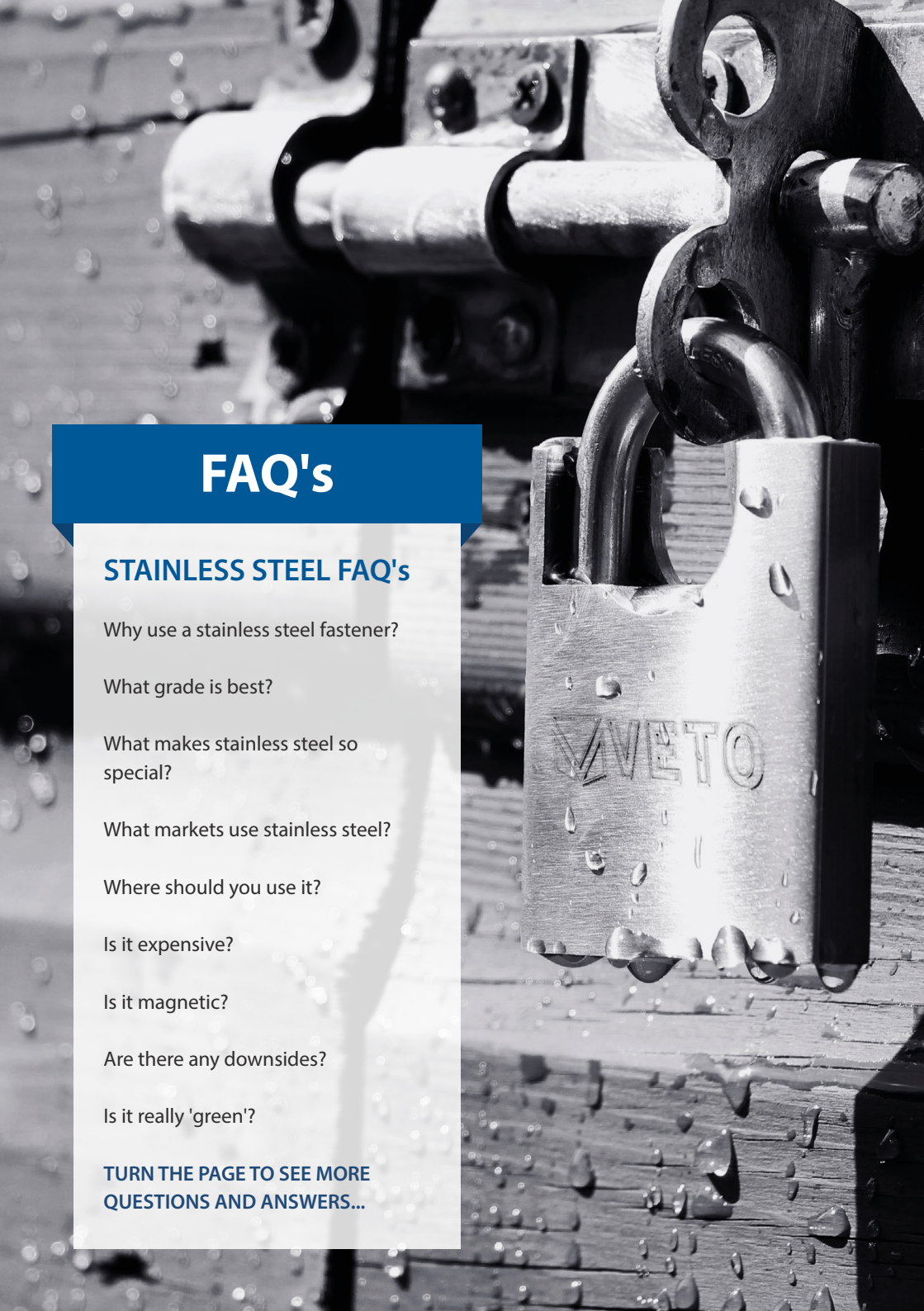


FAQ's

STAINLESS STEEL FAQ's

Why use a stainless steel fastener?

What grade is best?

What makes stainless steel so special?

What markets use stainless steel?

Where should you use it?

Is it expensive?

Is it magnetic?

Are there any downsides?

Is it really 'green'?

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1) Why use a stainless steel fastener?

SECURING WOOD:

Whether you are fixing decking, cladding or constructing buildings the wood contains water, tannins, pigments, oils and when in contact with a metal fixing corrosion begins. Adverse conditions (e.g. moisture in the air, acidic rain, salts, chlorine, higher temperatures) can accelerate the process and lead to discolouration around the location, and/or failure of the fixing along with deterioration of the wood in contact with the fixing. Stainless steel has properties that resist the corrosion process and hence are favoured by Carpenters, Joiners, Architects and Engineers. The rate at which acetic acid is liberated depends on the chemical constitution of the wood from which it is derived. This varies with species and largely accounts for the considerable differences in rates of production of acetic acid between timbers. Hardwoods are more prone to the natural releasing of acetic acids e.g. Oak, Cedar, Redwoods, Sweet Chestnut and Douglas Fir. In practice, kiln dried woods are much more likely to cause corrosion than air dried woods.

SECURING METAL:

Stainless steels are often selected for their corrosive resistance and good practice recommends continuity of material type with the fastener to ensure fit for purpose and longevity of service life. Stainless steel is less prone to corrode than carbon steel or aluminium making it the preferred choice. They are also suited to fix other metal types (e.g. aluminium sheets, steel pipes) but working environments can cause bimetallic (galvanic) corrosion and movement can cause galling ("welding") so other precautionary measures may be required.

2) What grade is best?

There are a multitude of types and grades of stainless steels. Since the microstructure of stainless steels has a decisive effect on properties, stainless steels have been divided into types depending on their microstructure at room temperature; Ferritic, Martensitic, Duplex and Austenitic. The addition of different elements during manufacturing creates the different types and grades. Most popular and readily available for fasteners is A2 austenitic stainless steel (also referred to as 18/8, 304 and EN 1.4301), this grade has a typical composition of 18% Chromium and 8% Nickel. For use in harsher environments, e.g. coastal, chemical, A4 also referred to as Marine grade, 316, EN1.4401, which has the element Molybdenum added is more suitable as the addition provides further resistance to corrosion.


NITON XRF ANALYSER



3) What makes stainless steel so special?

Stainless steels form a self protecting oxide layer when the right amount of chromium is added during manufacture. This layer self repairs in both dry and wet atmospheres without the need of costly painting, cleaning or maintenance. Improvements in manufacturing allow different amounts of elements to be added accurately to create this incredibly versatile alloy.

4) What markets use stainless steel now?

The Food, Drink, Pharmaceutical and Chemical industries have utilised the benefits of stainless steel for many years for reasons of cleanliness, resistance to chemicals, preventing contamination and ensuring the quality of our daily drinks, food and drugs. Likewise the Oil, Gas and Marine industries are reliant on stainless steel to survive the harsh conditions of exploration and distribution of fuel and transport around the globe. However with the development of supply chains and logistics, Stainless Steel fasteners are now more readily available to the public and professionals via multiple outlets, no longer is it to be considered as a specialist product.





5) Where should you use stainless steel?

There are three main geographical areas: Coastal, Industrial and Urban. Interestingly, coastal conditions in Great Britain can be found up to 10 miles inland. Industrial areas are usually self-contained within the manufacturing plant and specified within the construction and maintenance schedules. Urban areas especially near roads suffer from traffic pollution and salt from de-icing roads that can travel in the wind and attack buildings, bridges, tunnels, facades, cladding etc. Constructions 200m away from a busy road and 12 storeys high have been found to suffer measurable chloride corrosion.

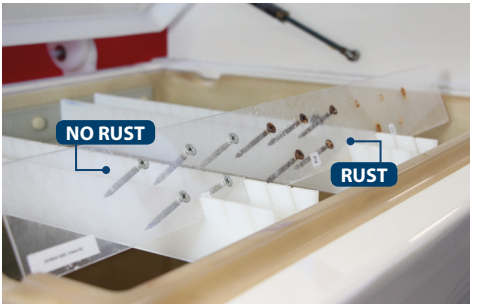
6) Is stainless steel expensive?

Compared to Carbon Steel fasteners, Stainless are typically of higher value. However as global production increases and Nickel prices remain low, the A2 stainless steel offers incredible value for money. The element Nickel is an important constituent of the alloy and historically been a cause of price volatility. Global markets dictate exchange rates, import tariffs, transportation costs, alloying element costs, production capacity and supply volumes; all factors determining the price of stainless steel.

7) How do I know if it's stainless steel?

Several plated products especially Zinc plated products look very similar however once installed the cost of failure or "bleeding" can have significant costs. The supply chain needs to have quality assurance processes and quality control checks to ensure the correct chemical composition of fasteners. New testing facilities at TIMco test the chemical composition of all products to check the stainless grades and provide the reassurance that customers need.





8) Is stainless steel magnetic?

Stainless in general tends to be LESS magnetic than "ordinary" steel, and some grades are non-magnetic. Stainless steel bolts can become slightly magnetic when processed by cold working. Even though the "raw material" going into the bolt making machine is non-magnetic, the process of forming the head and threads may cause the bolts coming out of the machine to be slightly magnetised.

9) Are there any downsides to stainless steel?

Not many! Compared to Carbon Steel fasteners it is softer and so pilot holes are recommended for wood screws in hardwoods whilst bolts need to be tightened slowly and less, preferably with some lubrication to reduce galling. Torque setting tables and torque wrench tools are highly recommended. As with most things in life, better products cost more.



10) Other factors driving the uptake of stainless?

Stainless steel is particularly suited to large-scale installations in segments of the commercial and public sector, such as hospitals, children's homes, sheltered housing, prisons, schools and hotels; in other words anywhere there is a health & safety issue.

11) Where can I get stainless steel fasteners?

TIMco's network of distributors can provide most stainless steel fasteners from stock or as a next day delivery service. As the world wakes up to the benefits of stainless more types and sizes will become available.

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sales@TIMco.co.uk • www.TIMco.co.uk

12) Where can I find examples of stainless steel?

The Chrysler building is probably the most famous of all the landmarks for its use of stainless steel, erected in 1930 in New York, it has only been cleaned 3 times and is still in perfect condition. The North Sea oil and gas industry has been built on the reliability of stainless steel in oil rigs and pipes. Every kitchen and restaurant will be full of stainless screws holding pipes, tables, sinks and toilets in place. New air conditioning units contain stainless steel filters to prevent bacteria growth. The internet and social media has an ever growing array of images and projects that are underpinned by stainless. Check out the horse heads (the Kelpies) in Falkirk.


CHRYSLER BUILDING

13) Is stainless steel really envionmentally friendly?

Yes, of all the mainstream metals and alloys available today, stainless steel is regarded as probably the most recyclable, sustainable and environmentally friendly metal on the planet.

CHEMICAL COMPOSITION

CHEMICAL COMPOSITION % [1]									
Grade	Elements								Notes
	C	Si	Mn	P	S	Cr	Mo[8]	Ni	
A2 (304)	0.1	1.0	2.0	0.05	0.03	15-20	0	8.0-19.0	3, 4, 5, 6, 7
A4 (316)	0.08	1.0	2.0	0.045	0.03	16-18.5	2.0-3.0	10.0-15.0	3, 4, 5, 6
410	0.09 - 0.15	1.0	1.0	0.05	0.03	11.5-13.5	0	1.0	

Notes:

1) Maximum values unless stated otherwise.
3) May contain Titanium <5 x C up to 0.8%
4) May contain Niobium and/or Titanium >10 x C up to 1.0%
5) Containing Titanium >5 x C up to 0.8%
6) May contain Copper up to 4.0%
7) Molybdenum may also be present at manufacturers option.
8) Maximum Molybdenum content may be specified in certain applications.

Elements:

C - Carbon
Si - Silicon
Mn - Manganese
P - Phosphorous
S - Sulphur
Cr - Chromium
Mo - Molybdenum
Ni - Nickel

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