D-Series Gas Fire Materials Guide

An **Escea D-Series Gas Fire** is a zero-clearance rated fireplace that can be built into a false cavity, allowing for numerous design scenarios with multiple finish options. Some scenarios may place materials in close proximity to higher than anticipated levels of heat. While these non-standard scenarios may meet the surface temperature combustibility requirements of *AS/NZS5601 Gas Installations**, some materials may be exposed to high or undesirable levels of heat, or levels of heat greater than their tolerances allow. Specifiers and installers must choose materials when in these scenarios, that meet the combustibility requirements **AND** also the maximum service temperatures allowed by the chosen product. This guide can help alleviate some confusion around the correct product to use for your specification.

DESIGN CONSIDERATIONS

Material Specification - It is critical to understand the impact of thermal stress which can affect the durability of the materials chosen. Specifiers and installers must ensure that materials used around the fireplace are suitable for the intended project.

- **Combustible Material**: a substance that is easily ignited or burned. *(Wood, polystyrene, and some fabrics*)
- **Non-Combustible Material**: a substance that will not ignite burn or support combustion. A non-combustible classification may still not make the material heat resistant. (*Fibre Cement, porcelain and stone, metals, concrete, gypsum board or tempered glass)*
- **Heat Sensitive Materials**: materials that respond to heat or changes in temperature. *(Manufactured Stone, Veneer Panels, Some Natural Stone, Laminate Panels, or Wood)*
- **Heat Resistant Materials**: materials that are able to resist and remain unaffected by heat. (*Porcelain Tile, Concrete, Calcium Mineral Board, Mineral Insulation, or Metals)*

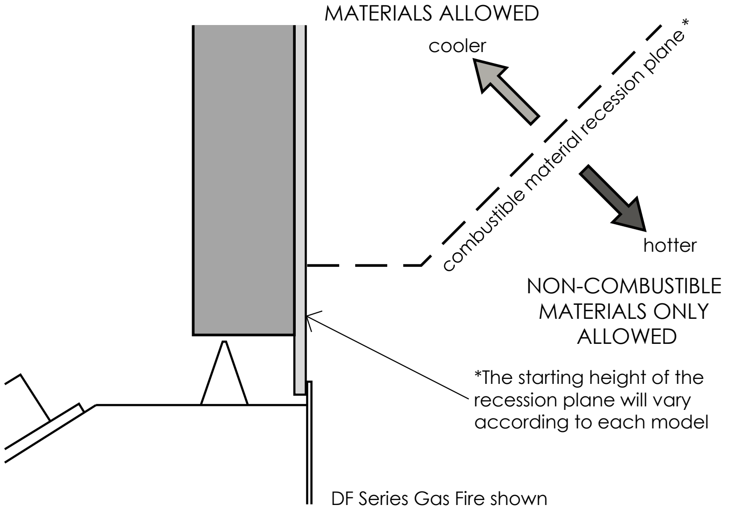
Materials expand and contract when heated and cooled (coefficient of thermal expansion). Understanding how materials interact and are affected by heat can assist in reducing any potential damage by heat. Movement can be minimised or eliminated with the introduction of control joints, using materials with a similar coefficient of thermal expansion, separation or by the addition of insulation layers.

Fire Rated Systems vs Heat Resistant Materials – the use of a fire rated material is often specified but may not always be suitable. Fire rated products form part of a fire rated system to provide for safe evacuation of the building and restrict the spread of fire. These products are not always intended to tolerate heat consistently and over long periods of time.

Some **design scenarios** expose materials to greater levels of heat than others. These scenarios can expose some elements of the project and materials to approx. 120°C while the fire is in operation. Low and sealed chimney cavities, under bench installations, recessed fires or overhangs above the fire, or surfaces exposed to direct heat from the fire can all be subject to higher levels of heat and protection should be offered, or the risk minimised.

Materials will deteriorate over time and it is the role of the Designer to anticipate any changes to materials that may occur during service. Material manufacturers provide maximum service temperatures to assist with this, and can apply to a particular material, application method and any finishes.

The **Combustible Material Recession Plane** above the fire represents a tested point at which the air temperature meets the requirement for maximum surface temperatures in accordance with *AS/NZS 5601:2013**. **This line does not define an area of hot and cold.** Moving away from this line towards the wall above the fire and into the combustible material zone, the surface temperature **decreases**. While moving into the non-combustible material zone would show an **increase** in the surface temperature.



Detail showing the combustible material clearance zone above a D-Series Fire. This will apply to mantels, joinery units, electronic devices and overhangs.

** "A gas appliance shall be installed such that the surface temperature of any nearby combustible surface will not exceed 65°C above ambient."*
AS/NZS 5601.1-2013 Sec. 6.2.5.

COMMON MATERIALS AND THE IMPACT OF HEAT

Material	Effect of Heat	Characteristics	Solution
Timber and Wood Based Products	Charring, Shrinkage or Excessive Movement, Deterioration.	Charring is deterioration from long term exposure to high levels of heat, which changes the composition of wood. Shrinkage from hot/cold cycles and rapid loss in moisture content.	Insulate from direct heat exposure. Ensure material stability with solid wood products.
Metals	Deformation, Heat Transfer.	High level of thermal expansion and contraction. But will generally return to original size. Conductor of heat.	Increase metal thickness to stop deformation. Insulate to stop heat transfer. Provide air gaps to less stable products.
Glass	Fracture, Heat Transfer.	High temperature tolerance but brittle. Will not tolerate localised changes in temperature within the same span. Low thermal coefficient.	Insulation with an air gap. Protection from direct heat exposure.
Plasterboard and Finishing Products	Fracture or Cracking, Deterioration.	Plasterboard is relatively stable. Will crack when stress is applied to joints or finishing areas. Gypsum finish compounds will break down from long term exposure.	Provide expansion joints and air gaps to metal parts directly exposed to heat. Avoid direct contact with heat.
Fibre Cement Sheet	Heat Transfer, Fracture or Cracking.	Stable and non-combustible. Poor insulating material.	Not for use as an insulating board. Protect finishing compounds from direct heat exposure.
Natural Stone	Fracture, Heat Transfer.	Durable with varied, but lower, thermal coefficients amongst stone materials. Stone is reactive to thermal stress. Stone has natural faults that can be triggered by heat.	Segmentation of stone sections, expansion gaps and protection from direct heat exposure.
Manufactured Stone	Fracture, Deformation, Heat Transfer.	Engineered stone, artificial stone or solid surfaces can be damaged by localised, rapid surface temperature changes. Maximum service temperatures differ across all types of stone.	Insulation to protect from direct heat. Segmentation of stone sections. Provide expansion/movement gaps.
Ceramics	Heat Transfer, Fracture.	Stable and durable. Tolerate high levels of heat. Low thermal coefficient.	Provide segmentation of sections alongside expansion/movement joints.

This Design Guide is intended to provide general information only and is not a complete description of all relevant material information. The successful performance of a material is outside the control of Escea (e.g. quality of workmanship and design). Escea takes no responsibility for material choice and reference should always be made to the material manufacturer's Technical Specifications for suitability of use. If in doubt, please contact the ***Escea Architectural Advisory Team*** *for assistance.*

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