

Abstract**A THERMAL INSULATION MATERIAL AND A FIRE AND HEAT
PROTECTION SYSTEM COMPRISING THEREOF**

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Ductwork used in heating, ventilation, and air conditioning (HVAC) systems in many large residential and commercial buildings can spread fire and smoke through the system during a fire, if not insulated properly. The present invention provides a fire rated insulation material for ductwork that is capable of self-intumescence and self-hardening during a fire to protect the ducts from fire damage and to slow down if not prevent the spread of fire. A thermal insulation material (1), the thermal insulation material (1) having a composition comprising a clay mineral, a base, a non-halogenated flame retardant, a non-alkaline borate, and a starch, wherein the thermal insulation material (1) is malleable and is capable of self-hardening and forming an internal vapor barrier when exposed to fire or a temperature exceeding 100 °C, thereby preventing the transfer of fire or heat.

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(Most illustrative drawing: Figure 1)