

High Heat-Radiation Pre-Coated Aluminum Sheet, FUSCOAT HS Series

1. INTRODUCTION

As performance improves in electric and electronic equipment in recent years, the amount of heat generated in these equipment is increasing. On the other hand, space-saving design is spreading thus restricting installation of heat dissipating fans. Consequently, temperatures within these equipment tend to rise substantially, thereby impeding full exhibition of their inherent performance. This is why the technique of dissipating heat externally has emerged as an important point in equipment designing.

Against this background, UniFus Aluminum has developed a highly heat-radiative pre-coated aluminum sheet, FUSCOAT HS series, where HS standing for “heat solution.”

2. FEATURES

- 1) The heat-radiation property of the product is almost equal to that of the ideal black body over 4~14 μm , i.e. an essential wavelength range in terms of heat radiation. The property was experimentally verified at the Kanagawa Industrial Technology Research Institute. Thus FUSCOAT HS series compares favorably with black anodized aluminum film, a representative material of good heat-radiation property.
- 2) The combination of aluminum base material of good heat conductivity with FUSCOAT HS series ensures superior heat radiation.
- 3) Due to its superior formability and high degree of flexibility in forming, FUSCOAT HS series is a feasible substitute material for post-anodizing and post-coating processes, raising a good prospect for considerable cost reduction.

3. STRUCTURE OF COATING LAYER

Figure 1 shows the structure of the coating layer. After conversion treatment is applied onto the aluminum bare material as an undercoat, highly heat-radiative coating is provided.

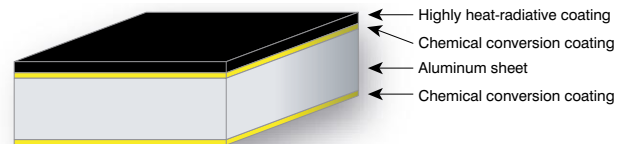


Figure 1 Structure of coating layer.

4. PROPERTIES

Table 1 shows measured emissivity of various materials, and Figure 2 and Figure 3 show the spectral emissivity and the experimental data on the emissivity of FUSCOAT HS series. From Figure 3 it can be seen that compared with unpainted materials with an emissivity of 0.1, FUSCOAT HS with an emissivity of 0.92 can reduce the material temperature by about 10°C. Not only has FUSCOAT HS series superior heat radiation property, but also its other properties satisfactorily meet the standard specified in JIS H 4001, “Painted aluminium and aluminium alloy sheets and strips.”

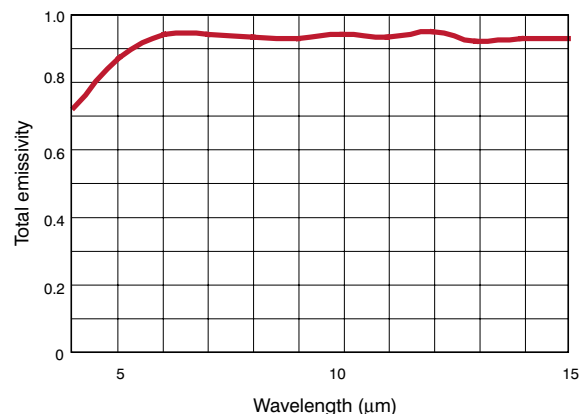


Figure 2 Spectral emissivity of FUSCOAT HS at 60°C.

Table 1 Measured emissivity of various materials.

FUSCOAT HS, black	0.75~0.92
Anodized aluminum film	0.70~0.80
Bare aluminum	0.05~0.10
Bare stainless steel	0.15
Bare steel	0.06
Coal, smooth surface	0.80

Notes:

- Emissivity of ideal black body is 1.0.
- Black paint can increase the emissivity of an unpainted surface largely by a factor of 10.

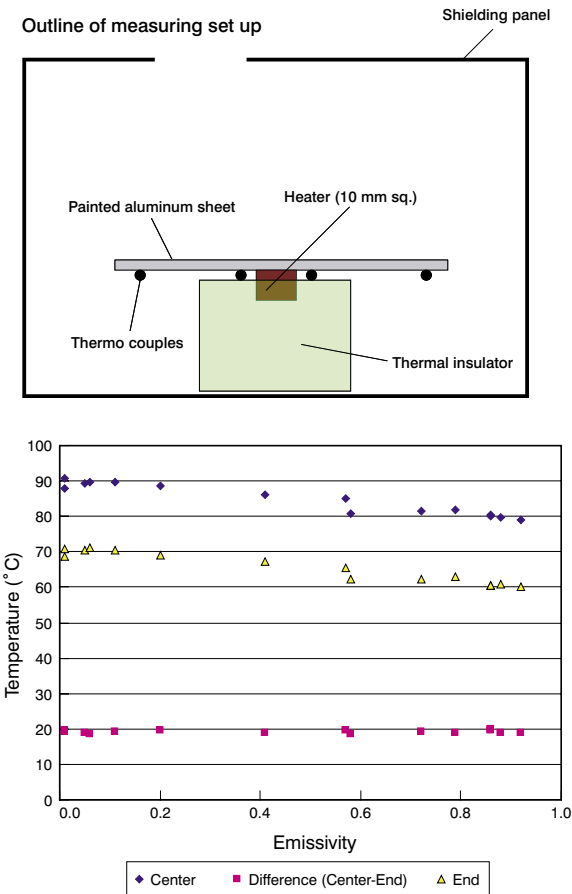


Figure 3 Experimental data on emissivity and temperature.

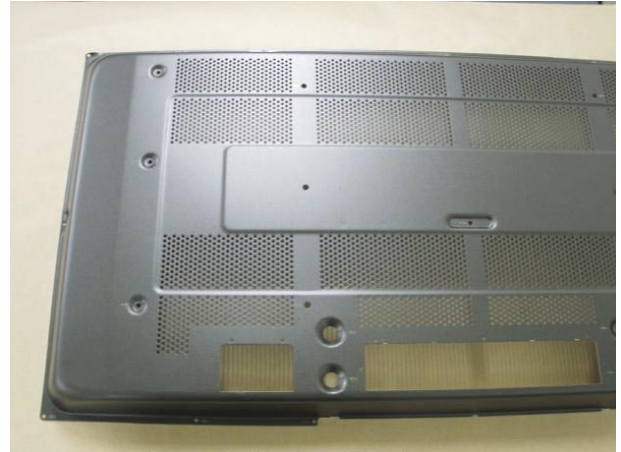


Figure 4 Application example of back cover for plasma display panel.

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5. APPLICATIONS

With its superior heat radiation and formability, FUSCOAT HS series has been adopted in various commodities such as back covers for large-sized TV sets and monitors, heat radiators for IC substrates, heat radiators for under-floor heating systems.

Figure 4 shows an application example of a back cover for plasma display panel.