DIY Stainless Wire Balustrading the AAA way

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Introduction

The best decks are practical, look good and are safe. At AAA Metal Suppliers we can help you achieve a professional quality job, whilst saving you money. Our high quality wire and marine grade stainless fittings have proven themselves in the marketplace for many years and have been used by professional balustraders, builders and DIY customers with outstanding results.

This guide to DIY balustrading, using AAA Metal Suppliers fittings, will show you in easy steps how to achieve a professional looking result. All you need is a basic set of tools including a measuring tape and a drill. We can offer hydraulic pre-swaged wires cut to fit your posts together with the fittings of your choice or, if you prefer, we can supply you with the parts and tools needed to hand or hydraulically swage your balustrade fittings.

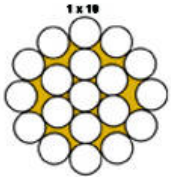
When you are ready just tell us the measurements between the posts you will be anchoring the wire from, the type of fittings you are after and we shall phone/fax/email a quote to you with a range of options that meet the Building Code of Australia (BCA) regulations. Any deck that is more than one metre off the ground has to have a balustrade or railing. The regulations also specify the types of materials allowed and the spacing between the wires. If you are building a new deck, or retrofitting a new balustrade to an existing deck, it's always good to check with your local council first. The distance between the wires and their ability to prevent small children from falling through is most important.

The cost of a wire balustrade depends on if you are having it professionally installed or if you are doing it yourself. Fully installed, the balustrade will cost between $600 and $700 per lineal metre. AAA Metal Suppliers DIY balustrades will cost around $200 -$300 per lineal metre. The final price is usually determined by a number of factors, but the main cost is usually the type and number of rigging screws and anchor points.

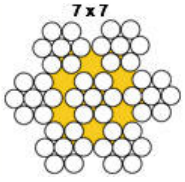
Choosing the Look

First you will need to decide how you would like the finished job to look. Please take a look at the photos in the DIY Gallery at www.aaametalsuppliers.com.au. They show some of the options available depending on whether you are using timber or steel posts or having the fittings hydraulically or hand swaged.

The most common wires used for balustrades are 3.2mm 1 x 19, 3.2mm 7 x 7 and 3.2mm 7 x 19 wire. 3.2mm refers to the diameter of the wire and 1 x 19, 7 x 7 or 7 x 19 refers to its construction, i.e. a 7 x 7 wire is made up of 7 wires with 7 strands within each wire.



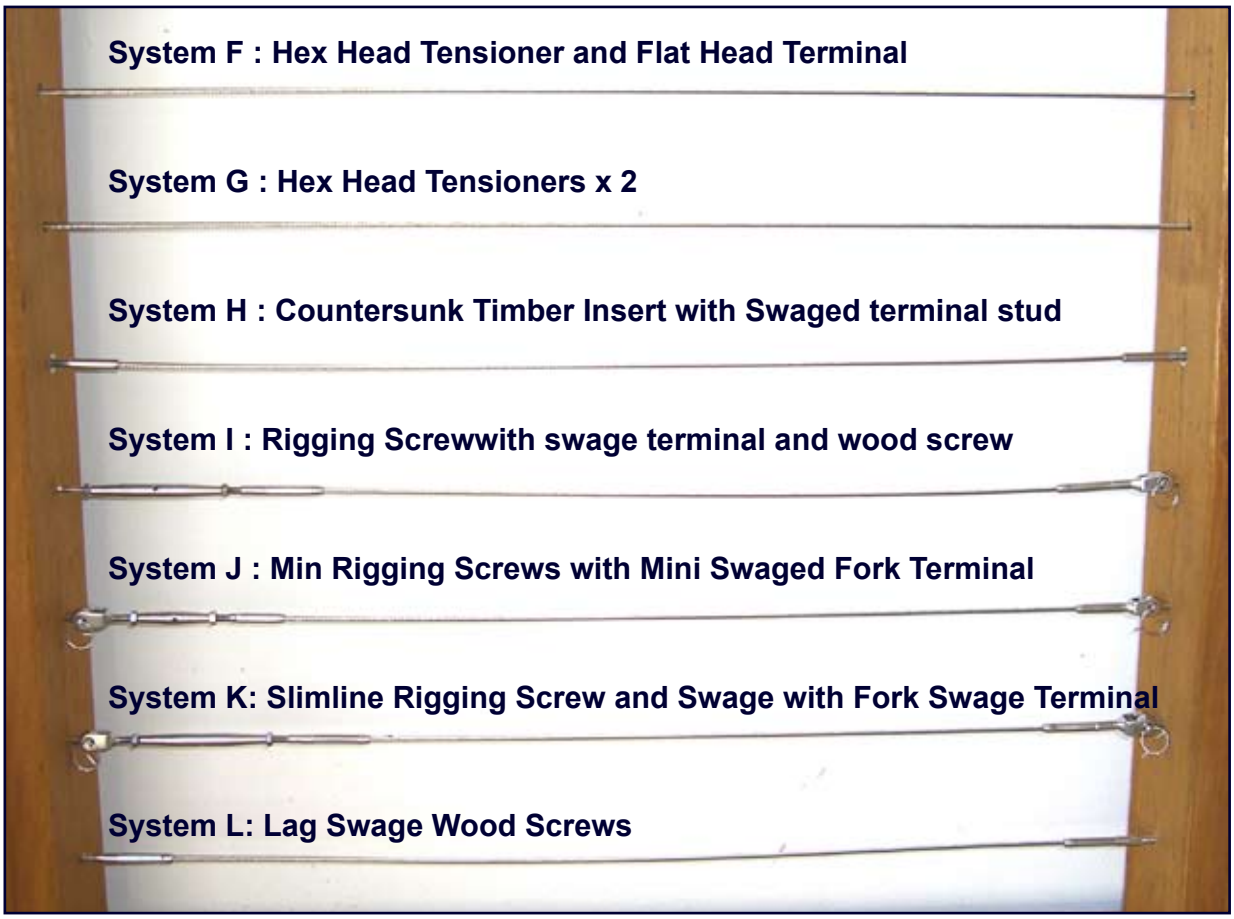
***1 x 19** - Is a very rigid wire making it very well suited for wire balustrades, however it cannot be hand swaged, making it only suitable for hydraulic swaging.*



***7 x 7** - Is a semi flexible wire making it the perfect choice for balustrades where hand swaging is being used.*

If you intend to hand swage the fittings yourself, use 7 x 7 or 7 x 19 wire rope with a thimble and ferrule at each end. The wire is tensioned using a Jaw/Jaw Rigging Screw. This gives a balanced, neat looking job.

Some DIY customers prefer the smoother line of hydraulically swaged fittings and 1 x 19 wire rope (swaging is undertaken in our workshop or we can hire you an hydraulic swager if you prefer). There are a variety of options available depending on whether you are using metal or timber posts. These usually involve a Jaw/Terminal Swaged Rigging Screw at one end of the wire and a Swaged Fork Terminal at the other.



* Systems G and F are through post wiring using hex head tensioning screws.

The Building Code of Australia (BCA) WIRE BALUSTRADE REGULATIONS

Most Councils have adopted the BCA Regulations for the spacing, position and installation of stainless wire balustrading. A few have their own particular requirements and we recommend that you check with your local council's building department before commencing this work.

If the bottom of your deck is less than 1 metre off the ground, then the Regulations will not apply to you. You can decide the most appropriate level of safety, wire spacing, and how many support posts you use on your balustrade.

If your deck has a drop off more than 1 metre to the area below and less than 4 metres you will need to fit your wires and posts according to BCA Regulations. In order to satisfy the 2009 BCA Regulations for a horizontal wire balustrade your system must not exceed the maximum deflections set out in Table I

If your deck has a drop off more than 4 metres to the area below, you are not allowed to use horizontal wires and instead they will need to be vertical or you can use a mesh infill.

Runs of wire can only be installed in straight lines and must be terminated at each corner. We recommend a maximum length of any run to be 10 meters. If you have a straight line of over 10 meters you should terminate on one side of a centre post and start a new run on the other.

TABLE I - WIRE BALUSTRADE CONSTRUCTION – MAXIMUM PERMISSIBLE DEFLECTION FOR STAINLESS STEEL WIRES, BCA 2009

		Clear Distance Between Posts (mm)					
		600	900	1200	1500	1800	2000
Wire dia. (mm)	Wire spacing (mm)	Maximum permissible deflection of each wire in mm when a 2 kg mass is suspended at mid span					
2.5	60	17	11	9	8	8	8
	80	7	5	5	5	X	X
3.0	60	19	13	8	7	7	7
	80	8	6	6	5	5	5
4.0	60	18	12	8	8	7	7
	80	8	6	4	4	4	4

Notes:	
1	Where a change of direction is made in a run of wire the 2 kg mass must be placed at the middle of the longest span.
2	If a 3.2 mm wire is used, the deflection figures for 3.0 mm wire are applied.
3	This table may also be used for a set of non-continuous (single) vertical wires forming a balustrade using the appropriate clear distance between posts as the vertical clear distance between the rails. The deflection (offset) is measured by hooking a standard spring scale to the mid span of each wire and pulling it horizontally until a force of 19.6 N is applied.
4	X = Not allowed because the required tension would exceed the safe load of the wire.
5	This table has been limited to 60 mm and 80 mm spaces for 2.5 mm, 3 mm and 4 mm diameter wires because the required wire tensions at greater spacings would require the tension to be beyond the wire safe load limit, or the allowed deflection would be impractical to measure.

Decide how many wires your need?

As a general guide we have found that the easiest way to ensure that the tension required for your balustrade will pass inspection is as follows:

Using 3.2mm 1 x 19 wire with hydraulically swaged fittings

- Distance between any posts no greater than 1200mm
- 80mm spacing between wires

or

Using 3.2mm 7x7 or 7x19 wire with hand swaged fittings

- Distance between posts no greater than 1200mm
- 60mm spacing between wires

Still confused?

If you wish to have greater distances between your posts and your job requires inspection, then posts may be further apart up to a maximum of 2m, but the trade off is your wire must be tensioned more tightly and spacing between wires reduced.

How to test?

Hang a 2kg weight, a full 2lt milk container works well, in the mid point of your wire between posts and measure the difference in deflection. If the wire deflects more than the maximum permissible as per Table 1 then the wire needs to be tensioned further. However, we suggest you contact AAA Metal Suppliers for advice on the most appropriate fittings to use in your situation.

Installing wire balustrade with threaded inserts (System H)

Step 1
Use a template clamped to the post to drill out the holes for inserts.

CS-TI

Step 2
Screw in the inserts (Left and right hand inserts must be fitted at opposite ends).

Step 3
Screw swaged wires into the inserts to the desired tension.

Steps to Installing Hand Swaged Wire Balustrade Using 5mm Saddles as the Anchor Point

What's easiest for a first timer?

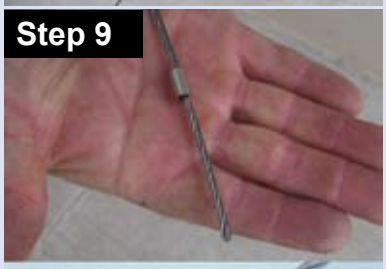
Step 1
Make up a template with desired wire spacings (i.e. 60mm, 80mm, 100mm).

Step 2
Drill holes in the template 20mm either side of the desired wire spacings to locate the screw points/pop rivets for the saddles.

Step 3
Clamp template to anchor post.

Step 4
Using a 3mm drill, drill out holes for screwing in the saddles

Step 5
Drill new holes in the template at the desired wire spacings. These holes must line up with the middle of the saddles or your wires will not be parallel.



Step 6
Clamp template to intermediate posts, if any, and drill holes. If grommets are to be inserted into intermediate posts a 9.0mm hole is required.
Measure and cut the length of the wire required

The length of wire can be calculated using the following formula:
A. The length inside to inside of posts
B. The overall length of the rigging screw/turnbuckle in a semi open position (minimum of 25mm of thread exposed at each end).
C. The inside height of the saddle at each end (approx 10mm for SAD-05 saddles)
D. The wire loop around the thimble and ferrule on each end of wire (approx 50mm for 3.0mm thimbles)

Length of wire = A-B-2C+2D

Step 7
Cut the wire with parrot beak wire cutters, not pliers. Hint: If using 3.2mm diameter wire, mark 50mm back from each end of the wire with a marker pen. This is where the back of the ferrule should end.

Step 8
Slip the wire through the intermediate post holes before commencing swaging. Split grommets can be fitted after installation is complete.

Hand swaging the ferrule

Step 9
Slip the ferrule over the main wire and loop the end of the wire also into the ferrule. Using pliers to hold the ferrule in place pull the main wire down onto the thimble until the wire holds the thimble in position. Ideally the thimble should be held firmly inside the loop of the wire but this is not critical. For safety and aesthetic reasons it is best that the very end of the wire does not protrude beyond the end of the ferrule.

Step 10
Using the hand crimper with the correct jaw size place the ferrule/thimble/wire into its jaws and squeeze handles fully together to crimp the ferrule onto the wire. Note: Different size ferrules require different size jaw openings.

Step 11
Slip the saddle through the eye of the thimble and attach to the post using 8 gauge screws or pop rivets depending on post type.

Step 12
Tension the wire strands by rotating turnbuckle/rigging screw as desired.

We recommend that you make up one wire and test it in position before doing multiple runs. If OK, repeat for the other wires.

Steps to Installing hydraulically swaged wire balustrade

(single point anchors such as lag screw eyes, coach screw eyes, eye bolt)

What's easiest for a first timer?

Step 1
Make up a template with desired wire spacings.

Step 2
Clamp template to post.

Step 3
Using suitable sized drill, drill out holes for fixing anchor points.

Steps 4A and 4B
Attach anchor points. Hint: Use the socket tool, LSE-tool, to drive the lag screw into the post. If using saddles use 8 guage screws to attach to post

Step 5
Clamp template to intermediate posts, if any, and drill holes. Note: If using pre-swaged wires 7.5mm (min) hole is needed for the wire to pass through the holes. If grommets are to be inserted into intermediate posts a 9.0mm hole is required.

Step 6
If wires are factory swaged, lay out wires with the adjustable ends in their intended position, otherwise go to step 11.

Step 7
Attach non adjustable end (e.g. fork terminal, button terminal) to your anchor point.

Step 8
Undo threaded terminal end from the rigging screw.

Step 9
Feed the wire through the intermediate post. Split grommets can be fitted after installation is complete.

Step 10
Re attach threaded terminal end to rigging screw and tension as required using the C-Spanner.

Step 11
Measure and cut the length of the wire required.
The length of wire can be estimated as follows, depending on the System you are using:

F : -75mm measured to outside of post
G : -150mm measured to outside of post
H : -20mm measured to inside of post
I : -180mm measured to inside of post
J : -140mm measured to inside of post
K : -210mm measured to inside of post
L : -50mm measured to inside of post (approximately)

Step 12
Cut the wire with parrot beak wire cutters, not pliers.

Step 13
Slide the wire into the swage end of the fitting.

Step 14
Hydraulically swage the fittings to the wire. Then go to step 7.

Want to do the hydraulic swaging yourself?

We can hire you an hydraulic swager and a wire cutter for $50 for two weeks (customer pays for return freight). Full easy to use instructions come with the hydraulic swager.

FLEX MESH

Made from high quality ASIS 316 marine stainless cable and secured with seamless stainless ferrules for added strength, FLEX Mesh offers a cost competitive, low maintenance balustrade solution for coastal areas.

FLEX Mesh offers an aesthetically pleasing, cost-competitive alternative to balustrades for bridges, staircases, marinas and multi-storey carparks, large barrier fences, wildlife enclosures and for supporting climbing plants on building facades. The thin stainless wire rope mesh is ideally suited for light, transparent structures under extremely high loads in harsh environments. Where fall protection and transparency are required, such as mezzanine floors, this stainless mesh can be combined as an integral part of the architectural structure.

FLEX Mesh is ideal as a stainless balustrade infill. It can be installed using traditional stainless tubes or strong stainless tensioning cables.

FLEX Mesh's 3D flexibility provides a light and almost invisible fall protection barrier. It is an example of how technical and aesthetic demands can be combined as an integral part of architectural components.

Manufactured to ISO9001 Standards, FLEX Mesh is available in a range of cable diameters from 1mm to 4mm and diamond sizes from 25mm (MW) x 43mm (MH) to 180mm (MW) x 312mm (MH).

Common Balustrade Fittings

Post Reducer (PR-38)

Ferrule (FE-MS-03)

Saddle (SAD-05))

Thimble (TH-03)

Coach Screw Eye (CSE)

Flat Head Swage Terminal (FHT-032)

Hex Head Tensioner (HTEN-R)

Turnbuckle Jaw/Jaw (TB-JJ-05)

Turnbuckle Eye/Eye (TB-EE-05)

Rigging Screw Swage/Swage (RS-SS-53)

Fork Screw Terminal (FT-S-05)

Rigging Screw Jaw/Swage (RS-JS-53)

Threaded Swage Terminal (TT-03205)

Wood Screw Threaded Terminal (LS-TT-05)

Lag Eye Screw (LHS-06)

Care of Stainless Steel Balustrade

Stainless steel looks best if it's cleaned regularly. Routine cleaning prevents any stubborn stains building up.

So what will you need?

For day to day cleaning, plenty of water, some mild detergent and a cloth or soft brush will do the job. You can use a 1% ammonia solution but don't use bleach. It's just too easy to make the solution too strong and too hard to rinse it properly afterwards. After washing, rinse in clean water and wipe the surface dry with a soft absorbent cloth. Simply wiping with a damp cloth is not as effective as it can smear dirt without removing it.

If you have to scrub a stain to remove it, make sure you use a clean nylon scourer or a cloth with chalk-based cream cleaner. NEVER EVER use steel wool (wire wool) to clean stainless steel. It is usually made of carbon steel and any fragments left behind will rust onto the stainless steel surface.

Watch out for scratches!

Stainless steel can be scratched by careless handling or aggressive scrubbing. Just like you would take care of a polished timber finish, avoid dragging rough items across the surface and be aware that grit trapped under other objects can be the culprit.

Avoid bad chemistry

Stainless steel may discolour if left in contact with salts or acids for extended periods.

Fingerprints, oil & grease marks

Unsightly fingermarks can be removed using glass cleaner and a soft cloth. You can also use a small amount of alcohol, methylated spirits, acetone or mineral turpentine. Then rinse with clean water and dry.

Rust marks

Apply cream cleanser with a soft damp cloth and rub gently. If the mark still won't shift, it might be necessary to use a proprietary stainless steel cleaner. These are usually based on dangerous chemicals (such as phosphoric, oxalic or sulphamic acids) and must be handled with care according to the manufacturer's directions. After cleaning it is important to neutralise the acid with a 1% ammonia or baking powder solution, rinse with lots of clean water and wipe dry.

Cement and mortar

Cement and mortar splashes should be washed off before they set. Mild acids such as vinegar may be needed but not those using chloride rich chemicals. Never use brick cleaning liquids which contain hydrochloric acid. Be very careful that loosened particles don't scratch the steel surface.

Don't go against the grain

Rubbing stainless steel against the grain will spoil the finish and stainless will lose its shine. Worse, rubbing against the grain can damage the surface by creating microscopic crevices where dirt can collect. This can lead to corrosion spots.

Avoid tea staining

Protection is always better than cure so we recommend a thin coating of "SALT X" or a liberal coating of car polish applied to your wires when they are installed and every 6 months thereafter. This prevents a build up of dirt in the twists of the wires and tea staining.

Plan, Measurement and Quotation Form

It is always a good idea to use the AAA Metal Suppliers' Checklist (below) to check what is required.

Become one of our many hundreds of satisfied customers and enjoy the savings, the ease of installation and the joy of achieving a professional looking job.

CHECKLIST

Accurately measure the distances between each of the anchor posts (inside to inside measurement). Lengths (or fax/email rough plan with lengths indicated)

Wire Length	Wire Size	No. of Runs	Swage Type (Hand or Hydraulic)	Fitting to be Swaged on	System No.
(Examples)					
4700mm	3.2 1x19	11	Hydraulic	RSJS+FT-032	K
2275mm	3.2 7x7	11	Hand	RSJS+FT-032	K
3215mm	3.2 1x19	11	Hydraulic	CSTI	H
(Your Order)					
Other - Please indicate					
Contact Details					
Name					
Address					
Contact No					
Email or Fax to					

Important Disclaimer
The recommendations contained in this publication are necessarily of a general nature and should not be relied on for specific applications without first securing competent advice. Whilst we have taken all reasonable steps to ensure the information contained herein is accurate and current, we do not warrant the accuracy or completeness of the information and do not accept liability for errors or omissions.

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