Supreme Steel A Great Cast

Jobs require less finishing or less complex processes



Yes, it is possible to get a quality result and dramatically decrease fabrication and machining costs. Supreme Steel has found that one of the single biggest benefits of the investment casting process, also known as the lost wax process, is that it can eliminate a significant number of machining, fabrication and welding steps. This results in a dramatic reduction in costs.

Additionally their Managing Director, Julian The 300 series of stainless steels contain integration of logos or part numbers into the component being produced".

precision castings since 1984. Through Supreme Steel's quality focus and customer responsiveness they have established a world-wide reputation for a wide range of quality components for many industries including; hand tools, medical & diagnostic components, oil exploration, mining resistance than those of the 300 series. equipment, food and beverage handling, fluid handling, transportation, marine hardware, and architectural fixtures.

As specialists in their field, Supreme Steel is often asked the question ... is stainless steel magnetic?

Of course many of you will know the answer, some of you won't and some of you will be surprised by the answer.

atoms are arranged to form a structure that is so that it is fully austenitic. This is an advantage predominately ferrite and ferrite is magnetic.

Once steel is heated to above 730 C the atoms

rearrange into an austenite state. Austenite is non-magnetic. So very hot steel is not magnetic.

The interesting thing though to many of our customers is the fact that some alloy additions will encourage austenite to be stable at room temperature, the result being steel, which is non- A CF-8M casting has its chemistry balanced so magnetic at room temperature. One such metal is nickel

Bogalo says, "This process yields a very sufficient nickel to render them non-magnetic. professional, high-quality result allowing for the As 316 & 304 are the most common stainless steel grades used, they are the grades that most people are familiar with. This has resulted in the Supreme Steel Limited has been producing misconception that all stainless steels are nonmagnetic. Stainless steels from the other series such as 200, 400, PH, Duplex etc have higher percentages of ferrite and are therefore magnetic. Some of these "magnetic" stainless steels have superior strength and corrosion

There are exceptions...

Casting said to be from the 300 series (eg a casting specified as 316) can be, and most often is, at least slightly magnetic. The reason for this is that 316 is a designation for a hot rolled or forged stainless steel. It is known as a 'wrought' designation. The equivalent casting specification is CF-8M, which is similar but not identical in composition and properties of the wrought grade. At room temperature mild steel is magnetic. The The wrought grade has its chemistry optimised for a wrought (worked) grade as the austenitic

microstructure requires less energy to squeeze

or roll the material into shape. This is not an advantage for a casting, as it does not have to be squeezed into shape. A casting forms its shape by the solidification of the liquid metal into the shape of the mould it is contained in.

that is predominantly austenite with usually 5 to 15% ferrite. This is done to enhance hot strength and reduce the possibility of complex cast shapes tearing as they cool in the mould. Since the casting is not going to be rolled, the increased hot strength doesn't cause any inconvenience. However, the presence of some ferrite renders the casting slightly magnetic.

Although the chemistries and microstructures vary between the wrought and cast grades, the physical and corrosion properties are fairly closely matched. The hot rolling imparts some strength to the wrought grade. This is countered by the ferrite phase, which imparts additional strength to the cast grade. The hot rolling imparts good corrosion resistance to the wrought grade by refining the structure. This is then countered by the increased corrosion resistance in the cast grade by slightly higher chromium content.

The bottom line...

If you need a stainless steel casting that is nonmagnetic, and don't want to get your head around these complex metallurgical factors, give Supreme Steel a call and let them do the hard work selecting a chemical composition which will result in a fully austenitic structure to suit your needs.



Phew Fighter ...

major supplier of filtration systems to the dairy exhausting tea break at a cost of almost three industry, reveals that one of its new products million dollars to create the new Filtercorp Phew could have saved the government the stink that Fighter surrounded the planned Fart Tax.

Acting on the tongue-in-cheek suggestion of a North Auckland client, (Peter James at Stainless Steel Specialities (1997) Ltd) the company invented the world's first fart filter for cows.

Kiwi-owned Filtercorp International, the country's Filtercorp says its R & D boffins spent an

It incorporates an exhaust pipe with a vertical stack, a HEPA filter, a mask or "odorsorb," and a dump valve. During trials it successfully filtered, captured and bagged the gas emitted - and automatically sent it to parliament for recycling.

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> For membership application details, please contact: New Zealand Stainless Steel Development Association, HERA House, 17-19 Gladding Place, PO Box 76134, Manukau City Telephone: +64-9-262 2885 Facsimile: +64-9-262 2856 Email: admin@hera.org.nz





Stainless Steel Submersibles stand up to aggressive effluent

After two years of arduous service at the Fontera, MacEwans from UR52N and showed absolutely no Te Rapa site, MacEwans Duplex stainless steel submersible pumps have proved to be invincible. Under extreme conditions and in what can only be described as pretty nasty effluent, the pumps have recently undergone extensive evaluation and a well deserved servicing.

choosing UR52N Duplex Stainless Steel material their pumping equipment. was the best decision.

Fitted with wear rings manufactured from 420 Stainless Steel and Ni-Resist, some of the pumps were pumping wash-down water from the tanker bay. This water contains quantities of grit and gravel, usually causing corrosion and significant damage.

On inspection the clearance between these wear rings had opened up from an installed clearance of 1 mm on total diameter to almost 9mm. The wet end which includes the suction cover, impeller and casing on these pumps were all manufactured by making, casting and machining.

sign of either chemical attach (PH range 2 to 12) or erosion.

They were like the day they were fitted. The condition of the quality and quantity of mechanical seal and heat transfer oils confirm the excellent sealing systems that the Tsurumi The condition of the pumps also reflect that Manufacturing Company of Japan, engineer into

> Rob Wilton, site maintenance supervisor is well and truly happy with the performance of the McEwans Duplex submersible Pumps. "I am very pleased with the performance of the pumps. They have run faultlessly for the last two seasons with improve up time and lower maintenance costs."

> This is not only an excellent result for MacEwans Pumping Systems Ltd and Fontera but also for New Zealand engineering. It confirms that New Zealand has the excellent skills available in design, pattern

Finally there is choice

when it comes to castors for the hospitality industry

With the ever-increasing demand for good quality castors, Rex now offers a wide range of stainless, zinc-covered stainless and plastic castors designed specifically for the hospitality industry. Configurations include stem fittings, plate or bolt hole, braked, swivel or fixed versions. Rex's Rhombus brand and in particular the RH340 and 367 are manufactured to high specifications in Germany. Mainly used where smooth, quiet operation teamed with good looks are key, these zinc-plated castors have non-marking rubber tyred wheels and move easily across hard or tiles surfaces with the minimum of vibration being transferred to the load.

More sterile environments demand a castor constructed entirely from stainless steel. The

394's fork assemblies and bearings are all stainless steel and have thermoplastic rubber wheels to withstand high temperature cleaning. One of the most popular choices of architects and other specifiers is the Nansin range from Japan.

Featuring highly polished plate finish, metal wheels and a soft rubber non-mark tyre, the Nansin range of castors offer a number of size and capacity options making them suitable for both domestic through to industrial applications.

To complete their excellent stable of hospitality castors, Rex also produces their own range. CH Series are for both retail and the hospitality sectors, their high load capacity and durable PVC tyred wheels offer all purpose usage with

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resistance to chemical wash down damage and are tough enough for use on rough surfaces. When t comes to stainless steel castors...Rex has it orted!



What the industry considers Standard for Heat Tinted Stainless Steel Welds

LES BOULTON & DICK AVERY (USA) CONSULTANTS TO THE NICKEL INSTITUTE

COLOURED HEAT TINTS (WELD DISCOLOURATION) DEVELOPED ON THE ROOT OF A STAINLESS STEEL BUTT WELD (TIG WELDING WITH ARGON GAS PURGING) OF 3MM THICK 316L PIPE (300MM ID).

The recent inroads made by stainless steels into a wider range of industries with stainless steel being used instead of traditional materials, has caused much debate over the corrosion performance expected of heat tinted stainless steel welds.

It has been established that coloured metal oxide films form on stainless steel welds during fabrication. These are often referred to as heat tints and can in various environments affect the in-service corrosion resistance of a welded stainless steel joint.

The service environment largely determines the extent of any heat tint oxide that is acceptable. However, two challenges face the stainless steel industry. These are the need for a better understanding and agreement on acceptable heat tint levels and a universal description of the varying degrees of heat tint.

This is of especial importance in particular service areas where avoidance or removal is very costly.

In response to these issues the Nickel Institute have prepared a paper that discusses these challenges to the industry. The following article gives you an overview of their findings. It consists of an overview of the nature of heat tints on stainless steel welds, along with an outline of the reasons why localised corrosion can sometimes occur preferentially at heat tints. Plus it endeavours to define the degree of heat tinting of stainless steel welds that would assist good decision making for the acceptability of site-made welded joints.

WHAT CAUSES HEAT TINTS? Stainless steel welds made with less-than-perfect inert gas protection develop surface heat tints. Heat tinting occurs when there is inadequate pre-weld or post-weld cleaning and contact is made with oxygen gas during welding.

This is most likely to happen on-site when stainless steel pipes are closed up and the welds are subsequently exposed to process fluids and where welds are inaccessible for cleaning such as the inside of tube or pipe welds.

The presence of coloured heat tints on welds can act as an indicator of the susceptibility of the weld to localised corrosion attack in aggressive environments.

Corrosion is most likely to occur in aqueous environments, although any degree of heat tint may also be deemed unacceptable if the oxide can compromise service cleanliness such as in stainless steel semi-conductor gas line services.

CONDITIONS AFFECTING CORROSION OF STAINLESS STEEL WELDS. There are a number of conditions that can contribute to premature degradation of stainless steel welds that are subjected to corrosive service environment. These include:

- · Surface damage to stainless steel, such as mechanical scraping and metal smearing due to contact with carbon steel
- Inadequate inert gas shielding of weld roots giving rise to oxygen ingress which causes heat tinting on inaccessible welds
- Inadequate post-weld cleaning of stainless steel welds that are heat tinted

Avoiding any of the harmful conditions during welding presents a challenge to the stainless steel industry. However it should be noted that the appearance of heat tint oxides or discolouration levels on stainless steel welds could also be influenced by factors other

than oxygen contamination of the inert purging gas. These can be:

- Moisture in the purging gas
- · Contaminants such as hydrocarbons, moisture and some types of particulates on the stainless steel surface prior to welding
- Hydrogen added to the inert purging gas
- The surface finish on the stainless steel

DETERMINING WHAT IS ACCEPTABLE.

Defining an Acceptance Criterion for heat tinting on stainless steel welds should be based on whether a post-weld cleaning treatment is to be carried out on the weld roots, or whether the level of heat tinting present on the as-welded joint will provide acceptable corrosion resistance in the particular application or environment.

GUIDELINES FOR EVALUATION. An evaluation practice for assessing the acceptability of a heat -tinted weld root that could be employed is below.

• If appropriate inert gas back-purging has been carried out during welding but access is poor for visual inspection of the weld roots, a nondestructive evaluation procedure to examine the weld root appearance could be employed, such as video endoscopy or closed circuit television inspection

 If the outcome from the non-destructive evaluation on inaccessible welds indicates that there are doubts about the level of heat tint present, then the properties of the stainless steel employed in the specific application need to be carefully reviewed. If there is certainty that the chosen grade of alloy has a higher corrosion resistance than is necessary for the environment, then a degree of weld heat tinting may be allowable.

 However, if it were known that later in time the stainless alloy employed may experience a change to the service environment leading to increased corrosivity (e.g. lying in contact with stagnant hydro-testing water or coming into contact with high chloride waste water), where the optimum corrosion resistance of the stainless steel was essential, then any level of heat tint remaining on welds may be unacceptable.

Until recently it has been normal industry practice to avoid or to remove coloured weld heat tints and the thin chromium-reduced layer beneath, before a welded stainless steel structure is placed into corrosive service. There has been considerable debate regarding the need to remove all weld heat tints and there is now general agreement that all coloured tints need not be removed when the stainless steel offers a good margin of corrosion resistance over that required for the particular environment. However, situations can arise in the field where a decision has to be made as to the acceptability of heat tinted welds.

AWS D18.2 (1999); HEAT TINT (WELD DISCOLOURATION) LEVELS ON THE INSIDE OF 316L AUSTENITIC STAINLESS STEEL TUBE. IN THE WATER INDUSTRIES A STRAW-COLOURED OR YELLOW HEAT TINT, UP TO AWS D18.2 NUMBER 3 ON THE COLOUR REFERENCE CHART, COULD BE ACCEPTABLE IN MOST SITUATIONS



Fast corner forming of stainless steel without Welding

Corner forming machines have revolutionised panel fabrication. These machines are now available in New Zealand. By eliminating the dependence on welding and grinding, time has been cut to a minimum completely changing the way fabricators approach corner forming.

HORSES FOR COURSES. There are two models of machines available to suit most of the work in the New Zealand market place, the Cornerformer-Multiplex and the Cornerformer-Variform

The Cornerformer-Multiplex is more suited to for job shops. It works as a moveable tooling system that allows individual and quick forming of closed corners regardless of how frequently the requirements may change. Whereas the ACF Cornerformer-Variform is better suited to mass production. It has a custom made 'fix-tooling' design to allow high volume panel production through fast corner cycle time.

FLEXIBILITY PLUS HUGE TIME AND COST SAVINGS

Both of these units allow individual sheet metal panel fabrication in most material types, material thickness and bend heights of the panel. There is no panel size limitation. Time savings are enormous, the finish quality is totally consistent

and of extremely high standard. There is no dirt and noise is minimal. Cost savings are gained through the elimination of welding-related consumables and abrasives. Further savings of labour costs are also achieved with only one operator being required to run a Corner-former machine.

These multi-purpose panel fabricators have been used to form corners on doors for electrical cabinets, claddings, panels, box covers, trays, container covers, lids, cooking trays, ceilings, oven doors, suitcase covers, furniture, pizza oven doors, bottom pans for dehumidifiers and similar parts.

After corner-forming zinc coated mild steel, no manual touch up of the zinc coating in the corner area is necessary

On mild steel used for fired enamel, the cold formed corner is constant and resistant against high temperature (higher than 96 degrees Celsius). After corner forming stainless steel, there is no colour change on the material surface and therefore no pickling of the corner is required.

SAFETY FIRST. A generous sized working table holds large paned dimensions with a Siemens S-7 Control system to run the machine. Operators are ensured absolute safety as the Cornerformers are fully covered and footswitch operated.



OPERATING IS AS EASY AS ABC. An excellent quality of finished product is achieved in the easy three-step process below.

1. Bends on a press brake are made as usual, then in the corner areas the rectangular blank is formed up by two special bottom V-die segments to prepare the area for the corner forming process.

2. On Multiplex, cold forming of closed corners is then achieved through a universal tooling that allows corner forming without any hindrance from material type, material thickness and bend height of flange. On Variform, Fix-tooling allows corner forming for mass production.

3. After cold forming, the surplus material is sheared off in accordance with bend height of the panel.

Opinions from the industry rate ACF's Cornerformer-Multiplex and the Cornerformer-Variform very highly. If you're in the metal business and you need corners fast...you need one!

Critical stainless surfaces need **Specialist Protection**

In response to the increasing demands for specialised protection films for the stainless steel industry, Mitech has spent considerable time and resources to now offer superior protection products. Manager Scott Holt says- "We believe if you are serious about protecting your critical surfaces you might as well do the job properly first time ... that's why we offer a range of quality films specifically for all type of stainless products to protect them against damage during fabrication and installation". One example is PoliFilm PF32C, a clear film with a no residue natural rubber adhesive backing. It offers excellent all round, general-purpose protection for products and projects that are not going to be exposed to UV light for long periods of time.

Where stainless is to undergo multiple handling or will be on-site for long periods of time Mitech recommends PoliFilm PF562C. PF562C is a 100 micron black and white film with natural rubber adhesive easy-peel backing. It offers excellent UV protection, and is now considered virtually the industry standard when it comes to protecting sheet.

One of the more specialised films Mitech offers is PoliFilm PFV32C. This is a deep drawing film created specifically for drawn items such as sinks. The film is applied to the stainless while the sheet

is flat, and is then pressed with the sheet as drawn. PFV32C is easily removed leaving a quality unmarked product for the end consumer

Other products in the Mitech portfolio are available in both high and low tack, for use while laser cutting stainless sheet. PoliFilm PF562C "Laser Lite" and PoliFilm PF563C/CT100 "Laser Film" are designed to suit both low and high pressure laser cutting applications. It is this attention to detail, and knowledge of stainless steel applications that sets Mitech apart. Mitech can also supply film applicators to fit most standard sized sheets, and film can also be slit in-house, with customers only

paying a square metre rate. This service is ideal when dealing with the protection of tube, when small width rolls can be used to spiral bind handrail and other high quality materials. Films can also be supplied branded with company logos for higher visibility.

The observed colour of the heat tints on welds for the grade of stainless steel employed should be visually assessed by a qualified third-party inspector as to the acceptability of the welds for the specific application and environment. There are now Colour Reference Charts available for specifying maximum heat tint levels allowable on stainless steel welds to support an Acceptance Criterion.

BEST INDUSTRY PRACTICES.

It is recommended that traceable records of the weld procedure specification, post-weld cleaning procedure, purging gas purity requirements and allowable maximum heat tinting of welds, should accompany the contract documentation when stainless steel welds are made in the field. This will ensure that high quality welding is carried out which is fit for the purpose intended.

For further information or for an unabridged copy of this paper please contact Les Boulton at The Nickel Institute



In a competitive environment Mitech Industries has made a point of putting their client's needs first, providing quality, cost effective, category-specific products with a high level of customer satisfaction as a result.