



STAINLESS STEEL

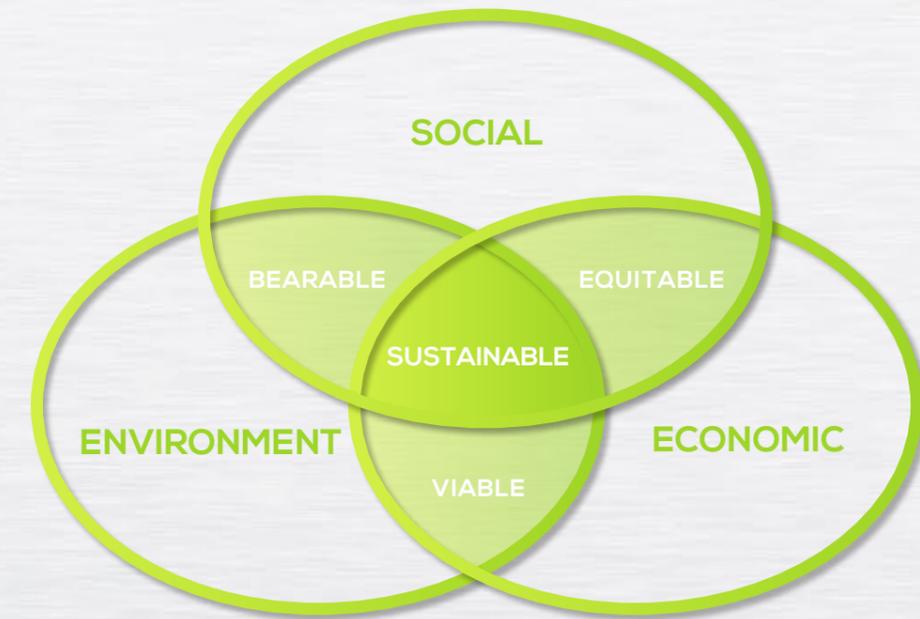
for a sustainable future



TEAM
STAINLESS

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Stainless steel can last hundreds of years if selected correctly

Stainless steel is 100 % recyclable without any loss in quality no matter how many times the process is repeated

DURABLE, HYGIENIC & RECYCLABLE

Stainless steel is easily cleanable and does not contaminate the product it touches

STAINLESS STEEL & SUSTAINABLE DEVELOPMENT

Due to its resistance to corrosion and staining, as well as needing little maintenance, most stainless steel products have long useful lives. The average life of stainless steel products is in the range of 15-25 years and, for some applications, much longer. For example, the Chrysler Building is over 80 years old! Stainless steel products contribute towards renewable energy generation, energy efficiency, reduction in environmental impact, and safe food and beverage production. There are many types of stainless steel to suit a wide range of applications. Chosen and used correctly, they can make a major contribution to sustainability.

STAINLESS STEEL AND RECYCLING

Stainless steel is 100 % recyclable. When products reach the end of their useful lives, over 80 % of the stainless steel is collected and recycled. The recycling of stainless steel is a large and profitable industry.

TURNING THE LIGHTS ON



BIOMASS

The conversion of biomass into biogas is among the cheapest forms of renewable energy. Properly specified stainless steel can withstand the corrosive materials used in the digester. As the biogas may still contain corrosive impurities, stainless steel tanks are also ideal for collecting of gas during the night, before it is

used to generate electricity during the day, when the price for energy is higher. Stainless steel biogas plants make a **triple contribution** to green energy generation: they solve problems of organic waste (including manure) disposal, save fossil fuel reserves and improve the CO₂ balance.

“ STAINLESS STEEL BIOGAS PLANTS MAKE A TRIPLE CONTRIBUTION TO GREEN ENERGY GENERATION ”



STAINLESS STEEL IS ESSENTIAL IN SUSTAINABLE ENERGY PRODUCTION & DISTRIBUTION



TURNING THE LIGHTS ON



NUCLEAR ENERGY

Nuclear energy is a low carbon power generation source. A wide range of stainless steel components is used in all stages of the nuclear cycle, contributing to the **safe and reliable** production of nuclear energy.



“ STAINLESS STEEL CONTRIBUTES TO A SAFE & RELIABLE PRODUCTION OF NUCLEAR ENERGY ”



SOLAR POWER



“ STAINLESS STEEL IS AN ESSENTIAL ELEMENT IN MOST SOLAR ENERGY APPLICATIONS ”

Whether we look at solar water heating, photovoltaic cells, solar cooling, or solar concentrators, the properties of stainless steel make it an essential element in most solar energy applications. Thanks to its **resistance to corrosion**, stainless steel tanks for molten salt offer a heat storage system for solar farms that

allows solar heat to be kept for 10–15 hours. The technology enables solar plants to operate without interruptions and thus contributes to making solar energy **commercially feasible**. Stainless steel is instrumental in solving today's biggest challenge: emission-free production of electrical energy.



STAINLESS STEEL IS PART OF THE ANSWER TO THE SUSTAINABLE WATER CHALLENGE

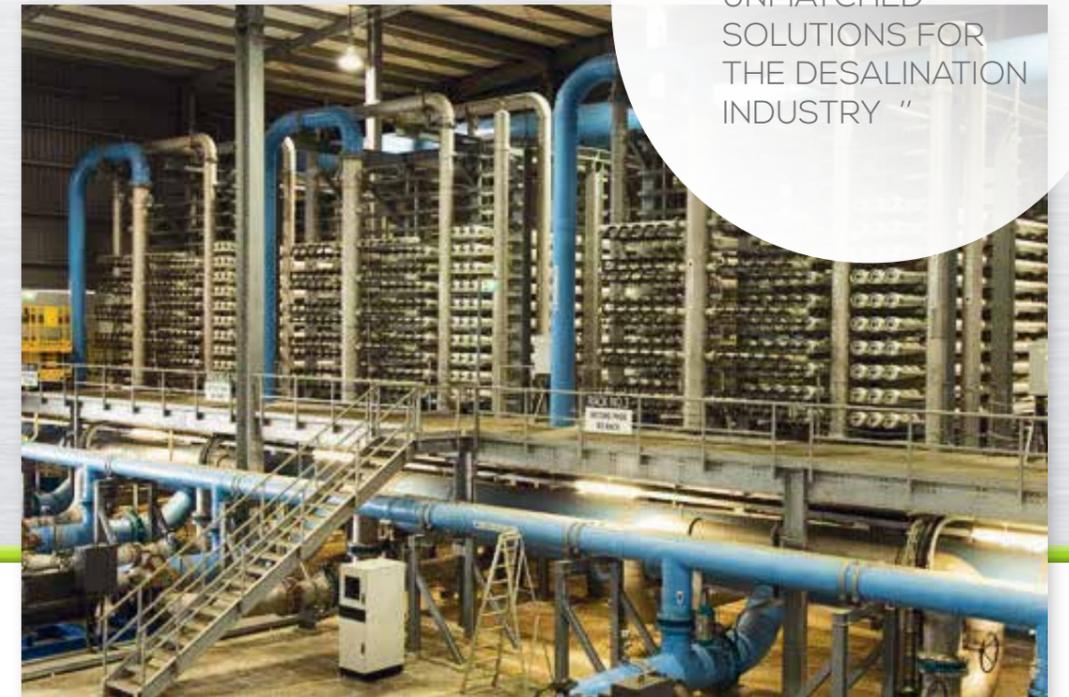


DESALINATION

Turning seawater into drinkable water is the **preferred solution** for supplying water for many arid regions. Stainless steel provides unmatched solutions for the desalination industry as seawater combined with high temperatures

create a corrosive environment which stainless steel can resist. In dry parts of the world, stainless steel makes the lives of millions of people better by providing access to drinking water.

“ STAINLESS STEEL PROVIDES UNMATCHED SOLUTIONS FOR THE DESALINATION INDUSTRY ”





WASTEWATER TREATMENT

Water is endlessly recycled but it needs to be purified, as only approximately 1 % of the earth's water is potable. Stainless steel is the optimal material for processes such as water purification and it also helps to **prevent contamination** of our lakes and rivers. This is why since the late 1960s stainless steel has been the material of choice for the construction of wastewater treatment plants.

“ STAINLESS STEEL IS THE OPTIMAL MATERIAL FOR PROCESSES SUCH AS WATER PURIFICATION ”



DRINKING WATER SUPPLY



The infrastructure providing clean water may be hidden, but is nonetheless very important. From the well to the tap, drinking water is extracted, treated, stored and conveyed in stainless steel equipment. **Health awareness** and the quest for **durable building solutions** make more and more owners choose stainless steel for domestic plumbing.

“ WATER IS EXTRACTED, TREATED, STORED & CONVEYED IN STAINLESS STEEL ”

STAINLESS STEEL
PRESERVES THE
TASTE AND
APPEARANCE OF
FOOD WHILE
ENSURING HYGIENE
AND SAFETY



KITCHEN APPLIANCES

Since its discovery early in the 20th century stainless steel has become a favorite in domestic kitchens, in the form of stainless steel ovens, cooking utensils and tableware. Why? It is because stainless steel makes these kitchen essentials extremely **strong, durable** and **easy to clean**. It has also proven in clinical tests to be more hygienic than other food-contact surfaces.

“ STAINLESS STEEL HAS
BECOME A FAVORITE
IN DOMESTIC KITCHENS ”





CUTLERY

Next time you are sitting in a restaurant waiting for your food to arrive, take a look at the back of your fork or your spoon – you are likely to see a couple of numbers (18/10, 18/8 or 18/0) next to the brand name. Those numbers are percentages; the first represents the amount of chromium and the second the amount of nickel in the

stainless steel fork or spoon you are about to eat with. Stainless steel is an **inert material**, which is **easy to clean**, so not only will the material remain pristine but so will the food, untainted by metallic constituents or corrosion products. These properties make stainless steel the most widely used material for cutlery.



“ STAINLESS STEEL IS THE MOST WIDELY USED MATERIAL FOR CUTLERY ”



FLASKS & WATER BOTTLES



Flasks are double-walled bottles with a vacuum between the inner and outer shell. Stainless steel is an ideal material for this application: it withstands the atmospheric pressure on the vacuum chamber, is **non-breakable** and the typical grades used have **low thermal conductivity**, making the insulating effect even stronger. Stainless steel water bottles are increasingly popular as people can reuse them many times over. Using strong, safe, durable and easy to clean stainless steel bottles means that you can bottle your own water making it cheaper as well as environmentally sound.

“ STAINLESS STEEL WATER BOTTLES ARE INCREASINGLY POPULAR AS PEOPLE CAN REUSE THEM MANY TIMES OVER ”



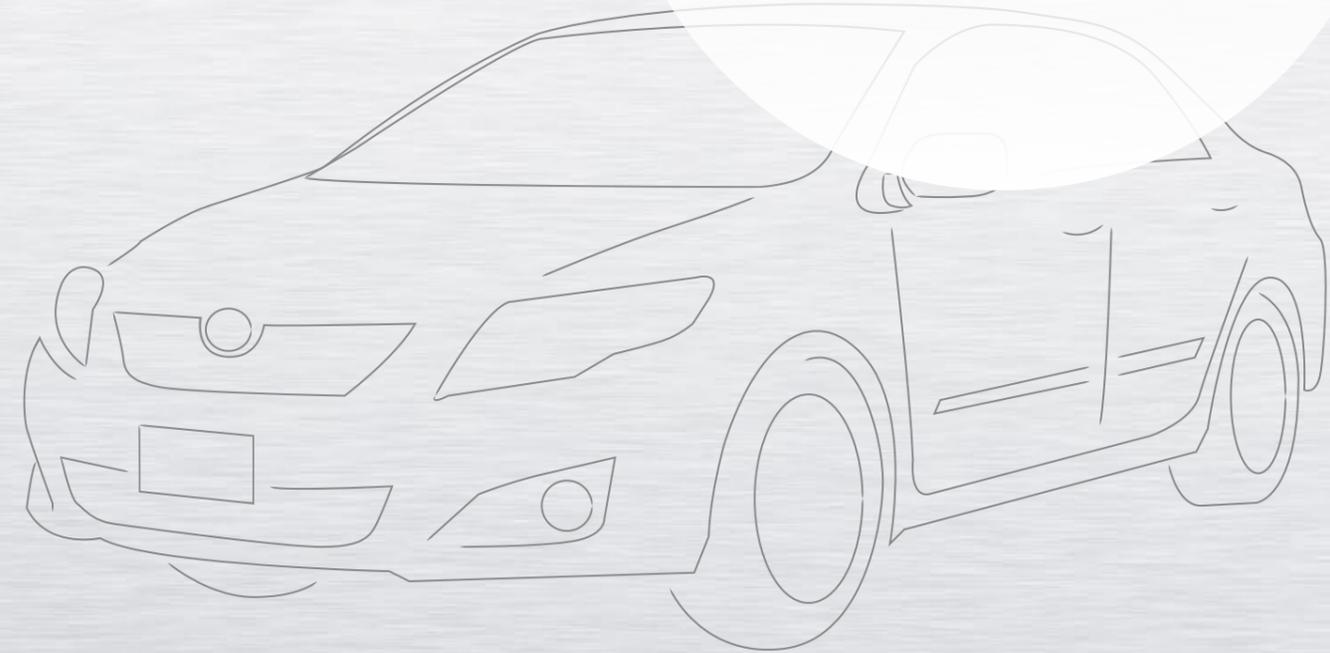
BIOFUELS

The production of ethanol involves corrosive processes, which require most of the tanks and pipes to be made from stainless steel. A medium-sized bio-ethanol plant can require as much as 2,000 to 3,000 tonnes of stainless steel. In the future, bio ethanol will increasingly be made from materials like waste wood, wheat

and corn chaff. The necessary pretreatment will involve strong acids and make high performance materials like super-austenitic and duplex stainless steel grades **indispensable** and hence widely used in the processing of chemicals. Stainless steel makes bio-ethanol production more sustainable.

WHILE DRIVING
YOU WILL COME
ACROSS MANY
SUSTAINABLE
APPLICATIONS OF
STAINLESS STEEL

“ STAINLESS STEEL
MAKES BIO-ETHANOL
PRODUCTION MORE
SUSTAINABLE ”





BRIDGES

Bridges are made to last - usually for more than a century. However, conventional bridge materials require regular re-painting or repair, which is extremely costly and causes traffic disruptions. Stainless steel bridges provide a virtually maintenance free solution **even in the most demanding environments** like seaside locations in hot and humid tropical climates.

“ STAINLESS STEEL BRIDGES PROVIDE A VIRTUALLY MAINTENANCE FREE SOLUTION ”



VEHICLE EXHAUSTS

“ STAINLESS STEEL CAN REDUCE THE ENVIRONMENTAL IMPACT OF COMBUSTION ENGINES ”



The use of stainless steel in automobile exhaust systems began with the introduction of catalytic converters. The new systems demanded resistance to **corrosion, mechanical stress** and **high temperatures**. Today, stricter emissions standards are

being extended to vehicles like trucks and motorcycles. With stainless steel we can reduce the environmental impact of combustion engines while keeping the costs down.





RAILCARS

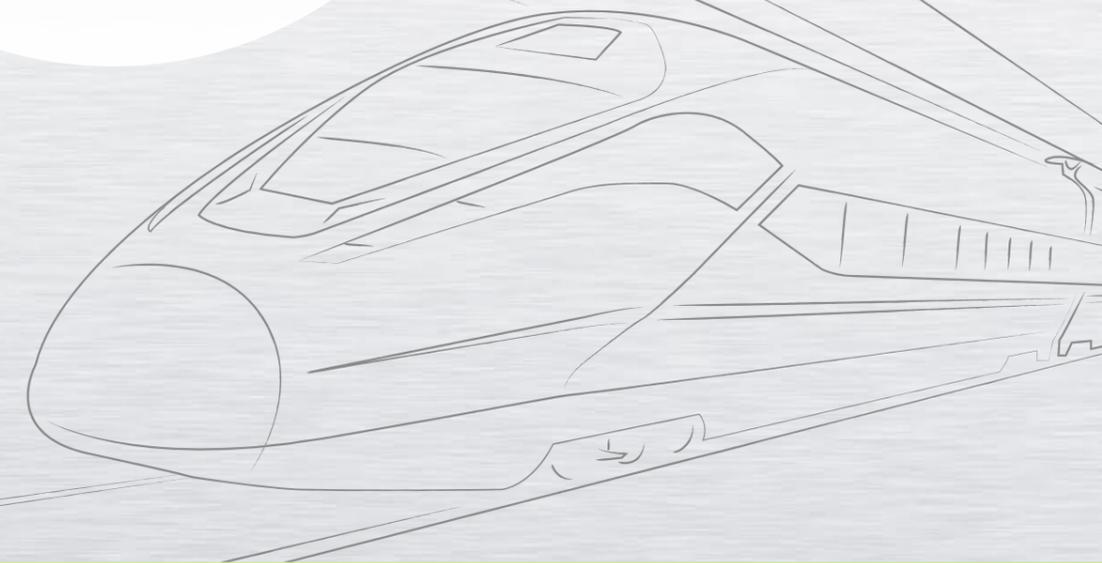
Because of its **low maintenance** and **long life** stainless steel has become an ideal material for the rail industry, whether passenger, freight, metro or light rail systems. Some grades of stainless steel “work harden” - increase in strength when deformed at ambient temperatures. This added

strength enables manufacturers to reduce the thickness of stainless steel railcar body structures, making them **lighter** and therefore **more economic** to operate. These characteristics also increase passenger **safety** in the unlikely event of a collision.

“ STAINLESS STEEL HAS BECOME AN IDEAL MATERIAL FOR THE RAIL INDUSTRY ”



STAINLESS STEEL IS USED TO KEEP GOODS AND PEOPLE MOVING TO THEIR DESTINATIONS





STATIONS



“ STAINLESS STEEL IS HELPING TO MAKE PUBLIC TRANSPORT MORE SUSTAINABLE ”

Stainless steel fixtures in stations are **high-quality, comfortable, fire resistant, lightweight** and **resistant to corrosion**. Stainless steel is hard wearing and its surface does not require any coatings, further reducing maintenance and running costs.

Hygienic cleaning is easy to perform and graffiti can be removed using suitable solvents without damaging the stainless steel. Stainless steel is helping to make public transport more sustainable.



AIRPORTS



“ STAINLESS STEEL IS BEING INCORPORATED INTO BOTH THE INTERIORS AND THE EXTERIORS OF AIRPORTS ”

In airports people are in constant movement, going through shops, gates and concourses. Stainless steel is being incorporated into both the interiors and the exteriors of airports because of its **pleasing aesthetic** but also because of its **structural strength, cleanability, corrosion resistance**, and scratch and impact resistance.



TUNNELS

Stainless steel is finding increasing use in tunnels for its **fire** and **corrosion resistance** properties and **long maintenance-free life**. Road and rail tunnels for example face the problem of exhaust gases and de-icing salt, so highly corrosion resistant grades of stainless steel are the most sustainable solution.

“ HIGHLY CORROSION RESISTANT GRADES STAINLESS STEEL ARE THE MOST SUSTAINABLE SOLUTION ”



STAINLESS STEEL IS USED TO BUILD STRONG, LOW MAINTENANCE AND BEAUTIFUL STRUCTURES THAT WILL LAST FOR DECADES





STREET FURNITURE



Durable, aesthetic, safe and **hygienic** stainless steel provides the ideal solution in a wide range of urban applications - including street furniture. Its low maintenance cost, ease of cleaning and resistance to vandalism also make it attractive to public authorities that are seeking sustainable solutions.

“ STAINLESS STEEL PROVIDES THE IDEAL SOLUTION IN A WIDE RANGE OF URBAN APPLICATIONS ”



BUILDINGS

The design of buildings has become a key factor in addressing the challenges of resource availability and climate change. A stainless steel roof or building exterior can reduce the solar heating effect and hence the demand on the air-conditioning system. At the same time, its corrosion resistance ensures **low maintenance and long life**, and it is a **fully recyclable** material.



“ A STAINLESS STEEL ROOF OR BUILDING EXTERIOR CAN REDUCE THE SOLAR HEATING EFFECT ”

STAINLESS STEEL
HELPS INCREASE THE
SUSTAINABILITY OF
FOOD PRODUCTION
AND PROCESSING



MILK

Dairy processes are particularly susceptible to contamination and only the highest standards of hygiene make them work reliably and safely on an industrial scale. No wonder that the dairy industry was the first to switch to stainless steel for most of their equipment: the use of austenitic stainless steel in the dairy industry can be traced

back to 1913. By facilitating the efficient, **safe handling** and processing of milk, stainless steel has helped **reduce the baseline cost** of the product to 55 in the year 2000 from about 100 in the 1920s. Plus pasteurised milk is perfectly hygienic thanks to the use of stainless steel in the milk production process.

" PASTEURISED
MILK IS PERFECTLY
HYGIENIC THANKS
TO THE USE OF
STAINLESS STEEL "



PRODUCING FOOD



FOOD & BEVERAGE

Stainless steel is the material of choice for the food and beverage industry because it does not affect the taste of products such as milk, beer or wine. It is **easily cleaned** and sanitised to prevent bacterial contamination. Using stainless steel helps **minimise food losses** and its **durability** makes it the sustainable choice for the food and beverage sector.

“ STAINLESS STEEL DOES NOT AFFECT THE TASTE OF PRODUCTS ”



CATERING



“ STAINLESS STEEL IS EVERYWHERE, IN KITCHENS ALL AROUND THE WORLD ”

Stainless steel is recognised as the best material for use in commercial food equipment. Used for work surfaces, sinks, display units, rotisseries, extractor hoods and endless other applications, stainless steel is everywhere, in kitchens all around the world. Stainless steel provides a

combination of properties vital to end-users in this sector. These properties include **corrosion** and **temperature resistance**, **cleanability**, **durability**, **impact resistance** and **attractive appearance**. It is also a very **hygienic** material and totally **neutral** in food-contact contexts.



STAINLESS STEEL
MEDICAL DEVICES
MAKE AN INVALUABLE
CONTRIBUTION TO
THE WELL-BEING
OF SOCIETY



MEDICAL EQUIPMENT

Stainless steel is inert, **corrosion** and **wear resistant** and has surface characteristics that make equipment **easy to clean** hygienically, even after years and decades of intense use. It can withstand sterilization processes while remaining resistant to corrosion.

“ STAINLESS STEEL
CAN WITHSTAND
STERILIZATION
PROCESSES WHILE
REMAINING
RESISTANT TO
CORROSION ”





PHARMACEUTICALS



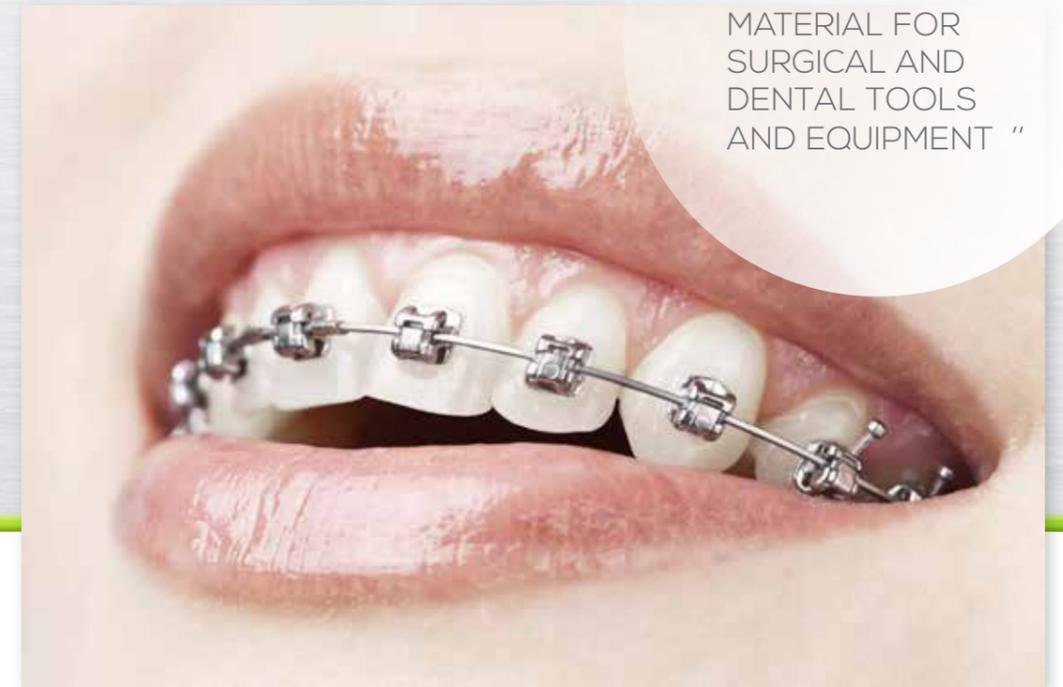
Stainless steel **does not react** with the chemical and biological substances used to produce pharmaceuticals. Its surface characteristics can be enhanced, e.g. by electropolishing, to minimise adhesion and optimize cleanability to the exacting standards of pharmaceutical and biochemical processes. Stainless steel helps to mass-produce medicine and make it widely available.

“ STAINLESS STEEL HELPS TO MASS-PRODUCE MEDICINE AND MAKE IT WIDELY AVAILABLE ”



SURGICAL IMPLANTS & DENTAL APPLICATIONS

Stainless steel is the preferred material for surgical and dental tools and equipment. Why? It is **accepted** by the body, **easy to clean** and **sterilize, strong**, and **resistant to corrosion**. Speciality stainless steels are used in implants such as bone fixation screws and prosthetic joints, helping many people have a better life.



“ STAINLESS STEEL IS THE PREFERRED MATERIAL FOR SURGICAL AND DENTAL TOOLS AND EQUIPMENT ”



TURNING THE LIGHTS ON

SOLAR POWER

- Photovoltaic Panels
- Solar Hot Water Panels
- How Nickel Stainless Steels Are Improving The Prospects For Solar Energy
- Solar Water Heaters - The Ferritic Solution
- Solar Power Case Studies

BIOMASS

- Stainless Steel in Biogas Production
- Agricultural Biomass Energy Generation Plant

NUCLEAR ENERGY

- Nickel Use in Nuclear Power
- Experimental Nuclear Fusion Generator
- Steam Turbine Blades
- Duplex 2205: The New Choice for Nuclear Power Piping

WATER

DESALINATION

- Desalination & Water Treatment
- Desalination in Stainless Steel
- Water - Our Most Valuable Resource

WASTEWATER TREATMENT

- Performance of Stainless Steel in Wastewater Installations
- Water Waste Treatment
- Stainless Steel in Sewage Water Treatment
- Thames Gateway Water Treatment Works

DRINKING WATER SUPPLY

- Potable Water Treatment Plants
- Drinking Water Fountain
- Stainless Steel in the Water Industry
- Drinking Water Applications
- Stainless Steel - Water for the Growing World

EATING & COOKING AT HOME

KITCHEN APPLIANCES

- Frequently Asked Questions: Cleaning Stainless Steel in the Home
- Domestic Applications
- The Care and Cleaning of Stainless Steel
- Stainless Steel in the Home of Tomorrow

CUTLERY

- Why Stainless Steel is Chosen in Countless Food and Beverage Related Applications
- Nickel in Food and Beverage Industry
- Stainless Steel and Hygiene

FLASKS & WATER BOTTLES

- Flasks and Water Bottles

ON THE ROAD

BIOFUELS

- Nickel-containing Stainless Steel in Ethanol Production
- Stainless Steels: Cost-Efficient Materials for the Global Biofuels Industries

BRIDGES

- Stonecutters Bridge Towers Case Study
- Bridges
- Pedestrian Bridge in Stainless Steel
- Stainless Steel Rebar's Resistance to the Corrosive Effects of De-icing Salt
- The Helix, a Complex Duplex Bridge

VEHICLE EXHAUSTS

- Stainless Steels in the Automotive Sector
- Stainless Steel in Automotive Applications
- Stainless Steel New Automotive Applications



TRANSPORT

RAIL CARS

- Innovative Stainless Steel Applications in Transport Vehicles
- Rolling Stock
- Corrosion Resistance Combined with Aesthetic Appeal Make Stainless Steel an Ideal Metal for the Manufacture of Passenger Rail Cars
- Railcars in Stainless Steel
- Stainless Steel Railways Applications

STATIONS

- Rail and Bus Stations
- Stainless Steel Accelerates Barcelona's Metro Line Expansion Project
- ISSF Book of New Applications
- Vauxhall Cross Bus Station in London
- Erasmus Metro Station in Brussels

AIRPORTS

- Sustainable Stainless Steel Transit Station Design
- Building Interiors - The Ferritic Solution

IN THE CITY

BUILDINGS

- Stainless Steel Sustainability Advantages in Architecture
- Stainless Steel Façades
- Stainless Steel for Roofing
- Online Information Center for Stainless Steel in Construction
- Stainless Steel Long Products for Building and Construction
- Energy-Saving Stainless Steel Facades
- Stainless Steel in Architecture

STREET FURNITURE

- Street Furniture Website
- ISSF Book of New Applications 2009 - Street furniture

TUNNELS

- Stainless Steel in Tunnels
- Tunnel Safety
- Stainless Steel New Applications for the Protection of the Environment - Air

PRODUCING FOOD

FOOD & BEVERAGE

- Stainless Steel in the Food and Beverage Industry
- Winemaking With A New Stainless Steel Surface Finish
- Nickel in Food and Beverage Industry
- ISSF Book of New Applications 2009 - Food and Beverage Industry
- Stainless Steel is a Winner

MILK

- Delivering 120 Billion Litres of Safe and Healthy Milk Every Year
- Stainless Steel in the Dairy Industry

CATERING

- Commercial Food Equipment - The Ferritic Solution
- Spotless Stainless - The Pride of Professionals

HEALTHCARE

MEDICAL EQUIPMENT

- Nickel in Medical Applications
- Nickel-containing Stainless Steels are a Vital Component for Medical Excellence
- Medical Sink
- Magnetic Resonance Imaging

PHARMACEUTICALS

- EpiPen® with a Nickel-containing Stainless Steel Needle That's a Real Lifesaver for Many Families
- ISSF Book of New Applications 2007 - Human Health
- Use of 2205 Duplex Stainless Steel in Pharmaceuticals

SURGICAL IMPLANTS & DENTAL APPLICATIONS

- Nickel-containing Stainless Steels Make the Hypodermic Needle a Life-Saver
- Surgical Implants

Team Stainless promotes the many benefits of stainless steel to a sustainable society. Team Stainless is an informal cooperation among associations of the stainless steel and alloying element industries. It has a global mission.

**This publication has been developed
by the members of Team Stainless**



Stainless Steel For a Sustainable Future
(interactive animation) :



**TEAM
STAINLESS**
www.teamstainless.org