Sheet Steel Facts 13

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Position Paper on Oil-Canning: Specifying Wide Flat Panels in Metal Cladding

This Bulletin is intended to inform building designers, architects, specifiers and owners on the phenomenon called "oil-canning". Oil-canning is associated with all thin sheet metal products and occurs in the wide flat portions of the cladding profile. It is seen as a series of standing waves, or regular bumps and hollows alternating along the flat length of the profile. This waviness, when viewed under certain conditions, can be undesirable aesthetically and may not meet with the owner's expectations. The CSSBI wants to help avoid this situation.

The cladding manufacturers are well aware of the potential for oil-canning in their cladding profiles. It is important for the proper steps to be taken during manufacturing to produce a quality product; therefore, specifiers should insist on product from a reliable, experienced cladding manufacturer, like a CSSBI member company.

Quality control, however, cannot end on the shop floor. The building project needs the cooperation and knowledge of everyone involved to enhance the quality of the finished job. Oil-canning is a phenomenon that can be minimized if the following factors are considered.

Sheet Thickness: The thicker the sheet, the flatter the profile can be maintained.

Flat Width: The narrower the flat width of the cladding element, the harder it will be for that area to develop into the noticeable oil-canning waves. The addition of stiffening ridges "breaks up" the surface and reduces the flat width of the profile. If wide flat elements are necessary, then more attention should be paid to the other factors which can reduce the possibility of serious oil-canning.

Temperature: The expansion and contraction of the cladding sheet due to changes in temperature creates stresses which will exaggerate oil-canning. This impact of temperature changes will be deceased if shorter sheet lengths are used.

Cladding Orientation: Cladding profiles can be installed both vertically and horizontally to achieve different architectural effects. The appearance of oil-canning in a vertical application is less pronounced than in a horizontal application due to the different way the eye of the observer perceives the standing waves.

Paint System: The nature of the paint system selected for the cladding is a strong contributor to controlling the visual impact of oil-canning. Textured finishes in lighter colours will reduce the visibility of oil-canning where the identical cladding in a darker colour with a smooth finish will highlight any irregularities.

Cladding Slope: The slope of the wall or roof on which the cladding is mounted will affect the visibility of oil-canning by changing the angle of incidence of the reflected light. Vertical applications with the light striking the surface at high angles of incidence perpendicular to the length of the flat element, will reduce the visibility of the oil-canning waves.

Handling: Carrying of panels in the flat, or twisting of the panels during lifting, can induce a wavy appearance to a previously flat panel. Twisting can occur if one corner of the cladding panel is used to lift the panel or to remove the panel from a bundle.

Installation: Over-engagement of the cladding panel and over-driving of fasteners are two installation related factors which can contribute to oil-canning. Most panels accommodate transverse thermal expansion by flexing of webs and by "take-up" at sidelaps. When panels are over-engaged, these relief features are hindered or eliminated, particularly for flat panels without corrugations. Installing the fasteners requires some control to ensure that the fastener is not over-driven. An over-driven fastener will pull down the cladding locally and can create deformations.

Erection Tolerances: Out-of-straightness of the structural supporting members will increase oil-canning by inducing bending stresses into the profile. As a last resort, the cladding profile can be shimmed to correct the most serious misalignment problems.

This Bulletin has tried to give an objective, factual explanation about the phenomenon of oil-canning in cladding profiles. The customer acceptance of metal cladding will be enhanced if all parties to the building project recognize the factors that contribute to enhancing the appearance of wide flat profiles. This recognition should be made at the start of the project, when there is still the opportunity to discuss any concerns with the cladding manufacturer.

For more information on sheet steel building products, contact the CSSBI at the address shown below, or any of its members companies.

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