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### Hygienic importance of stainless steel in developing countries

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*Stainless steel products play an active role in improving the hygiene in restaurants, public kitchen, schools, local health centers etc. This is so, especially in emerging markets such as India, Mexico, China and the likes (Developing countries). One of the major features in these markets is the changing social and living-habits in the urban and rural areas. Increasing consumer preference is felt for hygienic, aesthetic and easy maintenance qualities of stainless steel in labor saving devices. Stainless steel is preferred more with reference to particularly the increasing number of women joining the work force and the attendant requirements of modern kitchen and household equipment, ready-to-use foods, emergence of fast food outlets etc. and the industrial units mushrooming in this sector.*

#### HEALTH & HYGIENE

Hygiene is of utmost importance in sanitation or in the preparation or processing of food or beverages. Stainless steel has a proven record of success in these areas where sanitation and ease of cleaning are so important. The easy cleaning ability of stainless steel makes it the first choice for strict hygienic conditions, such as restaurants, hospitals, public kitchens, and other areas where people congregate. Stainless steel's hygienic properties, corrosion resistance, strength and formability are important benefits to fabricators and users in this sector.

Stainless steel's cleanability is similar to that of glass and china and far superior to plastics, aluminum and earthenware. The properties of corrosion resistance, durability, flavor protection, economy and aesthetics have led to its acceptance to countless food related applications. Stainless steel is becoming increasingly popular and more widely used as a food container in rural areas of the developing economy. In the given set of conditions in the developing economy, where the food is prepared and sold widely in the streets or even stored in the open, exposed to polluted atmosphere and dust, stainless steel helps to minimize the damage and risk to the human health.

Having no pores or cracks to harbor dirt, grime or bacteria, stainless steel lets soap and water do all but the toughest cleaning jobs. Cleanability is also important in relation to taste, color and contamination of edible products such as milk, processed foods and alcoholic beverages. Wiping action to the washing treatment enhances still further the bacterial cleanability of stainless steel. One of the outstanding benefits of stainless steel in case of taste or odour from one batch of food to the next batch is the readiness with which its surface can be cleaned free of soil and bacteria. This is of particular hygienic importance in food handling.

In food service equipment, stainless steel is required to resist aggressive fluids, abrasive materials and impacting utensils, to give off no undesirable compounds and to maintain its attractive appearance. Stainless steel's ability to meet these stringent demands and simultaneously provide superior cleanability and, critically, hygiene has led to the material's acceptance as the number one choice in the food service industry.

#### MECHANICAL RESISTANCE

Stainless steel is chosen in the catering trade for hygiene, durability, and resistance to scratches. It is chosen in many cases today for aesthetic reasons, particularly for premises like Pizza Restaurants where the cooking area is in public view. With the introduction of Food Safety Act, catering hygiene is a

growing area of importance and this is particularly relevant for waste disposal units. Stainless steel has become important as a sanitary product because of its suitability for high vandal risk environments as well as its hygienic qualities.

#### OUR MOST IMPORTANT FOOD: DRINKING WATER

We can live for some days without food but not without water. Water is a chain requirement for the human existence and better the quality of water, better is the health. The basic requirements in the water chain are the treatment, transportation, distribution, sewage treatment and disposal. For treatment, transport and distribution, hygiene is very important and it would be imperative to use stainless steel for the piping. In the case of sewage disposal and treatment, the corrosion resistance aspect of stainless steel plays the major role.

#### STORAGE OF WATER – A BARE NECESSITY IN DEVELOPING COUNTRIES

In developing countries, availability of treated water is at a premium as well as a point of concern, calling for tough measures to preserve / conserve treated water for a longer period. Stainless steel serves as a useful medium for prolonged storage of water and in maintaining hygiene. Better control over leakages and prevention of corroded material, by using stainless steel piping increases the availability. This is a major point of action needing immediate attention of governments in conserving, saving and utilizing water. Stainless steel can play an all-important role in these functions.

#### WHY STAINLESS STEEL?

Stainless steel avoids contamination of food & water and maintains freshness of the items handled. In food contact applications, the consumer today wants the same high level of functionality, food safety and cleanliness that is typically required in restaurant kitchens or in the food processing industry. The owners of food equipment consider stainless steel as a good investment. It lasts longer and attracts customers.

#### RESISTANCE TO AGGRESSIVE FOODSTUFFS

The food contents in acidic/alkaline forms attack the surfaces of the cooking/serving ware and create pitting which becomes the harbouring place for bacteria. This causes health hazards easily not understood.

Stainless steel is basically inert to most of the acids/alkalies released by cooked foods / vegetables, additives etc.. It does not normally get pitted, thus avoiding the worst chance for bacterial infection. Further stainless steel can be used for cooking as well as serving and does not break / crack unlike other comparative wares used for foods. Stainless steel is perfectly neutral to foodstuffs and the taste and appearance remain unchanged, even in contact with aggressive, acid substances from fruits and vegetables.

The food in developing economy is spicy with aggressive ingredients and strong colouring agents. Stainless steel equipment and containers are suitable for handling such food items and help in reducing to a great extent the risk of food poisoning.

Stainless steel is easy to clean and with only a minimum of maintenance, stainless steel can be maintained in the as-new condition for decades. Stainless steel is mechanically resistant. Kitchen sinks and cooking utensils of stainless steel withstand shock and abrasion. Stainless steel has a self-healing surface. The reason why stainless steel has a high corrosion resistance is its so-called "passive layer" that is formed at the surface. A Self-Repair Mechanism characterizes this layer, which is the secret of its outstanding durability.

As it is more formable than most other metallic materials, stainless steel is a favorite material of ambitious product designers. A wide range of decorative finishes is available from mirror-polished to matte.

Hygiene is of utmost importance, wherever food & beverages (water, tea, coffee, milk, beer, wine) are produced, prepared or processed. Stainless steel has a proven record of success in these areas where sanitation and ease of cleaning are so important.

In emerging economies, stainless steel equipment and storage vessels help to solve many of the problems related to lack of hygiene / cleanliness in water and food related environments, reducing to a large extent the risks of food poisoning by keeping them clean and sterilized.

The easy cleanability of stainless steel even with hot water (which can be available in any situation in a developing economy) can play a major role in ensuring the food stored in it, hygiene and safe.

### **CHARACTERISTICS**

Satin smooth or mirror bright, stainless steel lends its beauty to its surroundings, blending perfectly with other fixtures and finishes. The bright, easily maintained surface of stainless steel provides a modern and attractive appearance.

Stainless steel can withstand fire for a long time and does not warp or buckle easily. Stainless steel can retain its natural color for a very long time. Stainless steel is practically impervious to corrosive attack by animal fats, blood, salts, fruit and vegetable acids, human waste, detergents and moisture.

Stainless steel resists denting, nicking and scratching under the most vigorous of operating conditions. Stainless steel provides excellent toughness, ductility, weldability, formability and work hardening characteristics. Excellent cryogenic and high temperature oxidation resistance is also provided. Stainless steel's high strength permits the use of lighter gauges than other metals - and at prices competitive with most of them.

Because stainless steel does not corrode under normal conditions and never needs paint, costly maintenance is cut to the bone. When the total life cycle costs are considered, stainless steel is often the least expensive material option. Stainless steel needs no maintenance and can be kept clean, bright and beautiful simply by wiping and washing with water.

### **LEGISLATION**

The National Sanitation Foundation (NSF) in the USA is best known for its role in the development of standards for equipment, primarily in the food service area. The NSF's materials and finishes guide refers to three zones: the food zone, the splash zone and the non-food zone. The NSF stipulates that the food zone "surface materials shall be smooth, corrosion resistant, non toxic, stable and non absorbent under use conditions. They shall not impart odour, color or taste nor contribute to the adulteration of the food. Exposed surfaces shall be easily cleanable".

For applications, smooth is defined as " surface free of pits and inclusions, having a cleanability equal to No 3 (100 grit) finish of stainless steel. Materials in the splash and non-food zones must be smooth, easily cleanable and corrosion resistant or rendered corrosion resistant. Most Health Authorities insist on Stainless Steel (which meet the above specifications) equipment and cooking utensils before licensing a restaurant.

### **RECYCLING**

Stainless steel is environment friendly. It can be recycled, reduced or remade. In fact, disposal properties are a particular asset of stainless steel.

Stainless steel is theoretically 100% recyclable. If passed through a waste incineration process,

stainless steel can still be reclaimed from the ashes and recycled. But even if a discarded stainless steel product fails to be recycled and is dumped, there are no detrimental effects, neither on the soil nor on the ground water. Thus stainless steel is a material that is compatible with the environment.

The properties of stainless steel such as durability, corrosion resistance or ease of cleaning must be redefined in ecological terms. So the traditional USP 'durability' can be explained in terms of waste prevention. Similarly, the advantage of built-in corrosion resistance is the absence of coatings, which usually are the source of unwanted emissions during production and life cycle, eg. of harmful solvents. Easy cleaning means that aggressive cleansers are no longer needed and wastewater pollution is thus minimized.

### **LIFE CYCLE**

Using stainless steel will result in a very long life compared to mild steel on account of its great resistance to corrosion. Structures made from stainless steel will last many times the normal life. Stainless steel is probably more expensive to buy in the beginning. It is usually cheaper in the long run since it lasts for a long time and there is little or no maintenance and repair costs. Once the useful life is over, stainless steel is 100% recyclable. Scrap stainless steel is recharged into the electric furnaces for re-melting back into stainless steel. Stainless steel is a true "full life cycle" material.

### **CONCLUSION**

With emotional market development, consumers can be reached. The arguments to be used are on cleanliness, hygiene, brightness, long life, strength, hardness and ease of recycling. The ability of stainless steel to be recycled without causing additional problems to the environment is becoming increasingly important. As a rule, designs in stainless steel convey an impression of elegance, solidity and modern life style. Among all the high volume engineering materials, stainless steel is the only one that has established an almost ideal closed loop recycling system.

As to safety considerations, the chemical and biological neutrality of the material in food contact applications has become a focus of interest. Due to its corrosion resistance, stainless steel has proved safe even if exposed to food items with high acidity. This is a clear health advantage.

Stainless steel products fulfill consumer needs longer than comparable products made of other materials. There is no need to replace them prematurely because of wear and aesthetic deterioration. This is how a primary contribution to waste prevention is made. Stainless steel's many properties lead to its application throughout the food chain: from food processing and brewing, to distribution, to storage and to serving food.

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