Computer Models
For
Fire and Smoke

Model Name:	FIRESYS
Version:	2000.1
Classification:	General Fire Safety Engineering
Very Short Description:	Suite of relatively simple fire engineering programs developed for designers working under performance based fire codes. Also useful for teaching purposes.
Modeler(s), Organization(s):	Cliff Barnett, Macdonald Barnett Partners Ltd, PO Box 26 025, Epsom, Auckland, New Zealand.
User's Guide:	None required. Programs fully transparent with all data available on screen.
Technical References:	Butcher E.G.& Parnell A.C. "Smoke Control in Fire Safety Design." E. & F.N. Spon Ltd., London, 1979. Barnett, C.R. "Fire Separation Between External Walls of Buildings". Proceedings 2nd Symposium, International Association of Fire Safety Science, 1988. Barnett, C.R. "Fire Compartment Sizing Design Method" Proceedings, International Symposium on Fire Engineering for Building Structures and Safety, The Institution of Engineers, Australia, 1989. Barnett et al, "Fire Safety in Tall Buildings", Chapt 10, McGraw-Hill Inc., New York, 1992. Drysdale, D. "An Introduction to Fire Dynamics" 2nd Edition, John Wiley & Sons, 1998. Law, M.. "Safe Distance From Wired Glass Screening a Fire" Institution of Fire Engineers Quarterly, 29 (73) pp 62-70, 1969.

Law M. "A relationship Between Fire Gradings and Building Design and Contents", Joint Fire research Note No. 877, London, 1971.

Lawson J.R. & Quintiere J.G. "Slide Rule Estimates of Fire growth" Fire technology, Vol 21, No. 4, Nov 85 , pp 267 – 292, 1985.

Macbar Fire Design Code," Version 2.1, 1999.

Nelson H.E. & MacLennan H.A. "Emergency Movement", SFPE Handbook, pp 2-106 to 2-115, 1988.

Thomas et al " Investigations into the Flow of Hot Gases in Roof Venting", Fire research Paper No. 7, HMSO, 1963.

Thomas P.H & Law M, "The Projection of Flames from Buildings on Fire", Fire Press, Sci of Technology, 10, 10, 19.26, 1974.

Thomas P.H., "Testing Products and Materials for their Contribution to Flashover in Rooms", Fire and Materials, 5, pp 103-111, 1981.

Zukoski E.E., Kubota T, & Cetegen B. "Entrainment in Fire Plumes", Fire Safety Journal, 3, pp 107-121, 1980/81.

Validation References: None required.

Availability: Under final production. Available Feb 2001.

Price: Expected to be about US $170.
(Price in New Zealand expected to be NZ $400 plus GST).

Necessary Hardware: Pentium 100. 16 Ram. Runs under Windows 95, 98 and 2000.

Computer Language: EXCEL 97.

Size: 2.6 MB, 42 files, 14 folders.

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Detailed Description:

FIRESYS is a collection of relatively simple fire engineering programs designed to assist those who wish to arrive at approximate fire engineering solutions which can be applied to their building projects. Such people would include architects, engineers, building inspectors, builders, manufacturers, students, and the like.

FIRESYS is also aimed towards producing answers that may satisfy requirements for performance based fire codes. The software is user interactive and designed to be easy to operate. Entry data is in a different colour from output data. Printouts can be produced in a form that can be readily included with documentation sent to Authorities for building permit purposes. Each printout can show the name of the project, a description of the item under design consideration , and the date.

FIRESYS is intended to be a fully transparent program and there is no Guide Manual provided. Each separate program is provided with its own background page which provides an overview of the formula, the modelling techniques used, and references relative to that program. Onscreen "Worked Examples" are provided for some programs. Users need to acquaint themselves with the references provided, the background behind, the upper and lower limits, and the limitations of any particular program. One copy of the "Macbar Fire Code" Reference is supplied with each copy of FIRESYS.

FIRESYS is intended to be only a general design aid and is not intended to produce exact design answers per se. Many of the formula used produce only approximate results. The results can however be used for any particular project as guides towards part of an overall fire safety design solution for the project.

The following index will illustrate the nature of the programs contained in FIRESYS:

FIRESYS INDEX Ver 2000.1

5 B Separation Distance for Multiple Openings

5 C Wing Walls

5 D Parapets

Fire Egress

6 A Fire Egress From Rooms

6 B Fire Egress Widths (Doors and Corridors)

6 C Fire Egress Widths (Stairs and Landings)

6 D Fire Egress Widths Past Glass Screen

Trial Designs

7 A Firecell Parameters

7 B Firecell Sizes

7 C Flash/Vent/Time

7 D Radiation Loss

Design Fires

8 A t^2 Fire Model

8 B Triangular Fire Model

8 C Ventilation Controlled Model

8 D Liquid Fuel

Smoke

9 A Smoke Production Rate

External Fire Control

10 A Water Requirements

Eurocode Fire Design

11 A Equivalent Time

Miscellaneous

12 A Thermal Expansion

12 B Temperature Conversions

Data Base

Table A	Calorific Values of Solids, Liquids and Gases.
Table B	Fire Load Energy Densities
Table C	Energy Release rates
Table D	Material Properties
Table E	Time Temperature Values