



PANDROL AUSTRALIA
Proudly Australian

PANDROL

Overview

Pandrol Australia has a long and respected history in the Australasian region.

With three specialised plants located in Sydney and Adelaide, Pandrol Australia proudly manufactures tailor-made products for the Australian railway market, as well as for export markets.

Using innovative practices, involving the use of world-class engineering practices, Pandrol Australia is able to customise its products to the needs of particular clients, as well as providing cost-effective mass-produced goods, which remain cost competitive within the Asian market. Pandrol Australia caters for the harsh environmental conditions in Australia and for heavy-haul tonnages of up to 42 TAL. These achievements can also be attributed to 30% of the Delachaux Group's capital investment being made in Australia over recent years.

Using highly sophisticated and automated equipment, the Blacktown plant has three clip manufacturing

production lines, while the Winston Hills facility produces specialised injection moulded plastic rail fastening components. The factories are focussed on meeting individual customer needs, high quality manufacturing and production consistency. Pandrol Australia is focussed on giving their customers what they want, when they want it and at the right price. They are also adaptive to fulfilling urgent customer requirements.

Pandrol Australia and its foundry, Intercast & Forge, is recognised for its expertise in casting design and manufacture.

The Intercast & Forge casting foundry in Adelaide manufactures a range of unique products from the design stage, through production and distribution for a wide spectrum of industries, ranging from mining to automotive, construction to general industry, as well as to the specialist and high volume demands of the railway industry.



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Fastenings

HOW CLIPS ARE MADE:

The Blacktown plant is responsible for the production of up to 15 million clips a year.

Pandrol Australia utilises Industrial Robots in their clip production lines. Pandrol Australia's Plants also hold ISO 9001:2008 Quality Assurance Management Accreditation and ISO 14001:2004 Environmental Management Accreditation.



The high grade Australian made steel used to create the clips is supplied as bars and is cropped to length.

Pandrol Australia is a one-stop-shop for rail track fastening assemblies.



Innovative practices at the Pandrol Australia Blacktown factory include:

Robotics

With the introduction of robotics, production is now safer, quality is more consistent and there is increased productivity. Every clip is now the same as the previous one or the next one.

Automation of Quality Control Gauging

With paperless recording, more tests and measurements can be undertaken in a given time, with the same number of QC personnel.

Pandrol Australia prides itself on quality production on a world-wide standard.



The steel is then heated and pressed into shape using a combination of hydraulic forming machines and press tools.

The clips are then subjected to quality testing before being tempered to the specified in-service hardness using a tempering furnace and retested.

The clips are then cooled and painted.

Finally the clips are bagged for shipping.

Pandrol have been instrumental in developing a range of highly resilient fastenings to address the unique environmental demands of modern slab track.

VIPA SP was a development providing two levels of resilience: the rail pad and the baseplate pad. The first trials of VIPA in Australia were conducted on various Sydney bridges in the late 1980's. VIPA became a 'packaged product' of Pandrol Australia and has since then been used on a number of key projects.

VIPA DFC is a recently developed, value-engineered upgrade of the original VIPA assembly. It has the same vibration performance and stiffness characteristics as VIPA but this is achieved using a smaller footprint and a less bulky baseplate.



PLASTICS PLANT Located in a leafy semi-industrial suburb of Sydney, Pandrol Plastic's Plant is a plastic injection moulding plant, which produces high volume as well as low volume, injection moulded plastic rail fastening components. With its highly sophisticated and automated equipment, the Plastic's Plant has the capacity to produce up to 22 million parts per annum.

The automated, computerised and robotic-assisted equipment basically form 5 individual production lines of plastic injection moulding machines.

Pandrol's moulds, vary from single cavity, 2, 4, 8 and 16 cavity moulds, depending on the project size and future requirements for the particular item. The moulds are manufactured by a specialist Australian toolmaker, with each tool / mould displaying Pandrol Australia's name.

Pandrol Australia also manufactures a heavy duty side post insulator using HVN material, together with a supplementary cast steel liner, which provides its

reinforcement. The cast steel liner is supplied from Pandrol's own casting foundry, Intericast & Forge (I&F).

Pandrol Australia's Plastics Plant holds both ISO 9001:2008 Quality Management and ISO 14001:2004 Environmental Management Accreditation.

As a result of this Environmental Accreditation, the separation of raw materials is clearly designated and the waste from each individual production line is separated and specifically managed accordingly to its raw material type, then sold to a secondary manufacturer under Pandrol's Environmental Accreditation and associated procedures for managing product traceability.

The products manufactured by Pandrol Australia stem from 4 raw material ingredients:

1. High Viscosity Nylon (HVN)
2. Glass Reinforced Nylon (GRN)
3. HYTREL Thermoplastic Polyester Elastomer
4. High Density Poly-Ethylene (HDPE)

Intercast & Forge

Intercast & Forge (I&F) undertakes the design, manufacture and distribution of complex castings in a wide range of ductile, grey and white iron for the global rail, automotive, mining and other industrial markets.

The casting foundry is extremely innovative, manufacturing high quality products which are cost effective through optimisation and competitiveness. Incorporating lean manufacturing principles yet conscious of delivering excellence, it is proudly Australian, continuously improving and pushing the boundaries with

productivity (more per hour and more per mould), making I&F very competitive in the "low-cost" Asian markets.

I&F operate 3 high precision highly automated DISAMATIC vertical moulding machines capable of producing a maximum mould size of 850 mm x 650 mm x 500 mm. Total products currently manufactured by I&F are nominally 60 million items per annum, of which approximately 45 million would be railway sleeper cast-in shoulders.

Australia employs the latest computerised robotic technology in its manufacturing plants.



Shakeout and separation – the sand moulds are broken apart from the castings and runners. The sand is returned to the mixer for re-use and the castings and runners are separated for further processing. Runners are returned to furnaces for re-use and castings conveyed to shot blast machines.

Sand mould comprising silica, coal dust, bentonite (clay) and water is mixed and then blown into a moulding chamber. Dependant on the design of the casting the mould may also require a core (in yellow).



I&F EXPORT TO OVER 20 COUNTRIES, INCLUDING THE UK AND FRANCE (AS ENTRY POINTS INTO EUROPE), USA, CANADA, NEW ZEALAND, SOUTH AFRICA, BELGIUM, THAILAND, SINGAPORE, JAPAN, SRI LANKA, THE UAE, SWITZERLAND, RUSSIA, MALAYSIA AND INDONESIA.

Intercast & Forge is recognised for its expertise in casting design and manufacture.



Intercast & Forge utilise ladle pouring for efficiencies on low volume products, or unique iron chemistries. This gives flexibility to cater for most requirements needed in cast iron.



After transfer from furnaces the iron is poured into moulds from a stopper rod pouring vessel.



Molten iron is transferred from furnaces to moulding machines via ladle and poured into the pouring vessel.



Following shot blast cleaning the castings are inspected, gauged and fettled to ensure compliance prior to packing.



Quality checks occur throughout the casting manufacturing process. These include the following through state of the art laboratories located in the metal area, sand testing and metrology. I&F's Wingfield Plant also holds ISO 9001:2008 Quality Management Accreditation and ISO / TS 16949: 2009 Automotive Quality Management Accreditation and ISO 14001:2004 Environmental Management Accreditation.

I&F's mould patterns are manufactured locally in Adelaide, with the bulk being made in the I&F's Pattern Shop and this is supplemented by the use of experienced local pattern firms, Precise Tooling and Adelaide Patterns.

At all key points where flames are created through the melting process, there are extensive exhaust extraction systems in use, providing for a clean working environment. Operating an essentially 'smokeless' foundry, it has received recognition from policy makers, surrounding businesses and the community for its demonstrated commitment to the environment and employees.



Pandrol Australia, is committed to Continuous Improvement, therefore, through this commitment and its associated corporate culture, the clips and other rail fastening products produced today are the “best ever” produced.

Customer Satisfaction

Pandrol Limited has held Quality Assurance Certification to ISO 9001: 2008 Quality Management System since 1993, as Pandrol Australia undertakes design of rail fastening assemblies for the Australasian region. This certification is global through BSI Assurance UK Limited for “The design, research, development, testing, manufacture and supply of railway rail fastening components, track support and maintenance systems.”

Pandrol Australia also hold Environmental Certification to ISO 14001: 2004 Environmental Management System, which is an Australian certification through BSI Australia Limited for “The provision of manufacture, design, research / development and testing of railway rail fastening components, track support and maintenance systems.”

The introduction of robotics to the clip manufacturing lines has had a substantial impact on quality, the clip's placement into the forging machine, performed by the robot, in the same consistent way, each and every time, produces a highly consistent product.

The tooling, products and processes are quality controlled and approved by all key departments (production, technical, marketing and quality) to achieve the highest possible results.

Ongoing Technical Support with respect to quality and in response to customer in-service issues, is provided to support their customers in achieving their expectations of Pandrol's product supply.

“Quality in Pandrol is about assuring that the customer receives exactly what is ordered, on time, every time and that each product performs as specified.”

VANGUARD is an innovative low stiffness rail fastening system for mitigating ground vibration by suspending the rail by the web and under its head rather than clamping the rail foot.

Wedge-shaped elements are held in compression against the rail, so that as well as being supported, the rail is secured to the track foundation. This clamping force also provides adequate resistance to contain longitudinal loads in the rail. The principal advantage of Vanguard over more conventional rail fastenings is that it allows much greater vertical deflections under traffic without developing excessive rail roll.



Pandrol Australia is quality and environmentally accredited.

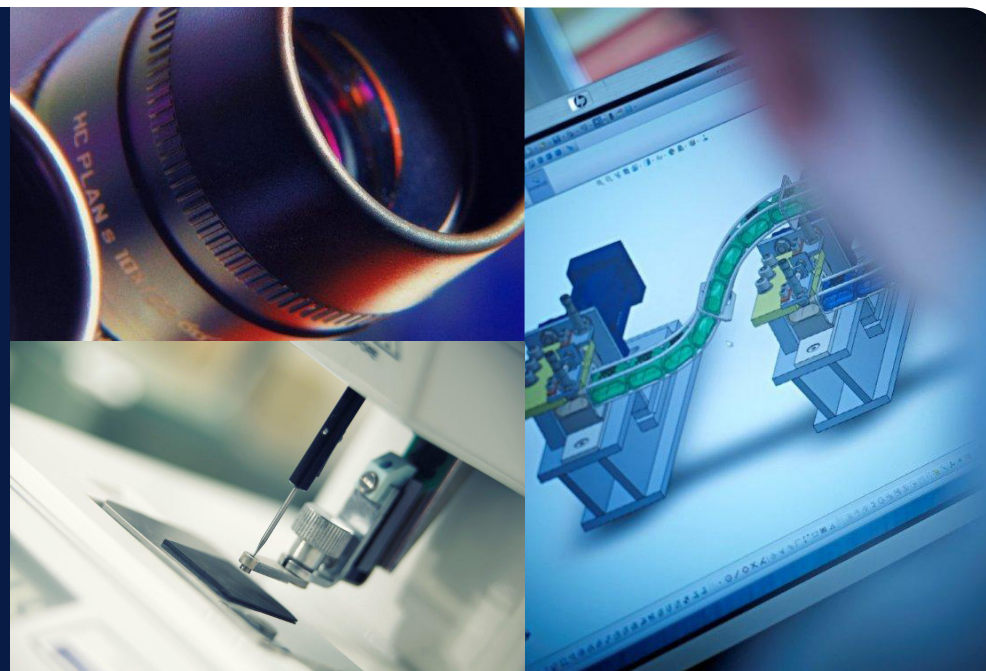
Product Development

PANDROL AUSTRALIA HAS THE ABILITY TO UNDERTAKE THE DESIGN AND DEVELOPMENT OF NEW ASSEMBLIES AND COMPONENTS.

This work is either in response to customer requests through sales and marketing or from internal corporate strategies to provide new or improved product and service.

The in-house design and development work includes new ideas from concept to final design as well as continuous product improvement.

Design work is carried out with the use of CAD software which enables 3D solid modelling of virtual components and assemblies. This is used to assess component design together with initial fit and functional checks.



Prior to manufacturing actual components, Pandrol Australia also has the ability to produce prototype parts from plastic, using 3D printing. This enables further checks of fit and function to be made with actual objects representing the finished part designs. Once the designs are accepted, tooling is then manufactured and prototypes made in the correct materials to enable full scale testing to be conducted.

Pandrol Australia are able to conduct the following tests in line with AS1085.19 Railway

Track Material Part 19: "Resilient Rail Fastening Assemblies", together with various other tests as are necessary, including:

- Assembly clamping force test;
- Longitudinal restraint test;
- Shoulder extraction test;
- Assembly repeated load test;
- Repeated load tests can be conducted using full sleeper assemblies in a 40 tonne capacity servo hydraulic dynamic compression testing machine.

Testing for compliance can be either:

- In-house
- In-house with an independent second or third party verifier or
- Fully independent undertaken by an outside testing laboratory.

Pandrol Australia engage the highly respected laboratories of the Institute of Railway Technology (IRT) at Monash University in Melbourne to undertake their independent testing.

Design backup is also available to Pandrol Australia through Pandrol's UK laboratories in Worksop, Nottinghamshire, England, where:

- Their design office is available for design work or product testing;
- They have the capability of undertaking Finite Element Analysis;
- Their data and technical resources are available for access and support; and
- Their drawing system is globally based and can be utilised in Pandrol offices worldwide.

Pandrol Australia also support the rail industry by offering a range of products and services from their external technology partners.



On-Track Technology is an innovative Contract Electronic Manufacturer (CEM) that has been providing Electronic Manufacturing Services (EMS) since 1991. Their goal is to make the electronic manufacturing experience as easy and stress-free as possible whether by managing a particular process in electronic manufacturing or providing a full turnkey solution.

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IEM, a US Company and Pandrol's partner in Australia, who is a leading supplier of safety, inspection and security equipment for the Railway and Transportation Markets worldwide, specialising in the machine vision field (automatic vision inspection), to develop various systems for measurement elements on vehicles with a train consist. IEM develops, produces, and markets innovative imaging, optical and other sensor-based systems for safety and security applications in the intelligent transportation system industry. By combining innovative sensor systems with advanced software, IEM creates WISE solutions for use in vehicle inspection, security monitoring, maintenance activities, and more.

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