

The Fire Performance of Doorsets Incorporating  
'Pyroplex Rigid and Flexible' Intumescent Seals

Report for  
Reddiplex Group PLC

THE PROFESSIONALS IN FIRE SAFETY •

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CONSULTANCY • TESTING

KC(5585)

Holmesfield Road, Warrington, UK WA1 2DS • Tel: 01925 655116 • Telex 629743 WARRES G • Fax: 01925 655419

The Fire Performance of Doorsets Incorporating  
'Pyroplex Rigid and Flexible' Intumescent Seals

1 Introduction

- 1.1 This report presents a considered opinion regarding the fire resistance performance of timber and steel based doorsets, similar to the specification of previously fire tested doorsets, but modified to include intumescent seals manufactured by Reddiplex Group PLC. The seals are referenced 'Pyroplex Rigid or Flexible' and may be provided in various dimensions, colours and carriers in place of the previously fire tested seals.
- 1.2 The modified doorsets are required to provide a fire resistance period of 30 minutes and 60 minutes, dependant upon the doorset construction and the intumescent seal specification, with respect to the performance criteria for integrity and insulation (where applicable) as specified in BS 476: Part 22: 1987.
- 1.3 The data referred to in Appendix 1 has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 64A, 1993.

2 Assumptions

- 2.1 It is assumed that the proposed 'Pyroplex Rigid or Flexible' intumescent seals will be installed into timber and steel based doorsets which have previously been shown to be capable of providing 30 or 60 minutes integrity, in the required door leaf configuration, when tested by a NAMAS/UKAS approved fire test laboratory in accordance with BS 476: Part 22: 1987.
- 2.2 It is also assumed the doorsets will be fixed to a suitable masonry wall construction, i.e. similar to that used for the fire tested assembly which has been found by separate fire test to be capable of providing the required period of fire resistance.
- 2.3 Door leaf to frame clearance gaps can have a significant effect on the overall fire performance of a timber doorset. It is, therefore, assumed that the leaf to frame clearance gaps will not exceed 3.5 mm in any case when measured along the hanging stile, meeting edges or top edge of the door leaf to frame junction.

3 Discussion

Proposals

- 3.1 It is proposed that 'Pyroplex Rigid or Flexible' intumescent seals may be fitted to previously fire tested timber and steel doorsets which have been shown to be capable of providing 30 minutes integrity when tested at a NAMAS/UKAS approved fire test laboratory, in place of the previously tested intumescent seals.
- 3.2 It is further proposed that 'Pyroplex Rigid or Flexible' intumescent seals may be fitted to previously fire tested timber and steel doorsets which have been shown to be capable of providing 60 minutes integrity when tested at a NAMAS/UKAS approved fire test laboratory, in place of the previously tested intumescent seals.

- 3.3 In addition, it is proposed that the intumescent seals may be fitted within the leaf or frame of the proposed doorset.
- 3.4 The proposed seals for 60 or 30 minutes integrity applications may have a variety of attributes as follows:
- i) The seals may be supplied in nominal overall thicknesses up to 10 mm inclusive or without a rigid or flexible carrier.
  - ii) The seals may be supplied with or without 'G'Lex' carriers in nominal widths up to 50 mm.
  - iii) The 'G'Lex' carriers may be supplied in nominal thicknesses up to 1.5 mm.
  - iv) The 'G'Lex' carriers may be of any colour.
  - v) The 'G'Lex' carriers may be supplied with or without smoke seals positioned within or fixed to the outer facing of the carrier.
  - vi) The intumescent seals with or without 'G'Lex' carriers incorporating the intumescent core may be fixed in position using a self-adhesive backing tape, panel pins, intumescent mastic smeared thinly onto one face, or adhesive which is capable of retaining the seal within or attached to the associated construction for the required period.
  - vii) The intumescent seals may or may not incorporate printing.

#### Basic Test Evidence

- 3.5 The test report referenced WARRES No. 67698 describes a fire resistance test performed on two identical timber based doorsets of single-acting, single-leaf configuration incorporating 'Pyroplex Rigid' intumescent seals. One doorset, referenced Doorset A, incorporated intumescent seals nominally 10 mm wide by 4 mm thick and the other doorset, referenced Doorset B, incorporated intumescent seals nominally 20 mm wide by 4 mm thick. The width of intumescent protection used was selected to provide the maximum amount of information for assessment purposes.
- 3.6 The doorsets were of proprietary origin and intended to provide 30 minutes fire resistance as previously fire tested with different intumescent seals. They were installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. This orientation was considered to be the worst case during the test because the door leaves deflected out of the door frame which enabled three directional exposure of the leaf edges, and as such, an increased rate of charring.
- 3.7 In each case the intumescent seals were fitted into grooves located centrally in the reveal of the door frame. The doorsets achieved integrity and insulation performances of 47 minutes and 51 minutes for each of the criteria for Doorset A and B respectively. Integrity failure of Doorset B was not directly associated with erosion of the leaf edge intumescent protection, but occurred due to a combination of factors relating to the proprietary design of doorset which was intended to provide 30 minutes fire resistance only.

- 3.8 The test report referenced WARRES No. 68333 describes a fire resistance test performed on two different timber based doorsets of single-acting, single-leaf configuration incorporating 'Pyroplex Rigid and Flexible' intumescent seals. One doorset, referenced Doorset A, incorporated the flexible intumescent seals nominally 10 mm wide by 4 mm thick and the other doorset, referenced Doorset B, incorporated rigid intumescent seals nominally 20 mm wide by 4 mm thick.
- 3.9 The doorsets were of proprietary origin and intended to provide 30 and 60 minutes fire resistance for Doorset A and B respectively, as previously fire tested with different intumescent seals. They were installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. This orientation was considered to be the worst case during the test because the door leaves deflected out of the door frame which enabled three directional exposure of the leaf edges, and as such, an increased rate of charring.
- 3.10 In each case the intumescent seals were fitted into grooves located centrally in the reveal of the door frame. The doorsets achieved integrity and insulation performances of 36 minutes and 69 minutes for each of the criteria for Doorset A and B respectively. The observations within the test report make no reference to imminent integrity failure of Doorset A at 36 minutes, the doorset being sealed at this time at the request of the sponsor.
- 3.11 The test report referenced WARRES No. 69700 describes a fire resistance test performed on a timber based doorset of single-acting, double-leaf configuration incorporating 'Pyroplex Rigid and Flexible' intumescent seals. The doorset incorporated intumescent seals nominally 10 mm wide by 4 mm thick along the jambs of the door frame and one of the meeting edges of the door leaves and a single 20 mm wide by 4 mm thick seal incorporating an integral smoke seal was fitted within the head of the door frame. The width of intumescent protection used was dictated by doorset construction.
- 3.12 The doorset was of proprietary origin and was intended to provide 30 minutes fire resistance as previously fire tested with different intumescent seals. The doorset was installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. This orientation was considered to be the worst case during the test because the door leaves deflected out of the door frame which enabled three directional exposure of the leaf edges, and as such, an increased rate of charring.
- 3.13 The intumescent seals were fitted into grooves located centrally in the reveal of the door frame with one seal being fitted into a groove centrally located along the meeting edge of one door leaf. The doorset achieved an integrity and insulation performance of 40 minutes for each of the criteria. The observations within the test report show that integrity failure occurred at the position of a hinge where the intumescent seal had been interrupted. At a position where the intumescent seal had not been interrupted by ironmongery, the specimen maintained integrity for a period of 50 minutes 30 seconds.
- 3.14 The test report referenced WARRES No. 69701 describes a fire resistance test performed on a timber based doorset of single-acting, double-leaf configuration incorporating 'Pyroplex Rigid' intumescent seals. The doorset incorporated intumescent seals nominally 20 mm wide by 4 mm thick along the jambs and head of the door frame and one of the meeting edges of the door leaves, the latter incorporating an integral smoke seal.

- 3.15 The doorset was of proprietary origin and was intended to provide 60 minutes fire resistance as previously fire tested with different intumescent seals. The doorset was installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. This orientation was considered to be the worst case during the test because the door leaves deflected out of the door frame which enabled three directional exposure of the leaf edges, and as such, an increased rate of charring.
- 3.16 The intumescent seals were fitted into grooves located centrally in the reveal of the door frame with one seal being fitted into a groove centrally located along the meeting edge of one door leaf. The doorset achieved an integrity and insulation performance of 75 minutes for each of the criteria. The observations within the test report show that integrity failure occurred at the position of a hinge where the intumescent seal had been interrupted. At a position where the intumescent seal had not been interrupted by ironmongery, the specimen maintained integrity and insulation for the full duration of the test of 81 minutes.

#### **Proposal for 'Pyroplex Rigid or Flexible' Intumescent Seals for 30 and 60 minutes Fire Resistance**

- 3.17 The proposal requires the previously fire tested 'Pyroplex Rigid or Flexible' intumescent seals to be fitted into other, previously successfully fire tested timber or steel based doorsets.
- 3.18 To enable the 'Pyroplex Rigid or Flexible' intumescent seals to be used within alternative doorsets, the available information on the proposed doorset must be considered. As this appraisal is intended to be used on a general basis, and not restricted to any particular doorset manufacturer, the following points are given to enable the 'Pyroplex Rigid or Flexible' intumescent seals to be used safely :
- i) The doorset into which the seals will be installed, including the particular door frame and associated ironmongery, should have achieved 30 or 60 minutes integrity when tested by a NAMAS/UKAS accredited laboratory in accordance with the relevant clause of BS 476: Part 22: 1987.
  - ii) For 30 and 60 minute doorsets the nominal core dimensions of the intumescent material will be maintained at a minimum i.e. if the 'Pyroplex Rigid or Flexible' seals are to be installed in doorsets previously fire tested with intumescent seals of nominal core dimensions of 8 mm wide by 2 mm thick, with a nominally 1 mm thick carrier, then the 'Pyroplex Rigid or Flexible' seals will have an active core material nominally 8 mm wide by 2 mm thick.
  - iii) Different sizes of intumescent material within the same doorset will be maintained.
  - iv) For 30 minute doorsets, the door frame and top rail of the door leaf (or lipping at the leaf to frame clearance gap along the top edge of the leaf) shall have a minimum density of 420 kg/m<sup>3</sup> and the vertical edges of the door leaf shall incorporate timber with a minimum density of 550 kg/m<sup>3</sup>.
  - v) For 60 minute doorsets, the door frame and lippings at the leaf to frame clearance gaps along the vertical edges, shall be of hardwood and shall have a minimum density of 550 kg/m<sup>3</sup>. The top rail may or may not be lipped with similar hardwood timber of similar density, but if it is not lipped then the top rail should have a minimum thickness and density of 45 mm and 420 kg/m<sup>3</sup> respectively.

- vi) When proprietary designs of previously fire tested 30 and 60 minute doorsets are being considered, it is important that the stability of the door leaves during the test is taken into consideration. For this reason 'Pyroplex Rigid or Flexible' intumescent seals shall only be fitted into doorsets where the leaves have deflected as follows:

Maximum Allowable Deflections at Leaf Edge Corners - mm			
Required Fire Resistance Period (minutes)	Single-Acting, Single-Leaf Doorsets	Single-Acting, Double-Leaf Doorsets	Double-Acting, Double and Single-Leaf Doorsets
30	12	10	15
60	12	10	15

- vii) The size and glazing of the proposed door leaf can also have a bearing on the performance of the doorset and the submitted test information for the proposed doorset should replicate the intended size and glazing detail.
- viii) The doorsets should be fitted as recommended in BS 8214: 1990.
- ix) Where test evidence suggests that the door leaves do not require latching or locking within the frame, the intumescent seals may be substituted providing the doorset incorporated sodium silicate or graphite seals only. The 'Pyroplex Rigid or Flexible' intumescent seals may not be used as a substitute for mono ammonium phosphate based intumescent seals used on unlatched doorsets.
- 3.19 The performance of previously fire tested designs of timber doorsets complying with the details given in 3.18 i) to ix) above, with the tested intumescent replaced with 'Pyroplex Rigid or Flexible' intumescent seals as discussed are expected to be similar.
- 3.20 Steel doorsets do not present the same areas for consideration as timber doorsets with respect to the items discussed in 3.18 iv) to ix) and, therefore, require less limitations on the use of the seals as substitutes.
- 3.21 An important aspect for consideration, however, which is not applicable to the same extent for timber assemblies, is ignition of the carrier and smoke seal due to convected, conducted and radiated heat. This appraisal, therefore, is not applicable to steel doorsets which have not utilised plastics carriers for the intumescent core or smoke seals unless seals incorporating similar carriers and smoke seals were incorporated during test.
- 3.22 The performance of previously fire tested designs of steel doorsets complying with the details given in 3.18 i) to iv), 3.20 and 3.21 above, with the tested intumescent replaced with 'Pyroplex Rigid or Flexible' intumescent seals as discussed, are expected to be similar subject to the limitation given in 3.21.

#### Proposal for the Alternative Location of Intumescent Seals

- 3.23 It is proposed that 'Pyroplex Rigid or Flexible' intumescent seals may be located within grooves along the centreline of the door leaf/leaves edge instead of in the tested location within grooves along the centre line of the door frame reveal.

- 3.24 The proposed alternative location for the intumescent seals maintains itself directly opposite the centre line of the door leaf edge. The properties of the intumescent seal in fire tests show that it expands multi-directionally and, therefore, it is capable of filling the small gap formed at the top of the meeting edges if the seal activated uni-directionally only.
- 3.25 The alternative location is considered to be of relatively minor significance since the leaf/frame clearance gap will continue to be sealed in the same manner as the fire tested assembly and therefore the proposal is considered to be acceptable.

#### Proposal for Various thicknesses of Intumescent Seals

- 3.26 It is proposed that 'Pyroplex Rigid or Flexible' intumescent seals may be utilised in thicknesses up to 10 mm.
- 3.27 In all cases the thickness of intumescent seals used will be maintained at a similar thickness to that previously fire tested. The proposal, therefore, offers a like-with-like substitution and on this basis is considered to be acceptable.
- 3.28 Where the core dimensions of the active intumescent product exceed the maximum dimensions previously fire tested, additional pressure/force may be generated when activated. This pressure can depend upon the size of gap being sealed, the resistance of the surrounding elements to resist force, the size of the seal and the length of time to which it has been exposed to elevated temperatures and erosion by furnace gases.
- 3.29 The forces generated by seals of greater dimension may cause increased distortion of a door leaf at its perimeter which could have a detrimental effect on the performance of the doorset in terms of integrity. For this reason, therefore, and to be conservative with this appraisal, the seal at 5 mm nominal thickness, with a variance in core thickness of 2 mm to 4 mm, shall only be used in situations where the previously fire tested doorset has incorporated seals of similar nominal core dimensions. On this basis the proposal is considered to offer no disadvantage over the previously installed seals and is, therefore, considered to be acceptable.

#### Proposal for Various Widths of Intumescent Seals

- 3.30 It is proposed that 'Pyroplex Rigid or Flexible' intumescent seals may be utilised in nominal widths up to 50 mm.
- 3.31 In all of the cases proposed, the intumescent seals will incorporate active material identical to that previously fire tested. The tested intumescent seals at nominal widths of 10 mm and 20 mm, have demonstrated in each case tested that they are capable of withstanding the penetration of flame and hot gases at the leaf to frame and leaf to leaf clearance gaps for periods well in excess of the required periods of 30 and 60 minutes respectively.
- 3.32 There is no reason to expect, therefore, that the introduction of 'Pyroplex Rigid or Flexible' intumescent seals at the proposed widths, in lieu of previously fire tested seals at similar widths, will have any detrimental effect on the integrity performance of the doorset tested subject to the conditions given in 3.18 of this report. The proposal, therefore, offers a like-with-like substitution and on this basis is considered to be acceptable.

#### Proposal for Alternative Thicknesses of 'G'Lex' Carriers

- 3.33 It is proposed that the core material of 'Pyroplex Rigid or Flexible' intumescent seals may be encapsulated with 'G'Lex' carriers of up to 1.5 mm nominal thickness.

- 3.34 The previously fire tested doorsets referred to in 3.5 to 3.16 of this report have incorporated 'Pyroplex Rigid or Flexible' intumescent seals with 'G'Lex' carriers of 1 mm nominal thickness. The proposed increase in carrier thickness up to 1.5 mm is not expected to have any significant effects on the fire test performance of the intumescent seals. The results of the tests provides evidence of acceptable performance and therefore, no doubts are expressed with the 'G'Lex' carriers at 1.5 mm nominal thickness over the range of sizes considered in this report and the proposal is, therefore, considered to be acceptable
- 3.35 The carriers are extruded from a proprietary material referred to as 'G'Lex' thermoplastic. The proposed reduction in thickness from nominally 1 mm to 0.5 mm is considered to be acceptable because it reduces, by approximately 50%, the quantity of volatile gases that may be emitted and possibly ignited by the carrier when heated and at the reduced thickness it is less likely to inhibit the expansion of the active core material. The proposal is, therefore, considered to be acceptable.

#### **Proposal for 'G'Lex' Carriers of Any Colour**

- 3.36 It is proposed that the 'G'Lex' carriers may be provided in any colour or finish option.
- 3.37 Any variance in colour or finish from the colour of the product previously fire tested uses no additional chemical or material combustible in nature which could have a detrimental effect on the performance and function of the intumescent seals. The proposal to manufacture the carrier in any colour is considered to be of cosmetic significance only and is, therefore, considered to be acceptable.

#### **Proposal for the Use of Various Types of Smoke Seal within the 'G'Lex' Carrier**

- 3.38 It is proposed that the various types of 'Pyroplex Rigid or Flexible' intumescent seals previously fire tested and assessed within this report may incorporate a variety of smoke seals including brush or fin type and located within or bonded to the 'G'Lex' carrier. In addition, it is also proposed that bubble, flipper, and bladed seals may also be used.
- 3.39 The fire tests reported under references WARRES No. 69700 and 69701 incorporated smoke seals in the head of the door frame and along the centreline of the meeting edges respectively. The use of the brush/fin seal in each case had no significant or quantifiable effect on the ability of the intumescent seals to restrict the passage of flame and hot gases at the leaf to frame and leaf to leaf clearance gaps for the required periods.
- 3.40 Empirical evidence is, therefore, available for the use of brush type intumescent smoke seals. Fire test experience of the fin, bubble, flipper and bladed types of intumescent smoke seal indicates that they have no quantifiable effect on the integrity performance of a doorset when used to seal the leaf to frame or leaf to leaf clearance gaps.
- 3.41 The positioning of the smoke seal within a groove in the 'G'Lex' carrier or bonded to its outer surface is of durability and changeability significance only and is not expected to have any significant effect with respect to the integrity performance of doorsets incorporating smoke seals for the required periods of 30 and 60 minutes. Smoke seals should not be fitted to doorsets of steel construction without prior evidence of performance that it is acceptable to do so.
- 3.42 Several different designs, construction and configuration of smoke seal have been subjected to test in accordance with BS 476: Part 31.1 The reader of this report should consult the test report to identify the acceptability of particular smoke seals for a particular application or configuration. A summary of results achieved is provided in Appendix 1 to this report.



### Proposal for Alternative Methods of Intumescent Seal Retention

- 3.43 It is proposed that the intumescent seals may be fitted into grooves within the edges of the door leaf/leaves or reveal of the frame using steel pins or intumescent mastic as an adhesive in lieu of the method tested i.e. self adhesive backing tape. In addition, the seals may be face fixed at similar positions.
- 3.44 The proposed methods of installation retain the intumescent seals at the position provided in the leaf edges or the frame and providing the visible face of the seal is flush with the outer face of the leaf edge or the reveal of the frame. The proposal is, therefore, considered to be a like-with-like substitution and as such is considered to be acceptable for the required periods of 30 and 60 minutes.

### Proposal for Printing on the 'G'Lex' Carriers

- 3.45 It is proposed that the 'G'Lex' carriers may incorporate printing to the face or edge of the carrier.
- 3.46 The addition of printing to the 'G'Lex' carrier would not be considered to have any significant effect on the performance of the intumescent seals to fulfill their required function. The proposal is, therefore, considered to be acceptable.

## 4 Conclusions

- 4.1 Previously fire tested doorsets which have achieved 30 minutes integrity as discussed in section 3 of this report may be fitted with 'Pyroplex Rigid or Flexible' intumescent seals as manufactured and supplied by Reddiplex Group PLC in accordance with recommendations given in this report, without detracting from the overall performance of the doorset.
- 4.2 Previously fire tested doorsets which have achieved 60 minutes integrity as discussed in section 3 of this report may be fitted with 'Pyroplex Rigid or Flexible' intumescent seals as manufactured and supplied by Reddiplex Group PLC in accordance with recommendations given in this report, without detracting from the overall performance of the doorset.

## 5 Validity

- 5.1 This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to WFRC the assessment will be unconditionally withdrawn and Reddiplex Group PLC will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of two years, i.e. until June 1999, at which time it is recommended that it be returned for re-appraisal.
- 5.2 The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

14th May 1997

KC(5585)

Appendix 1

Summary of Supporting Data

A1.1 Warrington Fire Research Centre  
WARRES No. 67698

A report on a fire resistance test performed on two identical timber based doorsets of single-acting, single-leaf configuration incorporating 'Pyroplex Rigid' intumescent seals. One doorset, referenced Doorset A, incorporated intumescent seals nominally 10 mm wide by 4 mm thick and the other doorset, referenced Doorset B, incorporated intumescent seals nominally 20 mm wide by 4 mm thick.

The doorsets were of proprietary origin and intended to provide 30 minutes fire resistance as previously fire tested with different intumescent seals. They were installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. In each case the intumescent seals were fitted into grooves located centrally in the reveal of the door frame. The results were as follows:

	Doorset A	Doorset B
Integrity	47 minutes	51 minutes
Insulation	47 minutes	51 minutes

The test was discontinued after a period of 52 minutes.

Test Sponsor                      Reddiplex Group PLC  
Report Issued                      12th July 1996

A1.2 Warrington Fire Research Centre  
WARRES No. 68333

A report on a fire resistance test performed on two different timber based doorsets of single-acting, single-leaf configuration incorporating 'Pyroplex Rigid and Flexible' intumescent seals. One doorset, referenced Doorset A, incorporated the flexible intumescent seals nominally 10 mm wide by 4 mm thick and the other doorset, referenced Doorset B, incorporated rigid intumescent seals nominally 20 mm wide by 4 mm thick.

The doorsets were of proprietary origin and intended to provide 30 and 60 minutes fire resistance for Doorset A and B respectively, as previously fire tested with different intumescent seals. They were installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. In each case the intumescent seals were fitted into grooves located centrally in the reveal of the door frame. The results were as follows:

	Doorset A	Doorset B
Integrity	36 minutes	69 minutes
Insulation	36 minutes	69 minutes

The test was discontinued after a period of 71 minutes.

Test Sponsor                      Reddiplex Group PLC  
Report Issued                      30th July 1996

Appendix 1 (Continued)

A1.3 Warrington Fire Research Centre  
WARRES No. 69700

A report on a fire resistance test performed on a timber based doorset of single-acting, double-leaf configuration incorporating 'Pyroplex Rigid' intumescent seals. The doorset incorporated intumescent seals nominally 10 mm wide by 4 mm thick along the jambs of the door frame and one of the meeting edges of the door leaves and a single 20 mm wide by 4 mm thick seal incorporating an integral smoke seal was fitted within the head of the door frame.

The doorset was of proprietary origin and was intended to provide 30 minutes fire resistance as previously fire tested with different intumescent seals. The doorset was installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. The intumescent seals were fitted into grooves located centrally in the reveal of the door frame with one seal being fitted into a groove centrally located along the meeting edge of one door leaf. The results were as follows:

Integrity	40 minutes
Insulation	40 minutes

The test was discontinued after a period of 51 minutes.

Test Sponsor	Reddiplex Group PLC
Report Issued	27th January 1997

A1.4 Warrington Fire Research Centre  
WARRES No. 69701

A report on a fire resistance test performed on a timber based doorset of single-acting, double-leaf configuration incorporating 'Pyroplex Rigid' intumescent seals. The doorset incorporated intumescent seals nominally 20 mm wide by 4 mm thick along the jambs and head of the door frame and one of the meeting edges of the door leaves, the latter incorporating an integral smoke seal.

The doorset was of proprietary origin and was intended to provide 60 minutes fire resistance as previously fire tested with different intumescent seals. The doorset was installed within a masonry wall such that each door leaf opened towards the heating conditions of the test. The intumescent seals were fitted into grooves located centrally in the reveal of the door frame with one seal being fitted into a groove centrally located along the meeting edge of one door leaf. The results were as follows:

Integrity	75 minutes
Insulation	75 minutes

The test was discontinued after a period of 81 minutes.

Test Sponsor	Reddiplex Group PLC
Report Issued	24th January 1997

Appendix 1 (Continued)A1.5 Warrington Fire Research Centre  
WARRES No. 70272

A report of an ambient temperature leakage test performed in accordance with BS 476: Part 31, Section 31.1: 1983, on six different specimens of smoke seals.

Each seal was fitted within the frame of a single-acting, single-leaf timber based doorset and was subjected to a range of pressures as given in the Standard. The results obtained were as follows:

Specimen Ref No.	Net Air Leakage at +25Pa (m <sup>3</sup> /m/h)	Net Air Leakage at -25Pa (m <sup>3</sup> /m/h)
Silhouette (R8561)	0.91	0.94
Thermapile (TF)	1.01	1.35
Thermapile (FN)	2.83	2.36
R8109 Single blade G'Lex Thermoplastic	0.68	0.63
R8110 Double blade G'Lex Thermoplastic	0.58	0.48
Thermapile (RP)	1.48	1.44

Test Sponsor                      Reddiplex Group PLC  
Report Issued                      May 1997

## A1.6 British Standard 476: Parts 20 and 22: 1987

Fire Tests on building materials and structures.

Part 22. Methods for determination of the fire resistance of non-loadbearing elements of construction.

## A1.7 British Standard 8214: 1990

Code of Practice for Fire Door assemblies with non-metallic leaves.

## A1.8 British Standard 476: Part 31.1: 1983

Methods for measuring smoke penetration through doorsets and shutter assemblies.

Section 31.1 Method of measurement under ambient temperature conditions.

Appendix 2

Declaration by Reddiplex Group PLC

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 64A, 1993.

We confirm that the component or element of structure, which is the subject of this assessment; has to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask Warrington Fire Research Centre to withdraw the assessment.

Signed:  .....

For and on behalf of: Reddiplex Group Plc. .....