



Importers and Wholesalers of Stainless Steel Hardware and Wire Rope Fittings,
Swage Presses and Associated Machinery

BRIDCO USER GUIDE AND CONDITIONS OF USE FOR STAINLESS STEEL COMPONENTS

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BRIDCO USER GUIDE AND CONDITIONS OF USE FOR STAINLESS STEEL FITTINGS

The following information is given to assist in the selection and correct use of stainless steel fittings used in rigging, balustrading, architecture and commercial applications.

You should carefully read and understand this brochure before selling, purchasing or treating any stainless steel components.

GRADES: There are many grades of Stainless Steel. You should check the grade of any particular component before selling, purchasing, treating, recommending or using that component for any particular purpose. The majority of Bridco stainless steel fittings are either grade 304, 316 or 316L, which are members of the Austenitic family. The guidelines and recommendations in this brochure are related to these grades.

GRADE 304: Has good corrosion resistance and is one of the most commonly used grades of stainless steel.

GRADE 316: Has a higher level of corrosion resistance. The grade 316 is often referred to as "marine grade". Typical applications are boat fittings and architectural components for exposed coastal applications.

GRADE 316L: Has similar properties to grade 316, however has an even higher level of corrosion resistance and is most suited to welding due to low carbon content.

Determining Grades

Most Bridco parts and fittings are manufactured from Grade 316 stainless steel as advised by our manufacturers. Periodic material analysis is commissioned by Bridco to confirm quality control, however with some cast products it is not always possible to ensure consistent material composition.

Some components also have grub screws, split rings and springs etc, that are often Grade 304.

If it is imperative that fittings fully comply with Grade 316 we recommend that material certificates will be required. Material certificates should be requested at time of order. This way an actual batch test can be supplied or obtained for the fittings supplied.

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, i.e. 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%).

N.B: 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 safely be applied to stainless steel products. We recommend consultation with Bridco for advice before conducting proof tests. It has not been feasible to include yield strengths in our Bridco catalogue as they can vary from fittings and application. The ultimate breaking strength of stainless steel fittings can also vary greatly.

The pictured shackle (SS-360F-10LR) has a rating of 0.75ton W.L.L., Proof load is 1.5ton, yield starts at around 3.0 ton, ultimate break in this instance was 5.72ton.

Note the shackle "broke" due to the pin stretching and pulling out of the body.



Where rated lifting products in stainless steel are required then **BRIDCO LR** or **CROMOX** rated components should be used. These items are only available through approved lifting specialists.

Binding or galling of threads also needs to be taken into consideration. Stainless steel threads have a tendency to seize up under load. Care should be taken to ensure threads are free of dirt or foreign matter and a suitable thread lubricant used.



Magnetism

Generally stainless steel Grade 304 and Grade 316 is non magnetic, however these grades can be become slightly magnetic due to cold working such as machining and finishing or from high temperature welding. Cast products can also be slightly magnetic.

Corrosion Resistance

Selection and installation of appropriate fittings should always be made having regard to the installation environment, access to regular inspection and maintenance and the use to which the products will be put. The following information may help better understand the factors and issues relating to corrosion in stainless steel.

Surface finish

The better the surface finish the better the resistance to corrosion.

For high salt or commercial applications Grade 316 with a high or mirror polish should be used

Satin finished products require extra maintenance especially in high salt environments and are generally not recommended for such applications.

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.

Further treatments such as passivating or electrolyzing will also promote better corrosion resistance.

Please note that modular hand rail fittings, open body turnbuckles etc. in their design, also require more regular maintenance due to gaps and crevices that may trap foreign contaminants.

Tea Staining and Corrosion

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. However if left unattended tea staining can progress to more severe pit corrosion. Pit corrosion is a localized form of surface corrosion which results in small pits or perforations. Embedded iron particles will also promote pit corrosion. Pit corrosion can ultimately damage the surface finish.

Environmental factors

Tea staining occurs most commonly within about 5 kilometers from salt water and becomes progressively worse closer to the source particularly if there is salt spray. However, wind exposure, pollution levels and higher temperatures can create environments where tea staining might occur 20 kilometers or more from the salt water or source of pollution.

Maintain Regularly

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 near salt water, 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 cold water. The appearance of the surface can be improved further if the washed surface is wiped dry.

The schedule for cleaning will vary depending on location and finish. As a general guide use your windows. If your windows are dirty or salty so is the stainless steel.

For further information on stainless steel cleaning and maintenance visit www.euro-inox.org/

Installation and inspection

After installation the completed structure should be washed and inspected for imperfections or contaminants caused by the installation process. Hand tools inc; allen keys and spanners leave fine metal filings that will promote rust stains. If discovered, imperfections should be cleaned off and polished with a suitable stainless polish. Nitric acid based cleaners, such as Bridco B40, dissolve metal contaminants and promote passivation. 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.

On building sites it may be required to re-clean assemblies after the building project is completed.



Maintenance of external applications

Rainfall on a regular basis will remove dirt, dust and other deposits from stainless steel if the design of the facade allows. In most parts of Australia however, there is often insufficient rainfall to effectively clean external fittings.

Bridco therefore recommend the use of the cleaning schedule below.

Environment	Distance from salt spray, beachfront or sheltered bay	Cleaning Interval
Mild	15km+	Every 12 months
Moderate	1 - 15 km	Every 4 - 6 months
Marine/Industrial/Urban	500m - salt spray / beachfront / 100m - 1km - sheltered bay	Every 3 months
Severe marine/Industrial/Busy Urban	500m - salt spray / beachfront / 100m - sheltered bay	Weekly

Warnings

Important notice regarding mooring chains and similar.

Stainless steel requires free access to oxygen. A build up of moisture, particularly salt water trapped in a crevice or very narrow gap can promote "crevice corrosion". Crevice corrosion is a particularly aggressive form of corrosion and is not always visible until catastrophic failure occurs. Barnacle or marine growth on stainless steel shackles or chain left continuously submerged is often responsible for the start of crevice corrosion. It is therefore not recommended that stainless steel items in Grade 304 or Grade 316 be used, continuously submerged in salt water for permanent or long term use as these may fail over time. Consult Bridco for suitable chains for these applications.

Humid Chlorine Environments

Environmental factors such as high humidity, can have a devastating affect on performance. Evidence exists of problems associated with indoor swimming pool enclosures.

Fatiguing

Stainless Steel has a tendency to work harden. Stainless steel wire ropes used on winches and over pulleys with small diameter sheaves have a limited life span. Care should be taken when selecting stainless steel to ensure it is the right product for your application. Consult Bridco for advice applications.

Design and Application

Although Bridco are able to assist and give limited advice we are not engineers or project designers. It is the customer's obligation to ensure that the products chosen will be suitable for the ultimate application. This includes compliance with any relevant building codes or standards.

The above notes have been obtained from the Bridco technical library and from research conducted by the Australian Stainless Steel Development Association (ASSDA) www.assda.asn.au of which BRIDCO is a member.

Warranty and Guarantee

All items stocked by Bridco are guaranteed to be free from defect at the time of shipment. Any item considered by Bridco to be defective will be replaced or repaired in accordance with our Terms and Conditions of Sale.

Bridco will not be liable

- * For any labor costs, charges or penalties incurred in the replacement of any item.
- * For defects in any item, which exceed its replacement cost to Bridco.
- * Fittings which are selected and installed without first obtaining our advice about the appropriate fittings for the specific installation environment.
- * Products that are not appropriate to the installation environment.
- * Products or property suffering damage, deterioration or staining as a result of inappropriate selection, installation, lack of care, lack of cleaning or lack of regular periodic maintenance in accordance with Bridco's recommendations.

Returns and Credits: refer to our Terms and Conditions of Sale.

A printable version of the 'Bridco User Guide' is available to download from our website www.bridco.com.au