Nickel-containing stainless steel in the brewing industry
Chrysler Building LEED rating status
Making cheese in Wisconsin

Food, beverages and the role of nickel-containing stainless steel

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THE MAKING OF A GOOD MEAL

The Nickel Institute’s new publication Nickel in Tomorrow’s World highlights the role of nickel and nickel-containing materials in responding to the opportunities and challenges presented by megatrends. There can be no surprise that food security – how to ensure it for an increasing population with rising quality-of-life expectations – was one of the seven megatrends examined.

This issue of Nickel reflects that theme. The stories all start from and come back to the ability of nickel-containing materials to be strong, robust, and easy to work with. When speaking of food security, the most important of all is the ability to repeatedly and aggressively clean and sanitize stainless steel surfaces as a vital defence against contamination and spoilage.

The message from New Delhi on page 5 is that the additional expense of providing mobile potable water tankers in stainless steel is more than compensated for by the long service life they give and the improved quality of water delivered when and where needed. From New Zealand we see tanks of raw milk being carried on trains where the quality and reputation of that country’s dairy products depends on the highest standards of hygiene and sanitation. In China, there are increasing demands for quality packaged drinks of all types and, as everywhere in the food and beverage sector, it is nickel-containing stainless steel that makes it possible (see page 10).

We hesitate to attribute the making of beer to any one country but if there was a shortlist of countries that deserved special mention, Belgium would certainly be there. The beautiful yet functional beer kettles in Belgium’s Stella Artois brewery feature on page 8 where we look at the various applications of nickel-containing stainless steel in that sector.

It is only through mass production that a growing population will feed itself. On page 11 we get an industrial designer’s view of the roles of nickel-containing materials for bulk food production. And keeping with the industrial scale of things, the kitchens of all large institutions – in this case, the teaching kitchens at George Brown Chef School in Toronto, Canada – are all seas of stainless steels.

Nickel-containing stainless steel also has a role to play in maintaining a safe and consistent product in artisanal food production. Its part in making traditional-style cheeses is explored on page 6.

From farms to kitchens all over the world, nickel is keeping food safe and people fed… and that megatrend needs to continue.

Clare Richardson
Editor, Nickel magazine
Tanks are everywhere. In their infinite variety of shapes, sizes and uses, they are vital to a functioning society. When it comes to food, however, and chances of contamination or colonization by bacteria, there is only one reliable candidate. That is why trucks with stainless steel tanks carrying edible oils, sugar, milk and all the other raw materials that go into the manufacture of foodstuffs are common sights on highways and, on occasion, railways. Less commonly, they are used to transport potable water. The reasons, however, remain the same: longevity, strength, corrosion resistance, and ease of cleaning and sanitation.

**Not by road alone – Milk by rail in New Zealand**

How can a country with 0.1% of the world’s population produce 2.2% of the world’s milk and do it in a way that takes trucks off the roads and reduces the carbon footprint of milk production? There is no single answer but part of the solution is transport of raw milk by rail.

It was in 1929 that the first road tanker made of Type 302 (UNS S30200) stainless steel was used to transport raw milk to a dairy, and stainless steel milk tanks have been used continuously ever since. And in countries where the production of milk is particularly intensive and the volumes are high, even railways are called into service.

Railways excel at moving bulk liquids. Over the years, improvements in insulation and cooling equipment have resulted in purpose-built rail-mounted stainless steel milk tanks capable of carrying large volumes of raw milk from rail-head milk tanks to receiving stations at a dairy factory. These containers are “intermodal”: they can be shifted from one mode of transport (such as a truck) to another (such as a rail car).

Two sizes of rail-mounted inter-model tanks are in use: one of 40,000 litres (about 10,000 gal.) made of Type 316L (S31603) and one, such as seen below, of 25,000 litres (about 6,600 gal.) made of Type 304 (S30400). These are called “iso-containers” because they conform to the International Organization for Standardization standard for refrigerated milk containers. Construction and maintenance of road- and rail-mounted milk tanks must also comply with globally recognized 3-A sanitary standards.

> Four times every day dedicated milk trains pass through the New Zealand countryside carrying raw milk to a processing plant

![Four times every day dedicated milk trains pass through the New Zealand countryside carrying raw milk to a processing plant](image_url)
New tankers for old – Clean drinking water when and where needed in New Delhi

India differs from New Zealand in every metric imaginable and faces different challenges: old infrastructure or lack of new infrastructure in fast-expanding urban mega-cities; climatic extremes of heat and drought; constrained water supplies and falling water tables. These are some of the realities facing many large cities in India and New Delhi, the country’s second-largest, is a case in point.

The water authority for the New Delhi National Capital Territory has long maintained a fleet of water tankers and in times of need they can supply minimum local needs until repairs are made, additional capacity is installed, or the summer heat abates. This long-standing service had traditionally used carbon steel tankers, the interiors of which were periodically painted with a coal tar paint to slow the inevitable corrosion. But the injurious chemicals that leached from the coatings, together with increasing volumes of rust particles as the tanks aged, led to many complaints about the quality of the water.

The recent decision to privatize this part of the water distribution system provided an opportunity to review the state of the equipment and see if something better could be found. It was quickly seen that nickel-containing stainless steel was the preferred material to replace carbon steel tanks.

Why stainless steel

Stainless steel does not require the coal tar lining of the previous generation of water tankers. This has an immediate positive impact on the acceptability of the water to consumers and removes a long-term health hazard. While taste may be of lesser importance when you are lacking water, the fact that stainless steel does not affect the flavour of water is also welcome.

It was quickly seen that nickel-containing stainless steel was the preferred material to replace carbon steel tanks

The tanks are expected to give many years of service and carry thousands of loads. As a matter of good practice, their interiors will be regularly cleaned and rinsed. Ordinary soap and water is sufficient most of the time. If, however, some contamination is accidentally introduced into the tank, stainless steel will tolerate whatever strong cleansing or disinfecting agents are needed to restore it to a safe state.

While identifying the most appropriate material for the water tanks was not difficult, there were initial concerns about the cost differential between carbon steel and stainless steel. This changed when the Delhi water authority and its contractors took into account the low maintenance and repair requirements of stainless steel tanks. This means a higher availability of the equipment and, overall, fewer trucks to achieve the same distribution capacity. Moreover, the projected service life of the tanks is five times longer than the typical three to four years associated with carbon steel tanks. Seen in this light, the apparently “expensive” stainless steel was highly competitive.

The picture improved even further when the superior strength of the stainless steel allowed a thinner gauge of sheet (4 mm) to be used. Depending on the size of the tanker, the total weight is between 500-1,100 kg (1,100-2,400 lbs.) lighter than the old carbon steel versions. The fuel savings over the life cycle of the tanker are expected to be significant and, in addition, air pollutants will be proportionately reduced.

Thus in January 2013 the first of 385 truck-mounted water tanks made of Type 304 (UNS S30400) stainless steel entered service in the National Capital Region of New Delhi.

“We are so pleased” said Mr. R.S. Tyagi, Chief Engineer of the Delhi Jal Board. “We knew stainless steel was the best material for the purpose but going through the process of calculating the true cost of different material choices made stainless steel the clear winner.” The other winners, of course, are the citizens of New Delhi who will be receiving clean, safe and refreshing water in times of need.
Cheese-making companies large and small make extensive use of stainless steel to produce their high-quality products. Although dwarfed by the giants in the industry, the Klondike Cheese Company occupies a secure niche in the enormous market for U.S. dairy foods. The company, like all other competitive cheese-makers, uses nickel-containing stainless steel in its production process. In Klondike’s case, products include feta, muenster and havarti cheeses, as well as Greek-style yogurt. About 50 million kg (108.5 million lbs) of feta cheese were made in the U.S. in 2012 and Klondike, based in Monroe, Wisconsin, was the second-largest producer. The fourth generation of the Buholzer family (brothers Ron, Steve and Dave) runs the company, with the next generation already active in the business. The company employs about 100 people.

Stainless steel at every stage
All of Klondike’s cheese and yogurt products start with cow’s milk from local dairy farms. Stainless steel is used in the milking equipment and farm milk storage tanks. The Klondike plant has 11 milk storage silos with a total capacity of 1,550,000 litres (410,000 gallons). All silos are made of Type 304L (UNS S30403) stainless steel bearing the 3-A symbol for high sanitary standards. Klondike uses high-temperature, short-time (HTST) pasteurization prior to its production of cheese or yogurt. Again, Type 304L stainless steel is the standard material of construction for pasteurizers.

Production procedures for each product
Each of Klondike’s products has its own production procedure. The first step in making feta cheese, for example, involves a computerized, fully automated coagulator. This 55-metre-long (180-foot-long) component is made of Type 304L and was engineered and constructed specifically for Klondike (see Fig. 1). The coagulator is essentially a moving trough with dividers that form individual cells. It takes about an hour for the product to travel the length of the line. Further processing includes cutting the curd and soaking it for 24 hours in brine in a tank made of Type 316L (S31603) stainless. Next the feta is vacuum-packaged in loaf form or else in the familiar crumbled form for Greek salad.

Meanwhile, the expanding appetite for Greek yogurt has presented Klondike with another product-line opportunity. The yogurt-making process is different from that of cheese however, so Klondike built a 3,700-square-metre (40,000-square-foot) plant to facilitate production. One part of the building contains stainless steel fermentation tanks (see Fig. 2), with the remaining space used for pasteurizing and packaging. The equipment in all the rooms is made of nickel-containing stainless steel.

Clearly, stainless steel is not just for mass-produced, industrial-scale operations; it also allows artisanal producers like the Bulholzer family to produce to the highest standards and even compete with large corporations.
LEED gold for old: nickel helps historic buildings achieve LEED status

New construction to the highest possible sustainability standards is one of the world’s most important megatrends and the LEED (Leadership in Energy and Environmental Design) rating system has become an important global metric. Currently, however, the U.S. Green Building Council (USGBC), developer of the original LEED, has introduced LEED-Existing Buildings (LEED-EB) so that older buildings can also aspire to LEED certification.

Two landmark buildings
On its 80th birthday in 2011, New York City’s Empire State Building became the tallest and most well known building in the U.S. to receive LEED-EB certification. The building gained Energy Star (a U.S. Environment Protection Agency program) certification in 2010. Building retrofits reduced annual energy consumption by 38%. While its nickel-containing Type 302 (UNS S30200) stainless steel roof spire is well known, the Empire State Building was the first large application for stainless steel mullion panels, which are a prominent exterior wall feature extending up the height of the building. Its nickel silver (copper-nickel-zinc alloy) interior details are also original.

New York’s iconic Chrysler Building (completed 1930) is another registered historic landmark. It earned Energy Star labels in 2008 and 2012. In late 2012, the building’s owner Tishman Speyer announced that the Chrysler Building had also earned a USGBC LEED-EB Gold rating. Recent upgrades to the building’s energy efficiency, made it possible to reduce energy consumption by 21%. The Chrysler Building was the world’s first large high profile roofing application for stainless steel (Type 302) but it also has many other stainless steel exterior details and nickel silver is used extensively in the interior.

While building energy reductions played a significant role in the Gold LEED-EB ratings of these buildings, they would not have been considered if they had not retained their original materials including their iconic stainless steel and nickel silver details. Buildings made from long lasting materials minimize resource use and landfill requirements, because there is minimal or no material replacement. Additionally, both buildings have stainless steel roofs that would earn heat island reduction credits.

In a recession, average occupancy and rental fee rates drop. Many major real estate investment firms have become ardent supporters of sustainable construction and renovation. Sustainable office space is in high demand. In USGBC’s Empire State Building announcement Dana Robbins Schneider, Vice President of Jones Lang LaSalle, the program manager for the project stated, “LEED certification is one of the top criteria for many tenants today, and it reinforces the strong business case we have made for a cost-effective energy retrofit that lowers tenant occupancy costs.”

Building retrofits reduced annual energy consumption by 38%
Best for brewing
For strict hygiene and maintenance, nickel-containing stainless steel is the material of choice

The world’s brewers are big users of nickel-containing stainless steel. Bright storage tanks outside breweries are a common sight, but few of us have seen just how much more stainless steel there is inside the buildings they guard.

**Large scale production**
Brewing today is a large-scale process. Production runs of 100,000 litres (26,000 U.S. gallons) are not uncommon and a modern brewery offers an almost blinding array of polished stainless steel vessels. Gone are the days of copper brew kettles and of concrete fermenting tanks. Legislation on food contact materials now specifies that the materials from which these vessels are constructed must not contaminate or alter the flavour of the food product they are processing. Hygiene regulations stipulate that they can be cleaned and sanitised thoroughly after every production run and the economics are such that durability and minimum maintenance are essential. For a liquid product such as beer, with its modest but potentially corrosive chloride content, Type 304 (UNS S30400) and Type 316L (S31603) have become the materials of choice in breweries the world over.

**Type 304 and type 316L have become the material of choice in breweries the world over**

**Intricate pipework**
But large tanks made from plate material are only some of the components used to convert mashed grains of barley into “amber nectar” (a term originally applied to honey but now more readily associated with beer). The liquid is pumped along kilometres of intricate pipework, then passes through multi-layered heat-exchangers, and is spun in centrifuges. All this equipment and more (including hundreds of control valves) depend on the formability, weldability, machinability, and strength of 300-series stainless steels.

**Kegs**
Take the humble keg in which the beer may be dispatched to the sales outlet. It is made entirely of Type 304 stainless steel. The starting-point is sheet material with its readily available 2B finish which exceeds the recommendation of the European Hygienic Engineering & Design Group for surfaces in contact with foods. It is smooth enough to resist the formation and adherence of bio-films and easily cleaned prior to re-filling. Two 1.5-mm-thick discs of this material can be deep-drawn into cups with a depth more than half that of their diameter. Their trimmed edges are butt-welded together to form a joint with a perfectly smooth and hygienic surface on the inside. Then a stamped-and-machined neck is welded on one end, inside of which fits a precisely machined concentric valve and dip-tube system which facilitates filling and dispensing. Finally, two 1.7-mm rings, or “chimbs” (the projecting rims of a cask or barrel), are fillet-welded onto the ends of the vessel so it can be stacked. All components are made from Type 304 stainless steel either as a casting or as sheet which has been rolled to a thickness and hardness appropriate for the component concerned. The first stainless steel kegs were manufactured in production volumes in the U.K. in 1962 and some of them are still working today.

The annual worldwide production of beer runs to hundreds of billions of litres each year. Little wonder that nickel is so highly prized its role in ensuring the taste and quality of the world’s most popular alcoholic beverage.
Lager tanks

Brewery pipework

New 50-litre (13.2 gallon) stainless steel kegs

Stella Artois’ brewing hall in Leuven, Belgium
The market for packaged, ready-to-serve beverages is growing rapidly as living standards rise both in China and around the world, and that means demand for beverage lines manufactured largely from austenitic stainless steel is also on the increase.

Langfang Best Crown Packing Machinery Co. Ltd., situated in Langfang City, northern China, specializes in the manufacture of beverage-packaging machines. Its main products include aseptic cold and hot filling lines for fruit drinks and milk-based beverages, carbonated beverage production lines, and pure water and mineral water production lines. The company’s equipment can be made to handle bottles made of polyethylene terephthalate (PET) or glass, as well as metal beverage cans.

To ensure the beverages meet food hygiene requirements and that Langfang’s processing equipment remains clean, bright and attractive, the 300 series of austenitic stainless steels is used. The choice of Type 316L (UNS S31603), in particular, ensures that beverage-contact parts can be properly cleaned and sterilized using hot steam. The components not in contact with liquid food product are made of Type 304 (S30400) stainless steel. These include the working table, bottle washing and screw-capping parts, machinery casing, and the side plates of bottle conveyors. Some stainless steel alloys with special properties are required. For example, high-hardness martensitic stainless steel Type S136, somewhat similar to Type 420 (S42000), is used for parts that prevent bottles from moving when caps are screwed on after filling.

The ultra-high-temperature (UHT) processing of beverages requires instantaneous sterilization of the liquids. The Langfang Best Crown UHT fruit juice bottling machines use Type 316L for all beverage-contact surfaces.

Ozone sterilization

Langfang Best Crown recently manufactured a sterilization machine for a Canadian company, its purpose being to disinfect PET bottles. Empty bottles must be sterilized prior to filling to extend the shelf life of the fruit juice, milk, etc. Research has shown that bottles can be effectively disinfected by filling them with water containing a concentration of ozone and retaining it for a period of time. The process is divided into two parts. First, the empty bottles enter a tunnel and are filled with the ozone-containing water and held long enough for bacteria to be killed. In the second part, a rotary machine is used to empty the bottles and rinse them with clean water before being conveyed into the filling-and-sealing area.

Since ozonated water is used for disinfection throughout the process, Type 304 is specified overall. The exception is components that require high strength and hardness and which therefore are made of S136 martensitic stainless steel.

The 300 series of alloys is widely used in liquid-packaging production lines. For example, superior quality alloys such as Types 316L and 304 keep food and drink uncontaminated and unchanged, easily meeting requirements for food hygiene and safety. Such alloys also ensure the equipment looks clean and appealing. And at the end of a long service life, all the stainless steels will be recycled and returned to service – another contribution to the sustainability of a high quality of life in China and the world over.
Earning its keep
Improved products and extended machine life with stainless steel

Every day, industrial designers constantly assess the costs and benefits of their choice of materials. And nickel-containing stainless steel is no exception. While it offers excellent advantages, and for some applications, nothing else is acceptable, in other cases there may be options that appear less expensive in terms of material cost and fabrication. However, the continuing dominance of stainless steel in food processing is explained by the value it brings. Not only does stainless steel provide more than enough to extend machine life and thereby increase machine availability and productivity, it provides consistent products that enjoy consumer acceptance. All of this reduces the cost of ownership and increases the return on investment. Luke Bamford of UK-based Baker Perkins Ltd., a manufacturer of food processing machinery, offers an industrial designer’s view.

Extrusion
In food processing, it’s imperative that the best-available materials be used for mixing and cooking. Consider the “extruder,” which consists of two long shafts with intermeshed screws that rotate in a barrel. Flour as well as liquid ingredients that provide flavour and colour are introduced into the barrel and mixed together. The extruder also cooks the product and forces it through a die at high pressure to form the “direct expanded cereals” that we buy as packaged breakfast cereals.

The extruder shafts need to transmit torque and resist corrosion. These requirements are especially important given that manufacturers are demanding ever-higher throughput.

In addition, the list of corrosive food additives is growing. In the past, shafts were made from low-alloy steels such as EN19 (BS 709M40, ~AISI 4140, UNS G41400) and EN30B (BS 835M30, no UNS number), but these have since been replaced by stainless steels such as 17-4PH (S17400). Not only does stainless steel provide toughness, ductility and strength for carrying high-torque loads, it offers greater resistance to pitting.

The elements that fit on the shafts and rotate inside the barrel liners must be compatible with each other: the materials must be hard enough to resist wear, tough enough not to crack, and able to withstand the corrosion caused by the products being processed. A standard offering may start with high-chromium tool steels such as AISI D2 (T30402) for the liners and martensitic stainless steels such as Type 440C (S44004) for the elements, with the hardness being carefully balanced to get the optimum life out of both.

When both abrasion and corrosion are present, a nickel-based alloy is required

AISI D2 (T30402) for the liners and martensitic stainless steels such as Type 440C (S44004) for the elements, with the hardness being carefully balanced to get the optimum life out of both.

Other, more demanding applications can be abrasive, in which case greater wear resistance is required. Increased corrosion resistance is also needed when hot salts, acidic flavours or colours are processed. When both abrasion and corrosion are present and a nickel-based alloy is required, hot isostatic pressing (HIP) may be used to produce a corrosion-resistant bi-metallic material for the food contact surface.

Heat transfer and corrosion-resistance

Efficient heat transfer and complete cooking are essential. Traditionally materials such as brass provide excellent heat-transfer properties, but brass is not strong enough to withstand modern operating environments or meet the requirements for pressure vessels. Although nickel-containing stainless steels such as Type 316L (S31603) are often used for these purposes, its heat transfer coefficient is too low for some applications. In such cases, pure nickel alloys 200 (N02200) and 201 (N02201) are used to provide a wall between the source of the steam heat and the product being cooked.

For yet other cooking applications, 316L will not have the corrosion resistance required. Salt in liquid flavours is a particular problem, especially when heated. Concentrations in food are usually low, but even in the best-designed and best-run systems, boiling water can leave concentrated salt deposits that will lead to corrosion. In applications like this, duplex stainless steel alloys such as 2205 (S32205) or 2507 (S32750) need to be used for their superior corrosion resistance.

While the aesthetics of stainless steel is an additional plus for consumer products, the demanding economics and engineering of food manufacturing requires the durability, toughness and corrosion resistance of nickel-containing stainless steels. And that is how these materials continue to earn their keep.
Stainless steel is particularly well suited to use in processing equipment for the food and drink sector: easily cleaned, durable and corrosion resistant. As well as being inert and not affected or corroded by products such as milk, it is the ideal material for environments where strict hygienic conditions are important.

The typical cleaning acids and hypochlorite sanitising compounds used in food and beverage plants mean that the nickel-containing stainless steels are specified. Unlike the copper or iron used in the past, stainless steel does not taint the taste or change the appearance of the food product. Even more important is its ability to withstand repeated use of the sanitising chemicals over the extended lifetime of the process equipment, allowing food producers the best guarantee of safe food products.

**Aseptic processing**
The ultimate guarantee of food safety is aseptic processing. Employed in both the food and pharmaceutical sectors, such techniques deliver an aseptic (sterile) product. The complete absence of bacteria or other potential food contaminants or spoilers means the product will remain fit for human consumption for an extended period as long as it remains sealed. It also reduces or eliminates the use of preservatives or additional chemicals, and nickel-containing alloy stainless steel is a key enabler of this technology.

One example can be seen in the Coca-Cola Amatil (CCA) facility in Perth, Western Australia, where equipment procured from Krones AG, a German-based process manufacturer was installed. The “blow-fill-seal” technology (see box for detail on BFS technology) includes over six kilometres (3.8 miles) of Type 304L (UNS S30403) and 316L (S31603) AS1528 standard grade stainless steel tubing with diameters ranging from 25-200mm (1-8 inch) diameter, all welded on site and internally passivated using citric acid.

Type 316L grade was specified for CCA because of the relatively high chloride content of the water supply in Perth. With spring water, one of CCA’s main products, the highest sanitation level is required to avoid microbiologically-influenced corrosion.

**Sustainable benefit**
The use of stainless steel has been a key feature in the successful outcome of this project. CCA’s State Projects Engineer Simon Wall said,
“As a beverage manufacturer, food safety aspects of our processes and equipment are critical to ensuring the integrity and quality of our products – an area that stainless steel ensures.”

Perth’s new BFS line commenced operation in 2012 and has the capacity to produce 26,000 bottles per hour and by the end of 2012, ten new blow-fill-seal lines had been deployed across CCA’s production facilities in Australia. When all the production lines are fully implemented, CCA estimates a saving of 7,000 tonnes of PET resin per year, a 15% reduction in bottle weight and 50,000 truck movements eliminated annually. Overall, this reduces the carbon footprint of every 600ml (20 fl. oz.) bottle by an average of 22% – a significant result in terms of sustainability.

How does Blow-Fill-Seal (BFS) technology work?

BFS technology is used to produce small liquid-filled containers (0.1 ml / 0.003 fl. oz.) for pharmaceutical products or large volume (500+ ml / 17+ fl. oz.) for the food industry. Using BFS allows the formation, filling and sealing of a container in a continuous process in a sterile enclosed area and without human intervention. The use of easy-to-clean nickel stainless steel is an essential element of the technology’s success.

First, plastic is vertically heat-extruded to form a hanging tube. This extruded tube is then enclosed within a two-part stainless steel mould and the tube is cut above the mould. The mould is transferred to the sterile filling space, where filling needles are used to inflate the plastic to form the container and fill it with liquid. The container is then sealed. All actions take place inside a sterile shrouded chamber. The product is then discharged to a non-sterile area for labelling, packaging and distribution.

Even the labelling...
The final step in food and drug safety

When the Food Safety Modernization Act (FSMA) became law in the United States in 2011, it was hailed as the most sweeping reform of American food safety laws in 70 years. A complex piece of legislation, it requires that food processors consider every piece of equipment in the food-product handling chain – even labelling equipment. The emphasis is on the prevention of contamination everywhere along the chain.

For processors of food products, proper labelling ensures that products are fully traceable, whereas consumers regard labelling is an essential source of dietary information. Equally important is that the labelling equipment itself be designed so that it can be sanitized routinely and easily.

Safety and sanitation

In response to the FSMA, Langguth America has introduced a line of labelling machines that takes into account all the requirements of the Act. The Waterloo, Canada-based company has a “clean design” option which guarantees stringent sanitation while shielding the product from the plant surroundings, and providing ergonomic and improved protection for operators. This option is available on Langguth’s hot melt, cold glue, and pressure-sensitive labelers and is deemed suitable for the pharmaceutical industry as well.

As might be expected, Langguth makes extensive use of stainless steel, in particular nickel-containing Type 304 (UNS S30400), which can withstand repeated and aggressive sanitization.

The equipment is designed to minimize the accumulation of dust and other contaminants. Components such as motors are complex in shape and thus impossible to sanitize, so it is important that they be sealed off using stainless steel. The Langguth equipment carries an IP65 rating, which indicates it is “dust-tight” and capable of withstanding low-pressure water jets.

“We use stainless steel wherever possible,” stresses Bent Jensen, Langguth’s Canadian sales manager. As a result, the food and drug industries are now able to achieve and maintain the highest standards for food safety.
NEW PUBLICATIONS

The Nickel Institute and NiPERA have recently published two new publications, available for download.

Nickel and Human Health fact sheet
NiPERA is pleased to announce a new series of fact sheets called Nickel and Human Health. A resource created by NiPERA, with input from other relevant groups as appropriate, the fact sheets are designed to communicate the concepts and current knowledge on human health issues to industry, regulatory authorities, and the general public.

The first fact sheet in this series is entitled "Nickel Allergic Contact Dermatitis" and is now available on the NiPERA website. The fact sheet contains valuable science-based information written in an accessible style for anyone who wishes to learn more about this disorder.

The fact sheet can be downloaded from www.niper.org

Nickel in Tomorrow’s World – Tackling Global Challenges
Nickel in Tomorrow’s World is a new brochure from the Nickel Institute looking at the role of nickel in the innovative technologies that will tackle some of the greatest challenges of tomorrow. The brochure examines seven megatrends ranging from water quality and supply, access to quality healthcare to efficient transport and infrastructure. Richly illustrated it provides some great examples for the vital role nickel-containing materials play in contributing to a sustainable economy and society. The publication can be downloaded from: www.nickelinstitute.org/MediaCentre

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</table>
New president for Nickel Institute

Tim Aiken was appointed President of the Nickel Institute in July 2013. Tim brings with him career-long experience at Nickel Institute member company Anglo Platinum and succeeds Dr. Kevin Bradley. As a former Chair of the Board of the Nickel Institute, he brings a deep understanding of the nickel industry and its stakeholders as well as the Institute’s membership.

Under Tim’s leadership the Nickel Institute will continue to promote the appropriate use of nickel globally; advocate for the appropriate application of health and environment regulation based on sound science as well as advance the knowledge of nickel health and environment issues through its science division NiPERA.

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Training on stainless steel

George Brown Chef School students put the grades to the test

Professional kitchens – in educational institutions and convention centres, hospitals and the military, and every restaurant from the neighborhood eatery to the highest-ranked homes of haute cuisine – depend on chefs and cooks to prepare attractive, nutritious and, above all, safe meals. At George Brown Chef School in Toronto, Canada, students learn their trades and work in a variety of state-of-the-art kitchens, all of which make very extensive use of stainless steels. While there is some use of ferritic stainless steel for less important surfaces – the panels of refrigerators and coolers, for instance – the work surfaces that need to be tough, durable and resistant to every kind of detergent, scouring agent or disinfectant, are made of austenitic stainless steel Type 304 (UNS S30400) with the pots and pans using the higher grade Type 316L (S31603).

These students come from homes that use stainless steel in their kitchens, train on the best stainless steel equipment, and will have careers in kitchens that, like those at George Brown, depend on nickel-containing environments with the ability to provide and maintain the highest standards of cleanliness and hygiene. — Bon appétit