smoke/Shield PTC 501 + 1/F, on 21 March 2000.

The test was conducted at the LPC Laboratories, Borehamwood for a duration of 125min.

The specimen tested consisted of a stainless steel, thirteen-blade damper within a galvanised steel casing mounted using a HEVAC/HVAC installation frame fitted with two builder's ties along each side. The specimen was installed in an opening, nominally 1170mm wide x 1190mm high, in a 150mm-thick aerated concrete block wall built within a heavily reinforced test frame having a nominal aperture of 3050mm x 3050mm.

The fire damper comprised a continuous series of thirteen interlocking double-skin blades, each approximately 985mm long x 80mm wide, contained within, and arranged to close, the aperture of the surrounding casing. The damper blades were designed to interlock with each other, and seal using a synthetic blade seal. The spigot of the damper casing on the unexposed face of the unit was extended by 500mm and fitted with a flange to permit attachment to a connecting duct, nominally 1000mm high x 1000mm wide x 1500mm long, which was in turn connected to an airflow measuring system. A 24-volt electro-magnetic actuator mechanism was employed to open and close the damper, being linked to an electrical thermal fuse, screwed to, and penetrating the extension piece.

Prior to carrying out any leakage tests, the unit was subjected to 50 opening and closing cycles. This involved setting the damper to its open position and then manually triggering the release assembly to close the damper by its own mechanism. The leakage measurements at ambient temperature were carried out on 20 March 2000, prior to the fire test.

The temperature on the unexposed face of the test construction was measured using a total of fourteen chromel/alumel thermocouples attached to the damper casing and to the supporting construction. In addition to the thermocouples attached to the test construction, two thermocouples were set in the airflow measuring system. At the request of the sponsor, two further thermocouples were positioned on the actuator casing.

The furnace temperature was measured by means of four bare wire plate thermometers set at a distance of 100mm from the exposed face of the test construction. The furnace was controlled using the mean of the four furnace plate thermometers to follow the temperature/time relationship specified in BS EN 1363-1:1999.

During the course of the test, the control fan was continuously adjusted to maintain a pressure differential of 300Pa across the damper. The pressure differential across the orifice plate was recorded throughout the course of the test and was used, together with the temperature data recorded adjacent to the orifice plate, to calculate the leakage rates during the course of the test.

The leakage of the damper at ambient temperature prior to the test was calculated to be 32.0m^3/hr.

Observations made during the test are given in Table 1. Unless stated otherwise they are of the unexposed face.

Table 1 Observations

Time min : s	Observations
0:00	Test started.
0:53	Damper fully closed.
8:00	Shrinkage of mortar fill to underside of spigot and along right hand side (RHS), hairline cracks developing.
9:40	Moisture vapour escaping from RHS hairline crack.
12:00	Moisture vapour escaping from hairline crack along mortar fill at underside of spigot.
15:00	Exposed face - Blades glowing a dull red.
16:00	Crack to underside of damper along supporting construction increasing to approx. 2mm wide x 500mm long. Red glow to edges of damper blades visible.
19:00	Water vapour escaping from small crack below actuator.
20:00	Red glow visible through gap noted at 8min, along underside of spigot supporting construction.
23:00	Thermal device penetrating LHS of spigot, starting to melt.
29:00	Lower 1/3 of damper blades glowing red. Melting of thermal device noted at 23min continuing and unit separating from mounting plate.
35:00	Red glow visible through gap along topside of spigot supporting construction.
44:00	Thermal switch continuing to melt.
60:00	Thermal switch fully melted and collapsed against outside face of spigot.
64:30	Leakage failure - 201m3/hr leakage recorded through damper. Small gap visible between top row of blades and spigot casing.
74:00	Galvanised coating yellowing to top of damper and spigot.

Table 1 Observations (continued)

Time min : s	Observations
103:00	Casing to underside and LHS of damper glowing red. Blades fully red. HVAC casing expanding at corners.
106:00	Thermocouple positioned at underside of unit, mounted on casing (reference Dc), detached.
120:00	Gap to RHS between casing and mortar approx. 3-4mm wide. Test stopped at request of sponsor.

The mean and maximum temperature data of the specimen is shown in Figures 1 and 2. The airflow leakage through the damper is shown in Figure 3.

Whilst the test data accompanying this letter related to a test which was conducted fully in accordance with European Standard BS EN 1366-2:1999, the presentation of the results in summarised form by way of this letter does not satisfy the requirements of the Standard. The presentation of the results in this way is by agreement with the sponsor who wishes to use the information for his own internal use only.

I trust the information provided is sufficient for your needs. Should you require any further information please do not hesitate to contact us.

Yours faithfully

C.M. Crook
Technical Officer, Building Products
LPC Laboratories

Richard A. Jones
Section Manager, Building Products
LPC Laboratories

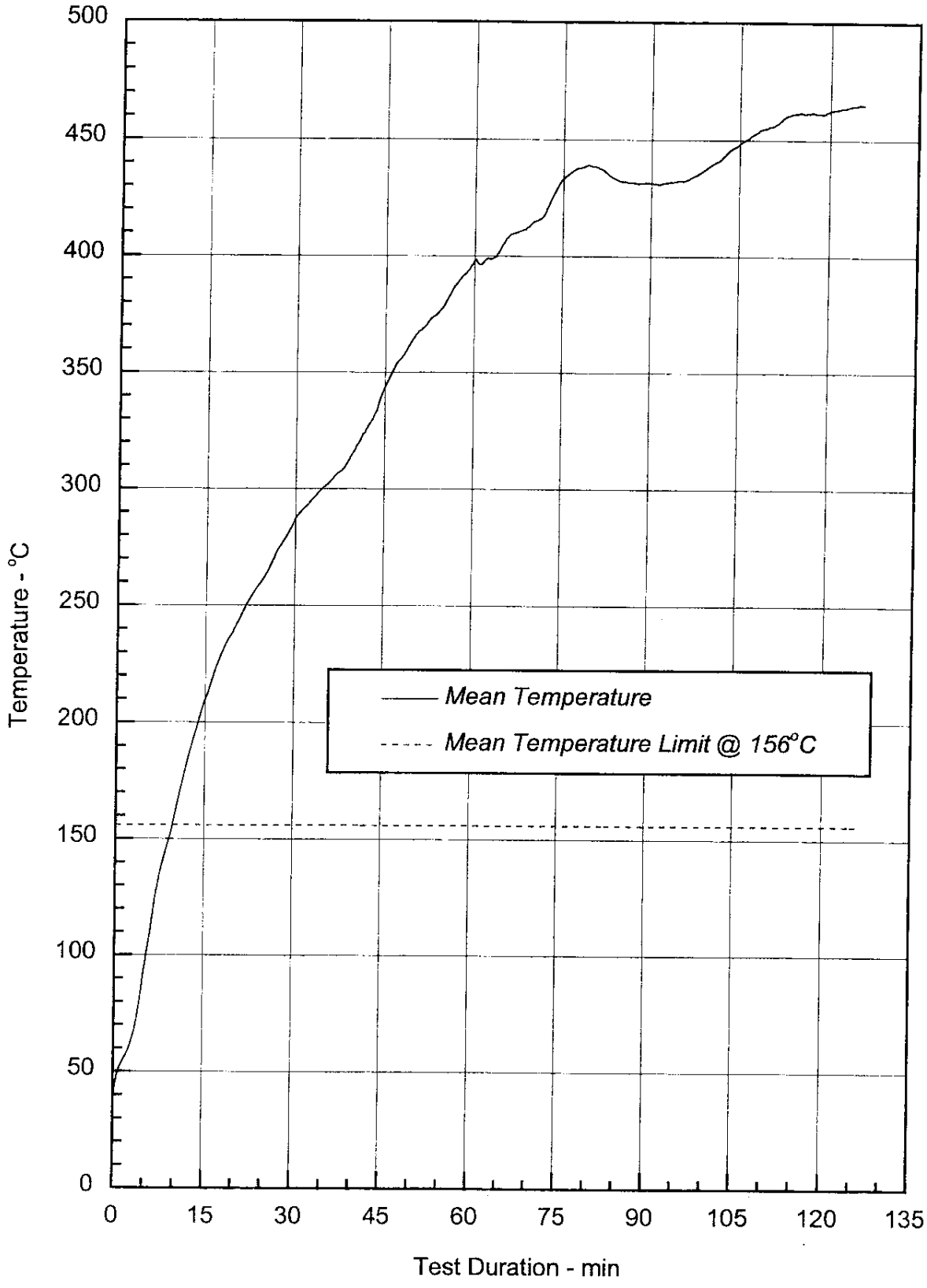

Figure 1 Mean face temperature recorded by thermocouples nos. 87-90

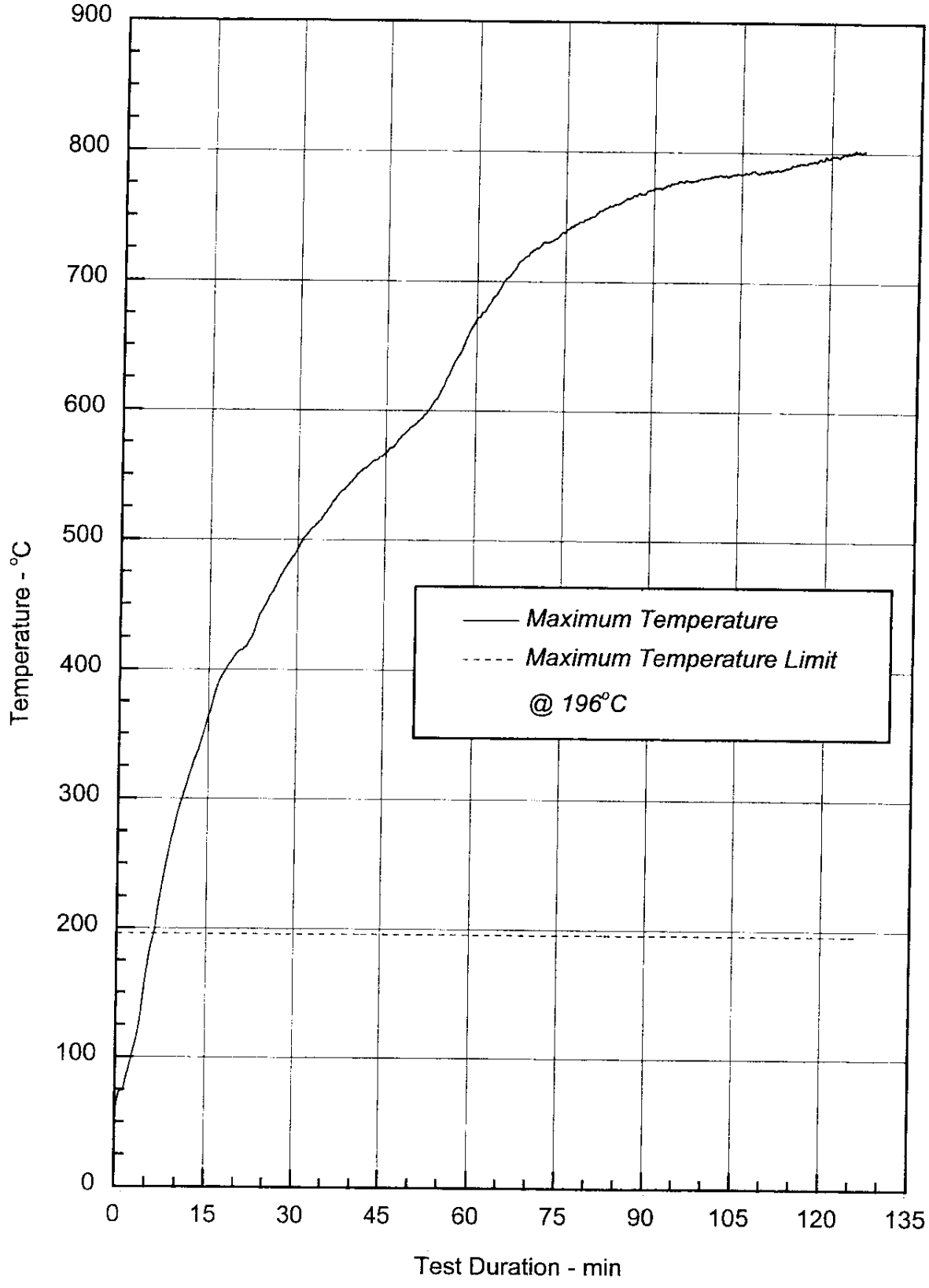

Figure 2 Maximum face temperature recorded by thermocouples nos. 77-90

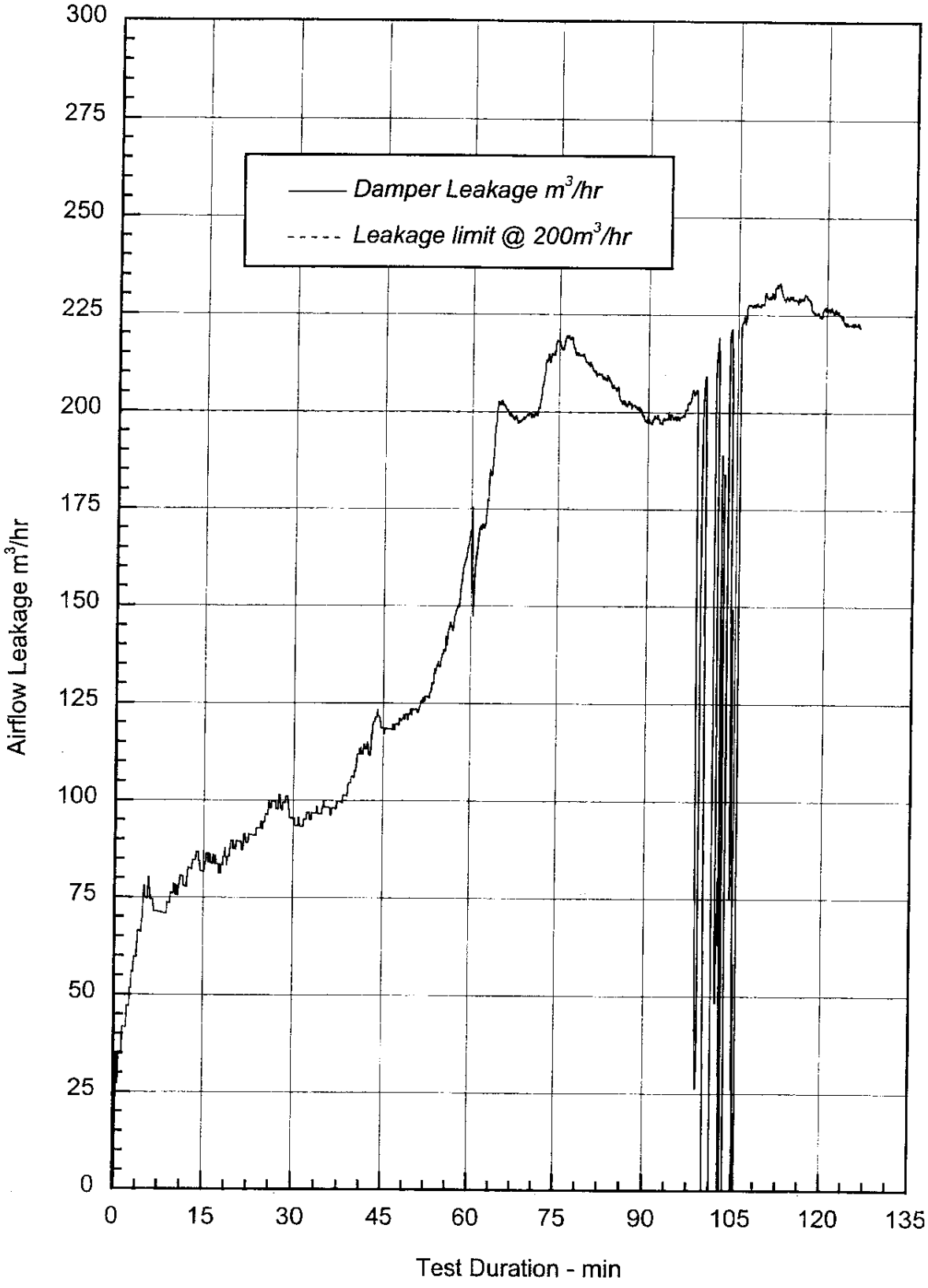

Figure 3 Airflow leakage through damper