

AUSTRALIAN STAINLESS

SPECIALISING IN STAINLESS STEEL AND ITS APPLICATIONS

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Photography: Shane Jones (159 Photography). Courtesy of Kane Constructions.



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Stainless Steel Supports Innovative and Engaging New Face for the Australian Museum

The Australian Museum's 2015 facelift saw its new entrance remade with a contemporary glass curtain wall feature supported by stainless steel.

The design brief for the architecturally stunning entrance hall feature was a structure that conveyed the image of a modern and transparent institution. Designers Neeson Murcutt Architects and Joseph Grech Architects drew inspiration from the museum's collection of gemstones for the new façade, resulting in a double-glazed window set against coloured glass panes.

ASSDA Member SGM Fabrication & Construction fabricated the stainless steel frames to support the glass facade as part of the museum's redevelopment plan. This transformation saw Australia's oldest museum swing the orientation of its entrance from College Street to William Street.

Fifteen stainless steel framed glass panels stand 8.5m high by 1.6m wide to form a dramatic vertically pleated structure that runs parallel to and complements the existing sandstone wall. Behind the glass façade are 48 diamond-shaped coloured glass panes positioned to take advantage of the northern sun, diffusing and refracting the light to create a welcoming ambience into the museum.

Around 30 tonnes of specialty glass was imported from Luxembourg for the façade. Seven tonnes of 316L stainless steel was used for the frames, including rectangular hollow sections (RHS) supplied by ASSDA Sponsor Midway Metals and 8mm plate supplied and laser cut by ASSDA Sponsor Vulcan Stainless.

SGM Fabrication & Construction's Managing Director Scott McHugh said welding the stainless steel frames was challenging due to the length and material, and all stainless steel plate had to be individually laser cut by Vulcan Stainless prior to being pressed. 'Straightness was a big consideration due to the frames holding 30mm thick glass in place. The frames had to be straight and true to within 3mm over the entire length (0.4% tolerance) to support the double-glazed glass.'

The stainless steel frames were pickled and passivated by ASSDA Member Australian Pickling & Passivation Service (APAPS) to remove any heat-affected areas from the laser cuttings and to ensure there was no iron contamination from the pressing.

The frames were specified in stainless steel for its strength, visual appeal and similarity of low maintenance regimes with glass. It was installed by Kane Constructions and the entrance hall was officially opened in September 2015.

The museum's grand entrance feature is a modern addition to the historically and culturally significant building, certain to maintain its visual appeal for decades to come.



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The Australian Museum.

Photography: Shane Jones (159 Photography).

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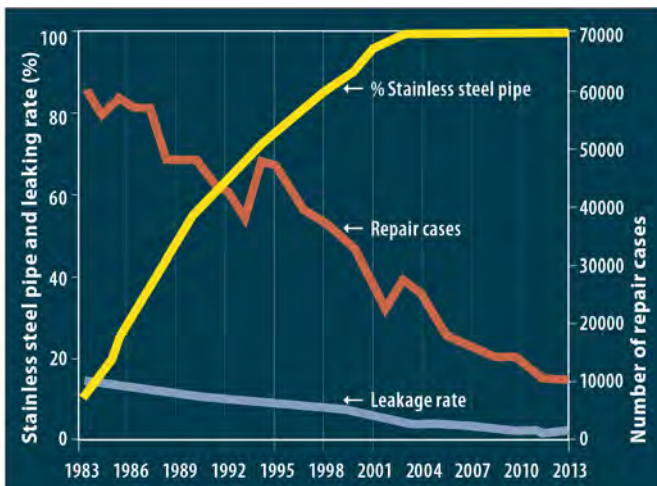
Corrugated pipe installation.

Image courtesy of Tokyo Suido Services/Showarasekan.

Tokyo, Japan

Prior to the 1980's, water shortages in Tokyo were chronic and rationing was occasionally required. When the city's water provider, the Tokyo Metropolitan Government Waterworks Bureau (TMGWB), analysed leakage repairs, they determined that 97% were on the distribution pipes of 50mm diameter or less. In Tokyo, there are more than two million such connections that take the water from the mains to internal systems in buildings. Historically, lead pipe was the preferred material for distribution lines because it is soft, malleable and easy to work with, especially for the last few metres from the mains to buildings. Once lead pipe is in the ground, however, various forces can act on it. Vibrations from traffic and construction work as well as subsidence and earthquakes can cause the soft lead pipes to deform, become detached or even break.

In 1980, TMGWB started to actively replace all service connections with grade 316 (UNS S31600) stainless steel pipe. In 1998 corrugated grade 316 (S31600) stainless steel pipe was introduced for distribution lines that take water from the mains to final destinations in homes, offices and industrial plants. The pipe is corrugated at regular intervals to allow for it to be bent during installation, to accommodate changes in direction and the avoidance of obstacles without additional joints. It also allows for movement of the pipe during earth movement and seismic events. By supplying a single length of corrugated stainless steel pipe, the number of pipe joints was greatly reduced. In switching to stainless steel pipe, the reliability of the water supply has increased and the leakage rate has been reduced by 86% from 15.4% (1980) to 2.2% (2013). To put this into context, since 1994 Tokyo has reduced annual water leakage by nearly 142 million cubic metres - the equivalent of 155 Olympic-size swimming pools per day, with savings in excess of US\$200 million per year. Also, annual leak repairs have decreased from 60,000 (1983) to 10,000 (2013). Due to the corrosion resistance of stainless steel, TMGWB expects service life in excess of 100 years.



Correlation between repair cases, leakage rates and installation of stainless steel pipes in Tokyo.

Courtesy of the Bureau of Water Works, Tokyo Metropolitan Government.

Taipei, Taiwan

In 2002, a severe drought brought intermittent water supplies to the Taiwanese capital over a 49-day period. Of the 450 metering areas in the city, 40% were losing half of their water or more before it reached consumers.

Analysis of repair cases showed that while polybutylene pipe made up only 3% of the length of the system, it accounted for 28% of all leaks. Approximately 90% of all problems occurred in plastic pipes, with the vast majority (83%) caused by cracking.

In 2003, the Taipei Water Department began a similar program to Tokyo, replacing distribution lines with corrugated grade 316L (S31603) stainless steel pipe. Although the ongoing program has so far only replaced 35% of the lines, the result has been a reduction in water loss from 27% (2003) to 17% (2014). This adds up to an annual saving of 146 million cubic metres of water, the equivalent of 160 Olympic-size swimming pools per day.

In 2014, a drought occurred with even less rainfall than the 2002 event which precipitated the pipe replacement program. However this time, the improvement in leakage rates achieved since 2003 meant there was no interruption to the water supply.

The 2002 drought in Taipei caused severe water shortages.

Image courtesy of the Taipei Water Department.



Western Cape, South Africa

South Africa is by nature a semi-arid country; its annual rainfall is only half the global average. It has a population of 55 million and is facing freshwater scarcity. It is estimated that at least 37% of its clean drinkable water is lost due to leakage from old and unreliable infrastructure.

The Groot Drakenstein Valley is the cradle of the South African deciduous fruit and wine industries. Water is supplied to over 800 farms including 50 vineyards. Here, there are numerous examples of carbon steel and cast iron pipes that have failed in many areas after just one year due to the very aggressive acidic soils and high water table. "We started a project in 1992 in the Drakenstein Municipality to replace existing piping with stainless steel," explains André Kowalewski, Senior Engineer - Water Services, Drakenstein Municipality. "We have reduced water loss to around 13% in comparison to the 37% national average. Ten years back only the Drakenstein Municipality used stainless steel. Now 80% of the Western Cape municipalities do."

André and his team plan for a life expectancy in excess of 50 years. Stainless steel used in Drakenstein is primarily grade 316 and in some cases grade 304 (S30400) in visible locations. Projects are currently focussed around pumping, purification, storage, pipelines and sewage. One such project is a 500 mega-litre/day delivery system completely in grade 316 stainless steel.

Investing in the future

The experience of Tokyo, Taipei and the Western Cape gives water authorities the confidence to specify stainless steel for piping systems. While the initial cost compared to competing materials may be higher, stainless steel has been shown to be a good investment over its long life, paying back each year in reduced maintenance and cost per litre processed.

This article was originally printed in Nickel Magazine (August 2016, Vol. 31, No.2), published by ASSDA Sponsor Nickel Institute.



Stainless steel pipe in the Western Cape resists aggressive acidic soil conditions.

Images courtesy of Johan Van Zyl.



Stainless Steel Transforms Meat Processing Plant

Over 17 tonnes of stainless steel has been used for the upgrade of a premier meat processing plant to support the growing local and global demands of Australian red meat supply.

The Australian Lamb Company (ALC) currently exports lamb to more than 60 countries worldwide, and recently secured a 10-year contract to process lamb for Coles supermarkets in eastern Australia.

ALC's multi-million dollar investment to support demand and increase production capacity included the expansion and upgrade of its meat processing operation in Colac, Victoria.

ASSDA Member and Accredited Fabricator Stainless Steel Associated Fabricators (SSAF) Australia was engaged to design, manufacture and install 65 box conveyors spanning 400m, three access walkovers and 30 production tables for the plant's re-engineered automated boning room.

The conveyor system was designed by SSAF Australia with input from the ALC's production team to achieve optimum process flow. The main criterion for the mechanical design was excellent product transfer, mechanical reliability and optimal hygiene through easy cleaning of the conveyor's belt and frame.

The box conveyors are a semi-modular design using the latest SEW-EURODRIVE MOVIGEAR® SERVO motors and gearboxes. Compared with conventional motors and gearboxes, SSAF Australia's Managing Director Chris Stacey said these systems are significantly more efficient in reducing power usage and allowing a wider speed range without loss in torque.

Grade 304 stainless steel with a 2B finish was specified and used for the upgrade, supplied by ASSDA Sponsors Atlas Steels, Midway Metals and Vulcan Stainless.

Grade 304 stainless steel is a standard requirement in the food industry where acid and salt are not present in the production process. With rigorous standards in food safety and hygiene to adhere to, the boning room must be washed down daily and to this end, the conveyors incorporate CIP (clean in place) systems.

Stacey said that grade 304 2B stainless steel with a PVC protective coating is the material of choice for their food grade equipment. 'By taking care during manufacture and polishing welds to 320G, 2B is superior to a No 4 or bead blasted finish. The smoother grain structure is much better than No 4 in inhibiting the growth of microorganisms and is easier to clean. Our equipment is regularly swabbed for surface cleanliness and this is critical to our customers' Quality Assurance (QA) requirements.'

With the full scope of works completed within a 6-month timeframe in early September 2016, the increased capacity of ALC's Colac operation has delivered significant benefits for the Australian lamb industry and a boost in the Victorian economy.

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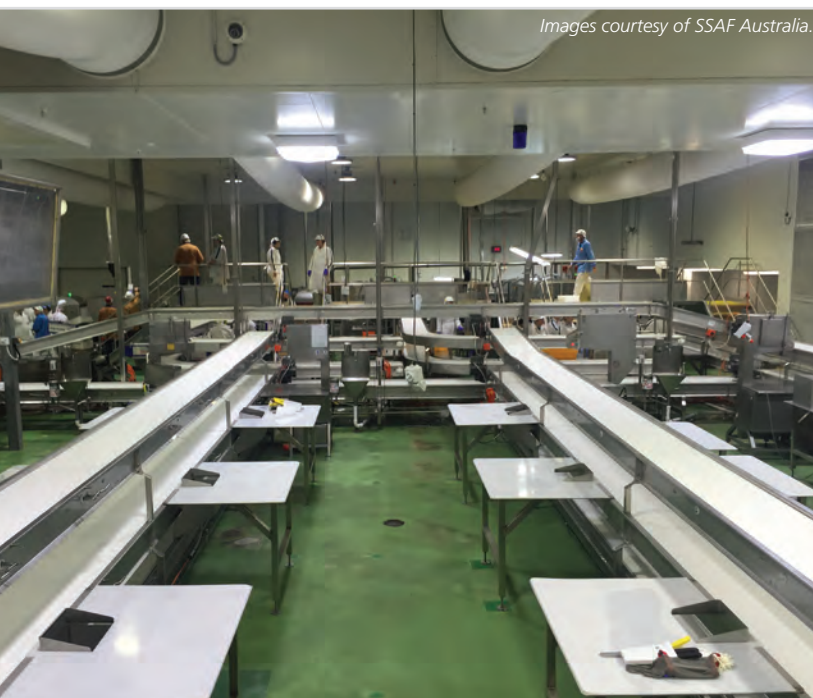
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Images courtesy of SSAF Australia.





Image courtesy of Stainless Aesthetics.

Impressive Stainless Steel Ribbon Graces New Brisbane Food Gallery

Stainless steel has brought life to a unique food precinct located in a recently opened premium office tower in Brisbane City's Golden Triangle.

Developed and constructed by Grocon, 480 Queen Street's sustainable and eclectic design boasts a 6 Star Green Star and a 5 Star NABERS rating. The building's food gallery, otherwise known as Room 480, is located on level 2 and capitalises on the stunning views of Brisbane River and Story Bridge to deliver a restaurant style experience and retreat for diners.

Complementing this space is a suspended stainless steel sculpture, designed by local architecture and interior design practice Arkhefield. Inspired by water flowing around rocks, the 'stainless steel ribbon' delicately hangs from the ceiling and weaves over the landscape of the room.

Grade 304 stainless steel was specified for the ribbon feature, using 100m of 0.9 x 600mm coil supplied by ASSDA Sponsor Dalsteel Metals. The 1 tonne of coil was supplied in a Bright Annealed (BA) finish and polyethylene coating on both sides for protection, with one side brighter than the other to fulfill the architectural effect and design requirements.

Arkhefield wanted the ribbon feature to be highly reflective on one side, with a brushed appearance on the other. As it curves and wraps through the space, the bright and flat sides of the stainless steel ribbon interact to reflect the surrounding colours and light, allowing movement and distortion throughout. Stainless steel proved the only material able to achieve this aesthetically appealing finish, whilst providing a high-quality, durable and lightweight structure.

The stainless steel ribbon spans 35m x 6m across Room 480's ceiling and was installed by ASSDA Member and Accredited Fabricator Stainless Aesthetics.

Stainless Aesthetics Director Mike Mooney said the installation of the entire 1 tonne of stainless steel coil as a continuous ribbon was one of the more challenging aspects of the project. This was successfully achieved using their custom designed and fabricated turntable, which housed the coil and allowed it to unwind safely 3.5m above floor level, while protecting the ribbon's surface finish.

The installation of the stainless steel ribbon around the light fixtures emphasised the visual appeal of the sculpture and its surface qualities. It is suspended using 3.2mm wire support cables and fixings in grade 316 stainless steel supplied by ASSDA Member Anzor Fasteners.

The stainless steel ribbon is an impressive and visually dynamic integrated element of Room 480, adding colour and movement to a traditionally formal space. In addition, the sculpture provides a level of intimacy to the space that could not be achieved with a standard flat suspended ceiling, providing a pleasant ambience for patrons to dine and relax.

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ASSDA could not continue without the valuable support of its sponsors and members, who work with ASSDA to grow the market for stainless steel.

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