

STAINLESS INDIA

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**Indian Stainless Steel
Development Association**

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Greater Role for Stainless Steel to Clean Up the Air

Among the many roles that stainless steel play in improving the quality of our lives, a very important one is the cleaning up of the environment we live in. The world over, stainless steel is widely used for potable water and wastewater treatment plants, Flue Gas De-scrubbing of coal-burning units, waste incineration, and of course automotive exhaust trains.

In India, the principal use of stainless steel for environmental purposes is in petrol driven cars, multi-utility vehicles, two-wheelers and diesel vehicles fitted with catalytic converters to burn off the noxious and harmful exhaust gases and convert them into harmless ones. The Indian Government's decision to impose stricter emission control norms for vehicles from April 1, 2005 means that stainless steel would be used in the exhaust systems of a larger number of cars and two wheelers in India.

How Auto Emission Hurts?

The main emissions of a car engine are nitrogen gas, carbon-dioxide and water vapour, which are mostly benign. But because the combustion process is never perfect, smaller amounts of harmful emissions such as carbon monoxide, volatile hydrocarbons from unburned fuel and nitrogen oxides which contribute to smog and acid rain and cause irritation to human mucous membranes are emitted.

What Catalytic Converters Do?

In the first stage, harmful nitrous oxides are reduced to nitrogen plus free oxygen. In the second stage, the unburned hydrocarbons and carbon monoxide are oxidized to make them harmless water vapour and carbon dioxide. The catalysts are thin layers of very expensive metals like platinum, rhodium and palladium.

Why Stainless Steel?

The abovementioned chemical processes can happen only at very high temperatures, in the region of 750°C plus. Besides, the exit gas temperature from the engine can be near 1000°C. These high temperatures and the highly corrosive condensates in the exhaust system make it imperative for the auto manufacturers to use corrosion resistant stainless steel of different grades for housing the catalytic converter and also for the exhaust train.

Before the introduction of catalytic converters, it was common to use aluminized steel or externally chrome plated carbon steel for the exhaust train, which is still the practice in the lower end vehicles. It was found that even aluminized steel could

not withstand the condensate corrosion in the train and hence stainless steel was chosen.

The automotive industry has adopted stainless steel for the exhaust systems to cope with the increasingly stringent emission norms, improve the engine performance and extend the durability of the exhaust system.

Grades of Stainless Steel

Apart from superior corrosion resistance, the material used in the exhaust system should also be able to withstand the thermal stresses caused by heat cycles of the exhaust gas and have superior thermal fatigue resistance.

It must be noted that it is the straight chromium 400 series grades that account for well over 90% of the market share in this application. Even among the 400 series, in the Indian market and generally elsewhere, 409 and its variants grab the lion's share, leaving only a few percentages for 439, 441 and 434. The enforcement of stricter norms will add a few more percentages to these three grades and perhaps new grades will enter the scene. 304 has a small but respectable share in this market.

Contd. on page 2 >>

AISI	%Cr	%Ni	%Ti	%Nb	%Mo
Ferritic Stainless Steel					
409	11.0	—	0.15	—	—
439	17.0	—	0.20	0.20	—
441	17.5	—	0.15	0.50	—
434	16.0	—	—	—	1.0
Austenitic Stainless Steel					
304	18.0	8.0	—	—	—
321	17.5	9.0	0.3	—	—



O P Jindal

Mr Om Prakash Jindal, Chairman of the Jindal Organization, died in a tragic air accident at Saharanpur, Uttar Pradesh on March 31, 2005. Mr Jindal was a successful industrialist, a sincere social worker and a successful politician. ISSDA, on behalf of its members, conveys its deep sense of loss and grief to the bereaved members of his family. Among his group companies are Jindal Stainless Ltd, Jindal SAW Ltd, Jindal South West, Jindal Steel & Power Ltd.

>> *Contd. from page 1*

While 409 is the leanest alloy, for increasing the level of corrosion resistance, 439, 441 and 434 have enhanced chromium levels along with incremental additions of titanium, niobium and addition of molybdenum. For instance, 441 could be chosen for the exhaust manifold which directly receives the hot effluent gases from the engine.

The emerging scene in India

As of April 1, 2005, it has been mandated that all cars and MUVs in the entire country must conform to EURO II (Bharat Stage II) norms. This compliance requirement for cars was earlier restricted to the five metros and six mini-metros. Similarly, in the case of two-wheelers (motorcycles and scooters) it has been made mandatory for the Metros from April 1, 2005. According to a reliable source, the mandating of catalytic converters and the use of stainless steel exhausts by 3-wheelers is also a distinct possibility.

When seen in conjunction with the fact that in 2004-2005 India produced 1,209,654 cars + MUVs and 6,900,961 two and three-wheelers, the implications for the stainless steel industry are enormous, especially in terms of tubes, which is the main product form for auto exhausts.



Given the complexities in implementing new policies, experts believe that the requirement of stainless steels for this application would be in the range of 18,000 tons for 2005-06 on the assumption of 11 kg per car and 4 kg per motorcycle.

(Contributed by Mr S K Suneja, Head-Steel Service Centre, Neel Metal Products Ltd, Gurgaon. E-mail: sksuneja@jbm.co.in)

The Art of Modularity

Type: Modular Stainless steel tubular railing with 4 rods running parallel as infill. Job time completion: 7 days for 4 floors.

Special features: This railing is a side wall mounting design. In this style the railings are not grouted on the expensive staircase marbles.

The side mounting design is such that the grouting is concealed and the aesthetics are clean and weld free. Also notice the bends are weld-free and modular. They have smoothed edges and therefore feel soft on running hands.

below Main Staircase Railings of residence in Jor Bagh Delhi.



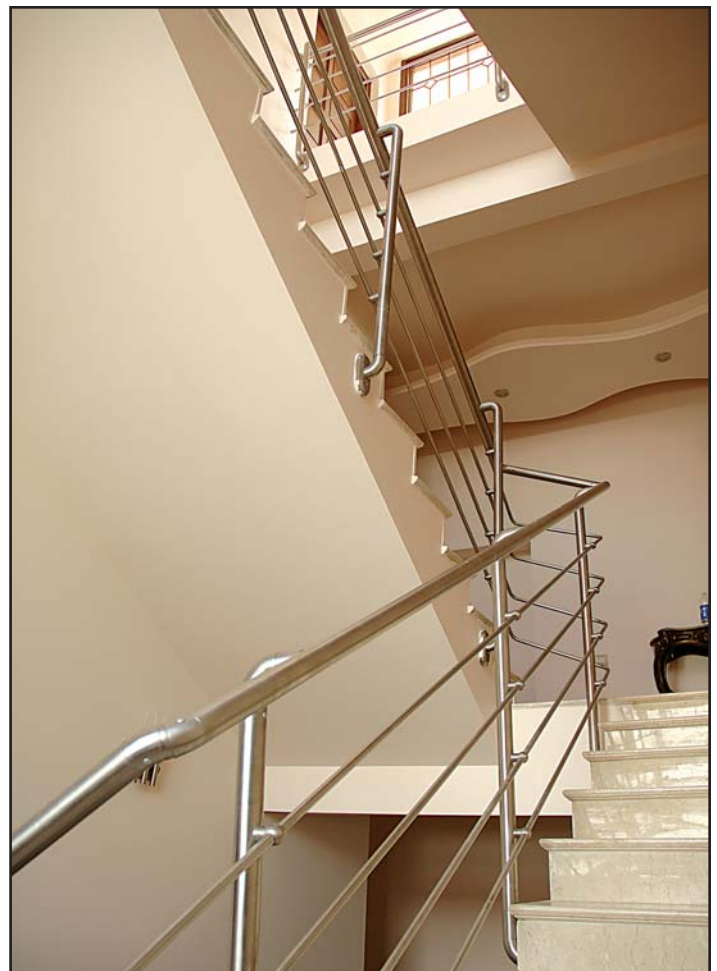
above: Grand Mall, Gurgaon

Project: Under installation.

Type: Main Atrium Circular railing built modularity without welding.

Special features: Another Milestone in engineering, this whole railing has been built to take a load strength of 'ZONE 5' specification i.e. to withstand distributed load up to 2.3 kN / metre. This high specification was achieved by Connect Architectural Products Pvt. Ltd. without using a single weld! Also as always aesthetics were kept in mind during design and execution.

The two projects have been undertaken by M/s CONNECT ARCHITECTURAL PRODUCTS PVT LTD, B-5, Sector 81, Phase 2, NOIDA-201 305, Uttar Pradesh; Tel: 0120-256 7155 / 6 / 7; Fax: 0120-256 8611; E-mail: deepak@ciplonline.com; Web: www.caps-india.com



8th International Stainless Steel Conference

November 6-8, 2005 The Grand, Vasant Kunj, New Delhi

CRU | EVENTS

CRU EVENTS' 8th International Stainless Steel Conference, in association with ISSDA, will be held on November 7 & 8, 2005 at Hotel Grand, Vasant Kunj, New Delhi. A number of top-notch speakers from around the world have already given their confirmation of participation in this event. A special India session is also being organized with presentations on flat products, long products and 200-series stainless steels.



The conference registration charges (for organizations located in India) are given beside:

Overseas companies may contact www.cruevents.com.

Conference announcement is available in www.stainlessindia.org. Alternatively, ISSDA can be contacted at nissda@gmail.com, nidissda@del3.vsnl.net.in or fax: 011-2686 3376 or K-36 (FF) Hauz Khas Enclave, New Delhi 110 016.

ISSDA members	before Aug. 31	Rs 4,500
ISSDA members	after Aug. 31	Rs 5,000
Non-members	before Aug. 31	Rs 5,500
Non-members	after Aug. 31	Rs 6,000

Indian Stainless Steel Market Research – 2005

Indian Stainless Steel Development Association (ISSDA) will be releasing '*Indian Stainless Steel Market Research – 2005*' in the last week of July 2005. The Indian market is a highly dispersed one with too many independent players, doing so many different things with the metal sourced from many different sources. The facts are difficult to get and very intriguing. All of us would want to get the real big picture. Knowledge is power, and with this report, ISSDA gives you the power to know the Indian market better. The research shatters some of the myths and guesswork about the Indian stainless steel market and brings to the fore some startling facts about this industry. In the last few years Asia has strongly emerged as both the world's largest stainless steel producer and user. India has been a part of this impressive growth. The 200 series Cr-Mn stainless steels have become a very controversial subject of discussion in many international forums. The whole world is curious to know more about it as well as what will emerge in the country in the near future. The research is being done by an independent agency, M/s Insight Management Consultants, a reputed organization based in Delhi. Research – 2005 covers: •Grade and product form-wise indigenous production; •End-use in all market sectors; •Detailing the trends in established market sectors, new application areas and nascent

sectors; •Imports and Exports; •Projections made till the year 2020.

SALE PRICE OF THE RESEARCH REPORT

(A) Rates for companies registered outside India

USD 2,500. Payments are to be made in favour of '*Indian Stainless Steel Development Association*' payable in New Delhi through a bank draft and sent to Indian Stainless Steel Development Association, K-36 (FF), Hauz Khas Enclave, New Delhi – 110 016, India OR by wire transfer to ISSDA's current account C/A 101341, Allahabad Bank, Anand Lok, New Delhi – 110 049, India. **Fax or e-mail intimation about the bank transfer of funds will be appreciated.** (Fax: +91-11-2686 3376; E-mail: nissda@gmail.com, nidissda@del3.vsnl.net.in)

(B) Rates for companies registered in India

ISSDA members Rs 20,000. Non-members Rs 25,000. Payments are to be made in favour of '*Indian Stainless Steel Development Association*' payable in New Delhi through cheque or DD and sent to Indian Stainless Steel Development Association, K-36 (FF), Hauz Khas Enclave, New Delhi – 110 016.

One of world's largest stainless steel plants to come up in Orissa

On June 9, 2005, Jindal Stainless Ltd. signed an MOU with the Government of Orissa for a 1.6 million ton fully integrated stainless steel plant. This will be one of the largest stainless steel plants in the world at a single location. This project involves mining of iron ore, chrome and manganese, ferro-alloys complex besides steel melt shop and rolling mills. A 500 MW captive power plant is also under construction. Mr Ratan Jindal, Vice Chairman and Managing Director, Jindal Stainless said, "This is a very important occasion for us. This project will bring maximum value addition to the minerals available in Orissa like iron, chrome and manganese Ores. Also the site selected for the Project, is suitable with availability of water from Brahmani river and export of products from Paradeep port. We are pleased to be in Orissa and look forward to working here." Mr N C Mathur, Director (International Marketing) Jindal Stainless Ltd, signed the MOU on behalf of JSL, in the presence of the Chief Minister, Mr Naveen Patnaik, Mr Ratan Jindal and other senior beauracrats. A total of Rs. 6,628 crore will be invested in the project by JSL. The project will be completed in two phases. The first phase is expected to be completed by 2007-08. The project is being implemented at Kalinga Nagar in Jajpur district. This project will employ about 2,000 persons and create indirect employment for 8,000 others.



Mr Bhaskar Chatterjee (right), Principal Secretary in the Department of Steel & Mines, Govt. of Orissa and Mr N C Mathur, Director (International Marketing), Jindal Stainless Ltd signing the MOU.

Thin-walled Stainless Steel Plumbing for Potable Water

Stainless steels are synonymous with corrosion resistance. This is the most important property required of a plumbing material in order to provide decades of leak-free service, supplying safe drinking water uncontaminated by the corrosion products of the piping material. Stainless steel piping systems have been used for many decades all over the world to handle waters in the highly corrosive environments of the chemical, pollution control, pharmaceutical and food & beverage industries. The invention of simple press-fitting systems for thin-walled pipes has made stainless steel a very cost-effective material for indoor plumbing for potable water. They are now being increasingly used to distribute potable water in buildings in North America, Europe and Asia.

What are stainless steels? Stainless steels are alloys of iron containing at least 11% chromium. To improve corrosion resistance and the engineering properties, usually nickel (8-12%) and some times molybdenum (2-2.5%) are added. The molybdenum containing alloys resist chlorides to a much greater extent. Though there are over 200 commercial grades of stainless steels, the ones used for potable water are grades 304 and 316.

The yield strength of these grades is in the range of 220-240 MPa, tensile strength 540- 680 MPa and elongation 40-45%. The combination of high strength and good ductility means that they can be bent like copper, although requiring more force. They are eminently resistant to physical damage. The higher strength and corrosion resistance makes the pipe work unaffected by high water flow rates.

The most important benefit is that stainless steels are **unaffected in the full range of potable water chemistries, including soft waters**. Other than for bacterial control, they do not demand any water treatment chemicals. Being buried inside the walls, the material should be corrosion resistant in the environs of brick and mortar. Stainless steels are not at all affected by cement and concrete.

Thin walled piping, easy installation and minimal maintenance during service life (over 60 years), make stainless steels a cost effective option for plumbing. Besides, stainless steels are non-toxic, manufactured from a high proportion of recycled materials and is itself 100% recyclable, which makes them eco-friendly. Because of aesthetic beauty, exposed installations are eye-catching not an eyesore.

Installation: Stainless steel tubes can be cut and bent like copper, but requiring more force. Standard machines for bending copper are fine for stainless steel – but should be made of steel and strong enough to bend at least the next size up in copper. Electromechanical pliers are used for pressing together the tube and the fitting, which has an O-ring in a groove and makes the joint leak-free.

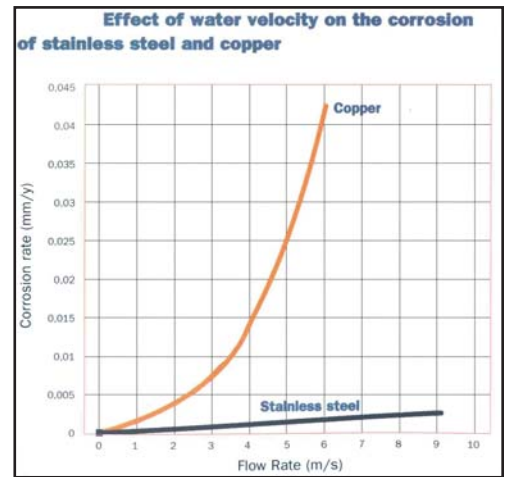
Grade Selection: There is a possibility for localized corrosion when chloride ions accumulate in tight crevices or stagnant water. The 304 grades are resistant to these problems up to 200 ppm chlorides. When chlorides are expected to be above 200 ppm, up to 1,000 ppm, grade 316 containing molybdenum should be specified.

To ensure best pipework performance, especially in large buildings,

- Horizontal runs should have a fall
- Dead legs should be designed out
- Use only low chloride insulation (less than 0.05% water soluble chloride ions)
- If there is a chloride environment outside, take measures to prevent the chlorides from entering the outer surface of the pipe work.
- After hydro testing, the pipe work should be properly and completely drained.
- Normal levels of chlorination do not affect stainless steels.

Galvanic Corrosion: In practice, the galvanic difference between stainless steels and copper alloys is not significant. Stainless steel pipe can be used with copper-alloy fittings and copper hot water cylinders. Stainless steel is more noble than galvanized steel, steel and cast iron: It should be electrically insulated from such materials to prevent their corrosion. This also applies in case of fixings made of steel. When connecting the building's stainless steel pipe with the municipal mains or the water meter, place a brass connector between the two to prevent the GI pipe from corroding fast.

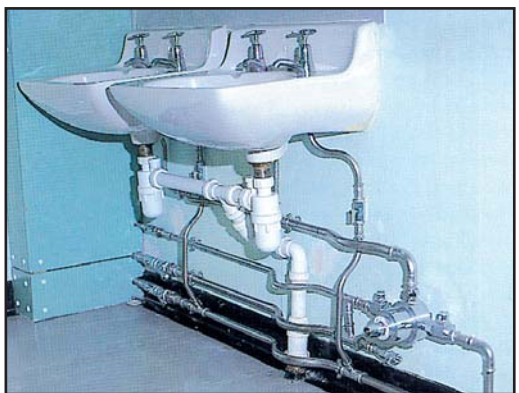
In conclusion, houses and buildings are designed to last 60-80 years. In general we observe seepage of water and the consequent damage to walls, ceilings and floors within 10-15 years. With stainless steel plumbing, you can be assured of leak-free



Grade	%Cr	%Ni	%Mo
304	17-19.5	8-10.5	—
316	16.5-18.5	10-13	2-2.5



Pressfittings, pliers and tube



Wash basins in a hospital

service during the service life of the building. Thus, it makes good economic sense to use stainless steel at the time of construction. These are also ideal watering landscape and parks.

Excerpted from an article written by Mr Ramesh Gopal for SOURCING HARDWARE, January-February 2005.

World Class stainless steel plumbing technology now in India !

VIEGA, a German company, is the world market leader in the field of press fittings. VIEGA was established in 1899 and is now the world's leading manufacturer in the sanitary & plumbing industry. VIEGA has four manufacturing facilities in Germany and employs more than 2,000 persons and offers more than 12,000 plumbing-related high quality products and systems.

VIEGA has developed a complete system of pipes and fittings (up to 54 mm) which is used in numerous fields of application in the building and industrial installations. The application areas include drinking water, heating, compressed air, industrial plants, sprinklers, shipbuilding, chemical industry, agriculture. This stainless steel system also offers an additional benefit exclusive to VIEGA, in the form of SC-Contur. SC-Contur is a unique feature that guarantees visible test safety when filling systems in the normal course of daily work.

VIEGA flameless connections have proved themselves millions of times in Germany and throughout the world. Flameless connection means no welding, no soldering, and no problems. The system provides everything you need for installation, plus the comprehensive VIEGA service.

Highlights of VIEGA Sanpress Inox system are:

- Press fittings and pipes made of stainless steel AISI 316 (DIN 1.4401)
- Unique stainless steel with SC-Contur for visible leak test
- Double pressing, cylindrical pipe guide, EPDM seal
- Economical one-man installation process using VIEGA press fitting tools
- Wide variety of applications in domestic and industrial installation work
- Uniform material appearance
- Press-fitted connections to comply with DVGW code of practice W 534
- System tested and quality monitored by DVGW Sanitary and heating systems

Makers of the famous *Gem* brand sanitary appliances now bring stainless steel **VIEGA Sanpress Inox** press fittings to the Indian market.

Marketed in India by: GEM Sanitary Appliances Pvt Ltd, A-57, Wazirpur Industrial Area, Delhi-110 052; Tel: 011-2737 7801, 2737 7802, 2737 7805. Fax: 011-2737 7806; E-mail info@gemtaps.com. For further details, please contact: Mr Mandeep Jain +91 98991 99512



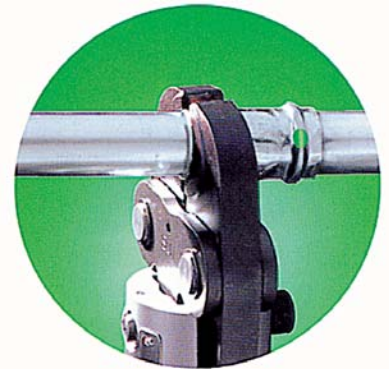
Winner of the 2003 'Steel Innovation Prize' awarded by the German steel industry for new ideas and initiatives in the category 'Steel components and systems for building applications'.



The four safety features of Viega press-fitted connections: SC-Contur, double pressing, cylindrical pipe guide, EPDM seal.



Sanpress Inox with SC-Contur: connections which have not been press-fitted = visible leakage during filling of the system.



Sanpress Inox with SC-Contur: press-fitted connections = guaranteed leak free.



High Pressure - Urban water distribution systems are evolving toward stainless steel

(Excerpted from: www.nickelmagazine.org)

The piping systems that deliver potable water and fire-fighting capabilities in tall buildings have unique requirements. They must be able to withstand not only high pressures but the motion of the building caused by seismic and wind forces. Speed and ease of assembly are also important during the construction phase as builders grapple with tighter deadlines and a more fluid, less skilled workforce.

As buildings grow ever taller, engineers are turning to stainless steel piping systems (S30400 and S31600) to meet these needs. Three of the newest and tallest buildings in the world, the Taipei Financial Centre in Taiwan, the Aurora tower in Brisbane, Australia and the Petronas Twin Towers in Kuala Lumpur, are prime examples of this shift to high-pressure stainless steel piping systems in certain circumstances.

The Taipei Financial Centre, a 101-storey, 509-metre-high building completed in 2004 uses the Victaulic grooved stainless steel system for fire protection and plumbing, and Victaulic valves and stainless steel pipes up to 318 millimetres (mm) in diameter for hot and cold water supply.

The Victaulic grooved system provides the flexibility to withstand any seismic activity, up to the strongest earthquake in a 2,500-year cycle. The system, designed especially for standard or light-wall stainless steel, is also less costly than traditional methods of welding, flanging or threading; that's because it can be installed quickly using less skilled labour and is easy to clean and maintain.

In the Taipei Financial Centre, the pipes for domestic water supply are made of Japanese standard JIS 3459 schedule 10S stainless steel for corrosion resistance. These pipes range in diameter up to 318 mm and can withstand pressures of 2,065 kilopascals (kPa). Both hot and cold water can run through the system because the couplings are flexible enough to handle thermal expansion and contractions and the gaskets are rated from -34°C to 100°C.

In addition, the stainless steel valves are designed to handle one and a half times the system pressure and have a "dead-end" shut-off service to isolate equipment for maintenance. An absorber in the system prevents water hammer.

S30400 stainless steel pipes and Victaulic couplings are also used in the Petronas towers, to accommodate high pressures and vibration.

For smaller diameter piping systems that do not require ready access, Victaulic's Pressfit system (also marketed as the Mapress system) provides economy, reliability and fast installation. The system uses S31600 or S30400 stainless steel pipe with fittings that can be permanently attached using a handheld electric tool, eliminating the risk of fire and the need for welded or threaded joints.

This type of system is being installed in Brisbane's tallest residential tower, the Aurora, scheduled for completion in January 2006. According to Blucher Australia, which supplied the 108-mm piping, the S31600 stainless steel pipe has a wall thickness of 2 mm for pressures of about 2,490 kPa. The pumps are electronically controlled by the water reservoir level at the top of the building for a slow startup, which prevents water hammer.

"No other pipe systems can withstand extreme changes in water

temperatures and the clean-in-place routines as well as stainless steel," said Mogens Jensen, managing director of Blucher Australia in a recent article for ferret.com.au, an on-line information source for suppliers in Australia.



Stainless Steel Water Gates

(Excerpted from: NICKEL magazine, July 2004)

Modern wastewater treatment plants, designed to handle peak flows after rain storms, need sluice gates to control the movement of wastewater between storage basins. In a multi-billion dollar program to repair aging sewers and improve wastewater treatment capabilities in Alabama's Jefferson County in the United States, S30400, S31600 and S31603 stainless steel have become the material of choice for gates, replacing traditional cast iron and F47006 (Ni-Resist D-2).

Although fabricated stainless steel gates have been in use for only a short time, experience has quickly shown that they are less expensive, lighter, easier to install, and less prone to leaking. They also are more resistant to corrosion in the presence of hydrogen sulphide and require less maintenance.

"Cast iron gates have been in use in the collection system for 70 to 80 years," says Harry Chandler, assistant director, environmental services department for the Jefferson County Commission. "We started using Ni-Resist over twenty years ago. Price became an issue and we asked ourselves if we could get the stainless steel gates at lower cost than the Ni-Resist. It was only five to six years ago that we began to look seriously at alternatives."

The County's largest treatment plants are Village Creek and Valley Creek. Village has a nominal capacity of 550 million litres per day (LPD) and a peak capacity of 1,820 million LPD. Valley has a nominal capacity 840 million LPD and a peak capacity of 1,590 million LPD.

The two plants have at least 200 fabricated stainless steel gates, ranging in size from 1-by-1 to 4-by-4 metres. They were fabricated by several manufacturers, including Whipps Inc. of Athol, MA, U.S.A. and H. Fontaine Limited in Magog, Quebec, Canada.

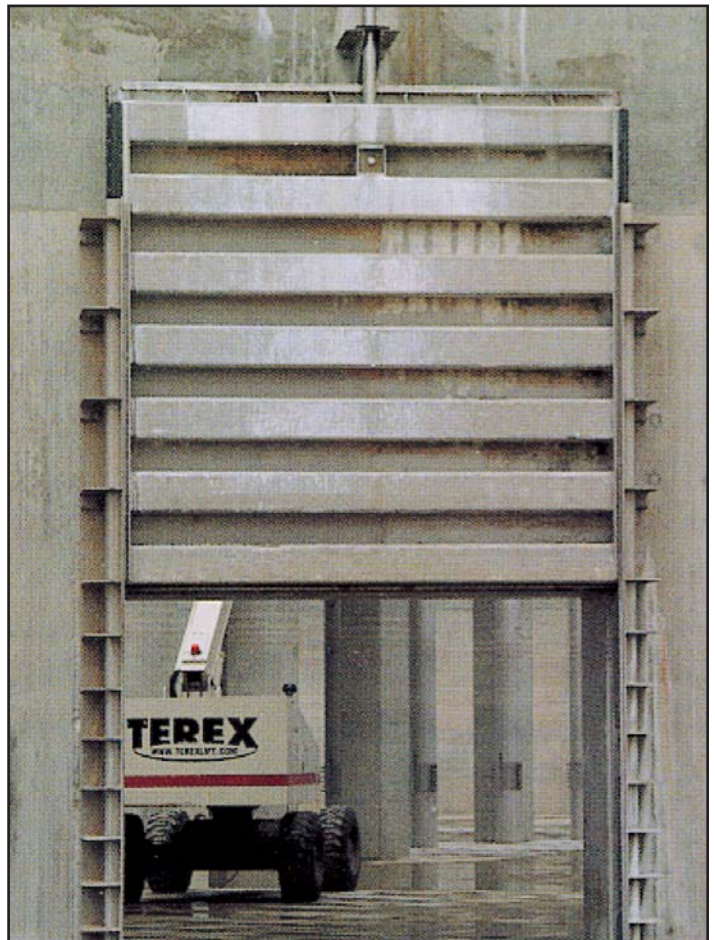
Whipps fabricated 111 gates from 9.5-mm-thick S30400 plate for Valley Creek. They range from small 0.3-by-0.3-metre gates, weighing 200 kilograms (kg) to ones measuring 4.6 by 4.6 metres and weighing 7,300 kg each. The company also fabricated 29 gates from S31603 ranging in weight from 580 to 3,700 kg each.

Although Jefferson County has adopted stainless steel gates as the standard six to seven years ago, Whipps has been fabricating them since 1977. "We've made only 300 iron gates between 1977 and 2003, but over 6,000 stainless steel gates in that time period," Fred Perry of Whipps says. Stainless steel is not yet the standard throughout the wastewater treatment industry, but it has taken at least 40% of the market and is growing annually, according to Perry. The American Water Works Association (AWAA) recently published a standard, C-561, for stainless steel slide gates.

The stainless gates were fully assembled and tested before shipping to Jefferson County. Once on-site, they were bolted to thimbles, which had been set in the concrete basin walls during their construction. The thimbles were also fabricated from S31603 and range in weight from 420 kg to 885 kg.

The plate from which the gates are constructed, using a combination of bending and welding, range in thickness from 6.3 millimetres (mm) to 9.5 mm. Each gate is passivated before leaving the plant, and further passivated on-site.

Cast iron gates, on the other hand, require on-site final assembly and adjustments to make them fit well. Although the standard for stainless gates is the same as for cast iron, Fontaine reports that its gates leak at only half of the AWAA C560 recommended leakage rate. The less leakage at the gates, the less untreated wastewater is released from the facility into the environment.



The many advantages that stainless steel gates offer over cast iron and Ni-Resist gates include: lower cost, lighter weight, ease of installation and lower leakage.

Chandler cites other reasons for choosing stainless gates: "The Ni-Resist had become adequate for corrosion, but there are a couple of other issues. The cast gates are very heavy and slide up and down in a brass frame. If the gates are not used, they freeze up. We wanted gates that were not heavy and that were easy to move," Chandler explains. "The stainless steel gates don't corrode or bind and have a seal that lets them easily move up and down."

The problem with the cast iron gates is widespread, according to Chandler. "We have 4,800 kilometres of sewers and close to 100 control structures. In the past year and a half, we looked at them,

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and most of them we could not operate. The stainless steel gates operated and the cast iron gates did not.

“These things are going to operate for twenty to forty years. Because you can’t turn them off, maintenance is a large issue. With cast, the wedges work against brass bushings that wear. Maintenance and replacement is more expensive.

“With stainless steel gates less maintenance is required on the

electrical equipment that raise and lower them. The seal on the stainless steel gate doesn’t wear as much and is easier to replace than the cast seals.

“We have four treatment plants, and all have undergone expansion in the past six to seven years. We have installed stainless steel gates in all of them. Stainless steel gates are becoming the standard in our treatment plants.”

Stainless Rivets Solve Window Problem

Singapore’s Building and Construction Authority (BCA) together with the Asian republic’s Housing and Development Board (HDB), has launched a program to replace nine million aluminium rivets with stainless steel ones in the windows in 43,000 HBD flats.

Between 2000 and 2003, at least 190 window cases installed by HBD fell out of flats because of aluminium rivets failed to hold the friction stays in the window casements. Corrosion and wear-and-tear, as windows are opened and closed, caused the failures. To solve the problem, the BCA is retrofitting using more durable and corrosion-resistant stainless steel rivets.

The stainless rivets, which vary in length from 10 to 17 mm and are 4.8 mm in dia, will be made from S30400. They have a tensile strength roughly three times that of the aluminium rivets.

The aluminium rivets were used for installing casement windows between 1987 and 1998 under the then-prevailing industry standards in Singapore and in effect internationally, according to HBD. Revised industry standards specifying stainless rivets were adopted in 2000,



RESIDENTIAL FLATS in Singapore are getting more secure windows.

though HBD switched to using them in 1998. The replacement program will run from March 2004 to February 2005.

(Source: NICKEL magazine, November 2004)

Stainless steel decorates Kolkata’s home



At a Kolkata home, a stainless steel sliding door, with locking arrangement, made of rectangular tubes and bars.



At the same house, an exquisite hand rails made of stainless steel grade 304 square and round tubes.

Stainless steel fabrication done by:
Mr Rajesh Agarwal, Proprietor, TAYAL FURNITURE, 121, J N Mukherjee Road, Ghusuri, Howrah-711 107, Tel: 033-2655 8680 / 2439; Mob: 0-98300 30649; Fax: 033-2655 8680; E-mail: tayalfurniture@yahoo.co.in

Nickel Institute – Good Practices for fabrication of austenitic stainless steels by
Dr David Jenkinson, Director-Australasia, Nickel Institute (NI)

The on-line training module is available from www.nickelinstitute.org/goodpractices or http://www.nickelinstitute.org/index.cfm/ci_id/13777.htm. The module gives an introduction to the practices that will allow you to transport, store, cut, form, weld and clean austenitic stainless steels in such a way as to preserve their corrosion resistance and aesthetic qualities.

Welcoming New Members

Autonix Auto Industries (P) Ltd

Since its inception in 1993, Autonix Auto Industries (P) Ltd. (AIPL) has established itself as a pioneering leader in the manufacture of stainless steel and special metal-based components which have extensive application in cars and motorbikes. The AIPL's modern manufacturing facility at NOIDA near Delhi has the capacity to produce 10 million components per month.

These components fashioned meticulously out of Stainless Steel and Brass (with Nickel Plated Surface) are critical components in Automobile such as New Generation Automotive Halogen Bulbs as well as Motor Bike Body Parts. The facility has full fledged following divisions :

- a.. Press Shop Division
- b.. compression moulding
- c.. injection moulding (in pipeline)
- d.. Rolling Mill Division
- e.. Welding Division (SIM, Butt, Projection welding and spot welding)
- f.. Surface Treatment Division

The production is ably backed by the in-house Tool Room and a stringent Quality Control Cell.

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The range of Stainless Steel Wheel Rims and other body parts for Bikes produced by the company has established its reputation in the OE and replacement markets.

Motorcycle Parts Division consists of all types of machines required for manufacturing Rim (with most sophisticated 14 stages Rolling M/c attached with Dual Head Sim Welding, Butt Welding and Hydraulic Sizing M/c), 6 stages Rolling machine for Moped Rims, 3 Stages Rolling M/c specially designed for Rear Fender and started supplying to one of Motorcycle manufacturer, Engine Guard, Leg Guard, Special Foot Rest, Battery Clamp etc.

Surface Treatment Division Consists of facilities like Electro-polish on Stainless Steel Surface through Electrolytic Processes, Various types of Plating, De-burring and Polishing through Centrifugal Machines with the help of special type of Ceramic media, Solvents and number of Automatic Buffing machines attached with special fixtures.

Press & Molding Division Equipped with more than 40 nos. of Hydraulic, Pneumatic, Mechanical Presses attached with Feeders and De-coilers etc ranging from 5 ton to 200 tonnes besides a Rotary type fully automatic auto cap moulding machine with a capacity of manufacturing 2400 pcs. per hour.

As OE supplier to reputed companies, AIPL has established itself

as a trusted source of world class components. At Autonix, Quality Control is inherent at every stage of the production process. Every lot of SS or brass raw material is subject to rigorous tests for tensile strength, elongation, cupping value, draw ability and bend strength. The Company's Quality Control experts ensure only the best materials go on to make the finished product which means critical specifications are conformed to without and compromise.

Tool Room consist of all types of sophisticated Tool Room machines manned by highly Skilled Personnel and Qualified Engineers. Design for manufacturing of all progressive tools with pneumatic attachments are accomplished in-house only on CAD. Backing these production lines are modern CAD based Tool Room and full fledged Quality Cell, wherein highly skilled Technicians and qualified Engineers manufacture all tools in house with sophisticated software driven system. The quality cell is equipped with precision instruments such as profile projector, strain viewer, height & bore gauges, hardness tester etc to track and monitor a whole range of quality parameters with precise accuracy.

Autonix Auto Industries Pvt Ltd, C-12, Phase II, NOIDA-201 305, Uttar Pradesh; Tel + 91-120-246 0761 - 65; Fax: +91-120-246 0766; E-mail: info@autonixonline.com; Web: www.autonixonline.com

SKM Steels Ltd

SKM Group was established in the year 1969 for dealing in ferrous and non-ferrous metals. Over the years, the group has diversified into various business activities and has grown into an organisation of nearly 20 companies engaged in various business activities like manufacturing imports, exports, trading etc. in diversified interest. It is striving to achieve its corporate philosophy of bringing the world closer through distribution of quality products worldwide.

SKM Group of companies is one of the leading manufacturers of stainless steel products. The company's product range consists of stainless steel billets, black bars, wire rods, bright bars and wires. The company has experience of almost four decades in their line of products. Having our manufacturing set up in India, the company has been upgrading itself to serve its customers in various fields of applications.

With a broad size and product range, SKM aims to appeal all

types of customers from volume users to the small consumers. From commodity products to the more demanding and sophisticated needs, the company offers something for everyone. Its aim is to give the customer exactly what they need on every occasion; quite simply the customer always come first.

As a result of continuous improvement with strong emphasis on quality and consumer satisfaction, today the company has achieved ISO 9001 Certificate and has become one of the most reliable sources of quality products in the international market.

Today SKM is exporting its products to USA, UK, Germany, Italy, the Netherland, Brazil, Turkey, Korea, Taiwan, Thailand, Hong Kong etc and aims to explore its products in different parts of the world.

With customer satisfaction as its prime commitment and quality

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material as its main objective, dealings in materials which are essential for the society, will always be guided by its corporate philosophy for times to come. The company's original philosophy of high quality, short lead times and competitive pricing is as valid today as it was four decades ago.

The company has got its head office in Mumbai and branch offices in Ahmedabad, Chennai and Indore.

a. Head Office: SKM House, 12 Khetwadi 6th Lane, Mumbai-400 004, India.

Tel: (+91 22) 5633 6801 (4 Lines);

Fax: (+91 22) 5633 6805; Email: info@skmsteels.com

b. Corporate Office: 30 C.P. Tank Road, Mumbai-400 004, India.

Tel: (+91 22) 5633 6691 (6 Lines);

Fax: (+91 22) 2380 5392 / 2388 6165;

Email: sales@skmsteels.com

Venus Home Appliances (P) Ltd

Venus Home Appliances P Ltd (formerly Standard Electric Appliances) the manufacturers of Venus Water Heaters is a 40 year old company that has been a market leader and a pioneer in the water heater industry. Venus is one of the leading brands of water heaters in India and stands for Quality, Reliability and Performance. The products manufactured by the company are electric water heaters, solar water heaters, gas water heaters, waste dispenser and mixer grinders. All Venus Electric Water Heaters use copper for the inner container, making them one of the largest consumer of copper in the home appliances industry. And following the market trend in sanitary ware, usage of SS as the outer body was phased out some time back. However, the physical strength and relative lower cost of SS is luring the company once again to experiment with SS. The Venus range of solar water heaters introduced by them last year have SS tanks and SS outer bodies, though they retained their signature copper tanks in select models. This year also, the company is planning to launch a lower end range of water heaters with SS tanks. SS tank, sheet suppliers can contact them to finalise the product specifications.

The company's vision is to provide the best quality products and after sales service to their customers. This has been the company's approach to realize the goal of attaining leadership in the water heater Industry.

Quality has always been the driving force for the company. The company is committed to providing customers with products of quality and reliability with continued efforts to innovate and improve on their existing products to suit the needs of the customers. The company strongly stands for values like the reliability, quality, ethics, honesty and Integrity.

The manufacturing plant is located in Tuticorin in Tamil Nadu, boasting a state-of-the art and environment friendly infrastructure. The plant has imported machinery like plasma / TIG welding machine from Germany; CFC free PUF injection m/c from Italy. Injection moulds for outer body have been designed in-house by the company in collaboration with external design houses. The company also boasts of an in-house 10 member strong R&D facility equipped with all necessary tools for design using CAD/CAM technology.

The VENUS range is currently being exported to Nepal, Bhutan and Sri Lanka. There are plans to start exports to other countries in the South East Asian and African countries.

VENUS HOME APPLIANCES (P) LTD, 5 / 54, A, Senthilam Pannai Village, Pudukkottai- 628 103, Distt. Tuticorin, Tamil Nadu; Tel: 0461-227 1891, 2, 3. Fax: 0461-227 1890, 7;

Email: murali@venushomeappliances.com;

Web: www.venushomeappliances.com

Universal Engineers

UNIVERSAL ENGINEERS, formerly known as Pyrosensors, are in the business for the past 15 years. M/s.Pyrosensors were renamed as UNIVERSAL ENGINEERS in the year 2003. M/s UNIVERSAL ENGINEERS are exclusively dealing with stainless steel fabrication. They are regular suppliers to ICF, RCF and other Zonal Railways.

The company is totally committed to ensuring quality of products especially in the fabrication of STAINLESS STEEL COMPONENTS.

The following items are in the company's scope of supply to INDIAN RAILWAYS:

- Stainless Steel Kitchen Equipments for Pantry Car including Stainless Steel panels for side walls, roofs and partitions.
- Stainless Steel Tubular Partition Frames.
- Stainless Steel Hand Hold arrangement for Self Propelled Vehicles.
- Stainless Steel Luggage Rack for Self Propelled Vehicles.

- Support Frame for Doorway Handles

- Stainless Steel Lavatory and Interior fittings like Sunk-in-type shelf below mirror, soap dishes, towel rails, swivelling coat hook, toilet paper holder etc

Besides above, the company also undertakes architectural work like staircase railings, stainless steel cladding etc.

UNIVERSAL ENGINEERS, Plot No. SS-2, 1st Main Road, Ambattur Industrial Estate, Chennai-600 058; Tel: 044-2624 1318 / 1347; Fax: 044-2624 1318; E-mail: saimera@vsnl.net

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SKM Steels Ltd
Sahu Refrigeration Inds. Ltd
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Sharp Engineers
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Sreevatsa Stainless Steel
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Venus Home Appliances (P) Ltd
Venus Wire Industries Ltd
Vishal Tubes & Pipes Pvt Ltd

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