



5.2 The “Air Cooled” Radiation Shield

Clearance reduction rules specify air space between a combustible surface and a radiation shield. This air space is the most important feature of the clearance reduction rules found in Table 3 of B365. Air space works like this: radiation emitted from the appliance strikes the shield and causes its temperature to rise. If the shield were placed against the combustible surface with no air space, heat would be transferred by conduction from the shield to the wall behind and no cooling benefit would result. However, spacing the shield away from the wall allows air to flow between the wall and the shield. The shield is then air cooled and the wall will be effectively protected from both radiant and conducted heat.

Why is an air cooled radiation shield so effective? It works because hot air rises. The radiation striking the shield heats it and, in turn, the shield heats the air behind. The heated air behind the shield becomes buoyant, begins to rise and sets up a convection flow. Air is drawn in under the shield, flows up behind it, and is expelled from spaces at the top of the shield. The hotter the shield gets, the stronger will be the convection flow, meaning that more air will rise behind the shield, increasing the cooling effect. Therefore, as the appliance produces more radiant

heat, an air cooled radiation shield becomes more effective in protecting the combustible surface from the heat.

Air cooled shields placed horizontally on ceilings can also keep combustible materials cool, although the convection air flow is not as effective as it is with a vertical shield.

5.3 Shield Construction

Wall shields should be permanently mounted to the wall using screws through non-combustible spacers into wall studs. Use drywall anchors if support is needed where there is no stud. The minimum distance between the shield and the wall is 21 mm ($\frac{7}{8}$ ”). Slices of metal tubing or electric fence insulators were the traditional forms of shield spacers. Spacers in the form of sheet metal channels can also be used. Be sure that whatever type of spacer is used holds the shield at least 21 mm ($\frac{7}{8}$ ”) away from the surface to be protected. The distance that shields must be spaced away from combustibles was decreased in the 1991 edition of B365 from 25 mm (1”) to 21 mm ($\frac{7}{8}$ ”) to allow the use of metal strapping or furring strips as channel stand-offs.