What is Tea Staining?

Tea staining can be defined as: discoloration of the surface of stainless steel that does not affect the structural integrity or the longevity of the material.

Contributing Factors and What Can Be Done About Them

The relationships between the contributing factors are complex, but generally become increasingly critical closer to marine water.

Environmental factors
Tea staining occurs most commonly within about 5 kilometers from the surf and becomes progressively worse closer to the marine source. However, wind exposure, pollution levels and higher temperatures can create environments where tea staining might occur 20 kilometers or more from sea water. These same factors also increase corrosion rates of alternative materials.

Surface finish
Rough surface finishes promote tea staining: The smoother the surface finish the better. A surface roughness (Ra) of less than 0.5 micrometers is strongly recommended, a No.4 finish is inadequate. Typically the products in this catalogue are 320 grit or higher which achieves a finish better than 0.5 micrometers Ra.

Stainless steel is not maintenance free but maintenance friendly. When using stainless steel material outdoors you need to clean periodically, especially in aggressive environments like coastal areas or swimming pools. Washing regularly will reduce the risk of tea staining. For best results wash with soap or mild detergent and warm water followed by rinsing with clean cold water. The appearance of the surface can be improved further if the washed surface is wiped dry. There are a few products in this catalogue we recommend for maintenance and cleaning.

Installation and inspection
After installation the complete structure should be washed and inspected for imperfections or contaminants caused in the installation process. If discovered, imperfections should be cleaned off and polished with a suitable stainless polish. Hydrochloric acid, sometimes used to clean cement or mortar residues, should not be used on stainless steel as it will stain the surface and may start more serious corrosion.

The above notes have been researched by the Australian Stainless Steel Development Association (ASSDA).

Mechanical Properties

It should be noted that although the ultimate breaking strength of stainless steel, compared to mild steel, is relatively high, the yield factor of stainless steel is much lower, ie. yield strength can be as low as 40-50% of the ultimate break load (mild steel by comparison has a yield strength of about 65-70%).

NB. It is important to make allowances for the low yield factor when designing structures that require safe working load. The usual proof tests of half break load cannot always be applied to stainless steel products. We advise consultation for advice before conducting proof tests. It has not been feasible to include yield strengths in our catalogue as this can vary greatly from item to item and application. Trade Products will not be held responsible for any replacement of products proof tested without prior consultation.

EXAMPLES OF TEA-STAINING