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NATIONAL ASSOCIATION OF STEEL-FRAMED HOUSING INC.

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FACT FILE 1
Fire

Simply steel will not ignite nor does it burn.

No home can be completely fire safe but there are a number of ways you can plan for a house that has high fire-resistance. Your choice of building materials is very important. Sometimes life depends on it. The right materials can significantly delay, minimise or prevent damage to your house. Should damage occur the materials of construction could mean the difference between repairing your home or having to rebuild it completely.

The CSIRO Division of Building Research, Victoria, produced a paper outlining the features of a house with high fire-resistance. Major factors were:

- steel wall frames, with gypsum board linings* for further protection
- concrete slab floor
- eliminating timber** in the roof (i.e. using steel roof framing)
- brick veneer external cladding

*Although steel is non-combustible, after some time it will eventually lose strength in the 400^0 - 500^0 C temperature range. Gypsum linings with reliable resistance to fire will protect the steel frame.

**The elimination of timber in the roof is a most important feature. When a roof catches fire, the burning rafters can fall into the cavity between the walls creating an intense local fire via a chimney-like effect (white pine ignites at 280°C).

Fire can take hold very quickly.

Table1: Average stages of fire in the room of a house

Stage of fire	Time (seconds)	Temperature
Small flame	0	Room temperature
Dense smoke	70	300^0 C
Smoke + flame	90	100^0 C
Flashover	150	600^0 C
Inferno throughout house, floor level or building	3 - 5 minutes	> 600^0C

(Data courtesy SA Metropolitan Fire Service)

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In the event of an external fire threatening the house, a bushfire for example, the main focus is to prevent burning embers or sparks from entering the building. It is particularly important to keep them out of the spaces above the ceiling and below an elevated floor.

A roof of steel sheeting fixed to a steel roof frame simply cannot burn. In addition, the long lengths and tight overlaps prevent the entry of fire even when burning embers fall on the roof. Cover plates or closure strips seal off the small openings at the end of steel roofing profiles.

The space below the floor can be eliminated by building on a slab of concrete laid directly on the ground. Alternatively, on a sloping site an elevated floor consisting of a concrete slab on structural steel sub-flooring can perform the dual function of defending the building against fire and termites.

Further references:

AS 3959 *Construction of buildings in bushfire-prone areas* (Referenced in the Building Code of Australia)

Standards Australia Handbook HB 36 *Building in bushfire-prone areas*

The Complete Bushfire Safety Handbook by Joan Webster (Random House)

Bush Fire Protection - a booklet from the NSW Rural Fire Service, tel. (02) 9684 4411

External Water Spray Systems to Aid Building Protection from Wildfire - a report by the Fire Protection Association Australia. Email fpaa@fpaa.com.au

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