Technical Bulletin 33

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ZINCALUME® steel and zinc-coated steel in high temperature and food contact applications

INTRODUCTION

BlueScope manufactures ZINCALUME® aluminium/zinc/magnesium alloy-coated steel and zinc-coated steel products with a variety of coatings and finishes to meet the needs of customers.

For the purpose of understanding the effects of elevated temperature application, these products can be classified into two groups being ZINCALUME® steel and zinc-coated steel.

This Technical Bulletin provides information relating to the use of ZINCALUME® steel and zinc-coated steel in high temperature and food contact applications.

In general, for applications involving elevated temperatures, depending on the structural requirements of the component and the temperatures involved, potential changes to the mechanical properties of the base steel, at temperature and subsequent to heating, should be considered.

ZINCALUME® STEEL

ZINCALUME® steel must not be exposed to temperatures in excess of 200ºC.

ZINCALUME® steel is supplied with a clear acrylic coating with a thickness of 1-2µm. This acrylic coating is prone to degradation above 200ºC and can generate fumes above 250ºC.

These fumes may be associated with a heavy odour and discoloration of the metal surface.

ZINC-COATED STEEL

Zinc-coated steel must not be exposed to temperatures in excess of 250ºC.
At temperatures between 250ºC and 300ºC, Fe-Zn alloy growth occurs which appears as spots / blankets on the surface which obscures the spangle pattern.
Between 300ºC and 350ºC, there is fracturing and detachment of the zinc coating and embrittlement of the base steel.

FOOD CONTACT APPLICATION

ZINCALUME® steel should not be used in any applications in contact with food, although it is suitable as a catchment for rain water harvesting.

The surface treatments used in ZINCALUME® steel and the zinc in zinc-coated steel can become soluble when in contact with food acids.

As such, containers manufactured from ZINCALUME® steel and zinc-coated steel must not be used to store food or beverages.

The use of ZINCALUME® steel (which is manufactured with a clear acrylic resin coating) in toasters and heaters is not recommended due to the temperature application issues outlined above.

Aluminium/zinc/magnesium alloy-coated steel without a resin coating may be suitable in these applications.

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