CMT
CONTRARIAN MICRO TEXTURES
by Rigidized® Metals Corporation

Technical Information

Thermal Expansion

While the concept of thermal expansion is well understood among architects and engineers, occasionally there are problems relating to insufficient thermal expansion allowances. If expansion joints are not properly located or fastening points for metal panels do not allow linear expansion, permanent damage can occur to the panel work that otherwise has nowhere to go as it expands. This damage comes in the form of buckled and undulated surfaces that are the result of panel sections colliding with each other. An example of this sort of damage appears in Photo A.

Photo A. *Photo courtesy of Technical Marketing Resources (www.tmrstainless.com), an independent consulting firm specializing in stainless steel applications engineering and marketing.*

Table 1: Thermal Expansion (10^{-6}in./in./°F)

Range Between Room Temperature and 212° - 750° Except Titanium at 1000° - 1800°

MATERIAL	COEFFICIENT
Zinc	19.3
Aluminum	13.7
Stainless Steel	10.2
Copper	9.8
Titanium	7.1

Different materials have unique coefficients of thermal expansion (refer to Table I). Building systems need to be designed to facilitate expansion of the materials from which they are made. Table I provides a ranking of thermal expansion coefficients of different metals.

Expansion joints should have sufficient free play to accommodate the potential expansion of the specific metal being installed. Further, fastening devices must allow for thermal movement. Panel clips should allow panels to slide freely as they expand. Panels should have slotted holes if through-panel fasteners are to be used.

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