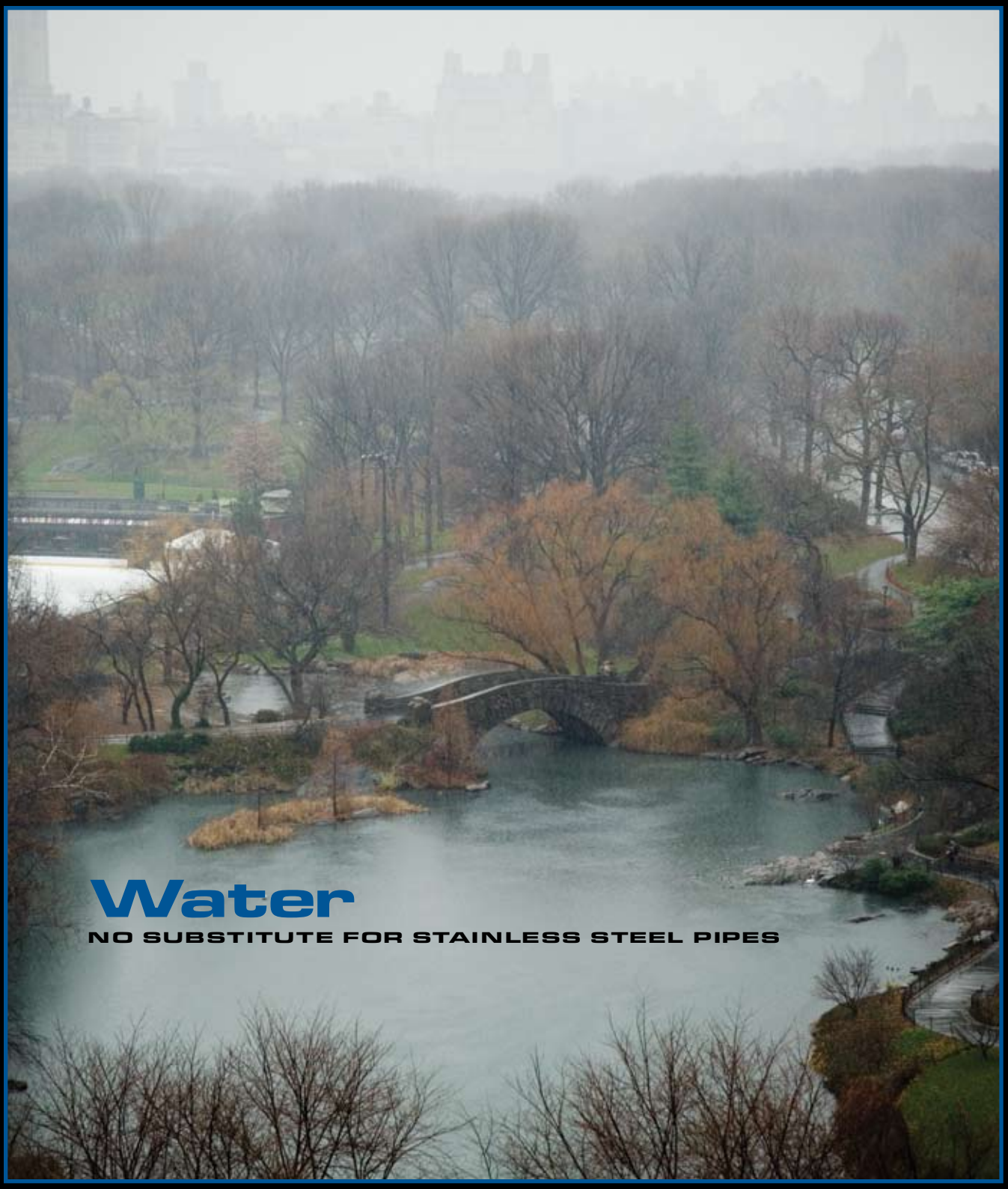
NICKEL

The business of being green

Plating without chromium six

MARCH 2007 VOLUME 22, NUMBER 2 THE MAGAZINE DEVOTED TO NICKEL AND ITS APPLICATIONS



NICKEL

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The Magazine Devoted to Nickel
and its Applications

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Cover photo:
Central Park, New York City as seen from the upper floors of the Plaza Hotel. Photo by Robert Lowell for Nickel Institute.

The next issue of Nickel Magazine will be published in June 2007.

GETTING THE WORD OUT

WHAT DO YOU ASSOCIATE WITH THE TERM "STAINLESS STEEL?" When we asked this question of 11 people who made up a very small focus group organized by the Nickel Institute in Toronto, we got the following answers: kitchen appliances; cutlery; shiny, sleek, durable metal that does not rust.

Were these people -- five males and six females between the ages of 18 and 61 -- aware that stainless steel contains nickel? As it happens, six were not. How aware were they that stainless steel is recycled? Nine either didn't know or else thought it was not recycled at all.

HOUSEHOLD PRODUCTS made of stainless steel should be marketed as containing 60% recycled material.

CLEANUP CORPORATION

Compare these results with common perceptions of paper, glass and plastic: everyone in our focus group was aware that these materials are recycled, either extensively or somewhat. Only two thought stainless steel is recycled.

Unless customers are made aware that stainless steel is perhaps the most recycled man-made material on the planet, the many businesses that use stainless will continue to miss out on an important marketing advantage.

I recently happened upon a furniture ad in *The New York Times Magazine* which boasted about the sustainable attributes of the materials used to make a sofa. This company, Crate & Barrel, was letting its customers know about the important environmental advantages of their products. There are many such examples in the marketplace.

Likewise, the users of stainless steel need to inform their customers that 80% of all stainless steel products are recycled and that stainless steel typically contains 60% recycled material.

Knowing that stainless steel is one of the world's most recycled materials would improve its reputation for the end user, thus boosting its potential for sales.

Toward this end, the Nickel Institute and the International Stainless Steel Forum recently launched an advertising campaign of print ads and online videos (see story, page 11), and it was in order to gauge people's response to the ads that the 11-person focus group was formed.

After watching our recycling videos, nine of the participants reported feeling very or somewhat positive about stainless steel, whereas the remaining two had no opinion. The nine also said the ads had changed their opinion of stainless either significantly or somewhat.

We took these results to mean we had succeeded somewhat in making our audience aware that stainless steel is one of the most recycled materials and that it is recycled more than paper or glass. Now it's up to the businesses that use stainless in their products to do likewise.

Patrick Whiteway

Editor

NICKEL IN USE

An Alternative to Electroplating

New nickel-chromium-plating process does not use hexavalent or trivalent chromium

Two California inventors are promoting an inexpensive and environmentally friendly process for chrome-plating automotive wheels, marine hardware, faucets and other items that require a decorative and durable finish. The process uses vacuum metallization technology and a nickel-rich chromium alloy.

"This is going to revolutionize the way wheels are chrome-plated," predicts Gary Goodrich, president of California-based Goodrich Technology Corp. and co-developer of the patented composition and process. The Chrysler division of Daimler Chrysler has approved the finish – marketed under the trade name PermaStar – for its vehicles. General Motors, Toyota, Honda and other carmakers are already either taking a look or testing the product for themselves.

Goodrich and co-inventor Patrick Colahan set out to find an alternative to traditional electroplating. "We are two guys who saw a need years ago for a chrome alternative," says Colahan, who brought his experience in production engineering to the search. Goodrich was in the business of remanufacturing aluminum wheels and wanted to find a better way to refinish rims.

The process works like this: two layers of primer are applied to a substrate at high temperature, producing what Colahan calls "a glass-like finish" without the usual mechanical polishing. The primed wheel or other object is then placed in a vacuum metallization chamber containing a small amount of argon gas. A base coat of 80% nickel and 20% chromium is vaporized and applied to the object to a thickness of 1,000 angstroms. "It's put down atomically, one atom at a time," says Goodrich. The same process is used to apply an additional 500-angstrom thick layer of pure chromium. The final step is to add a protective acrylic topcoat.

Colahan and Goodrich experimented with other metals, including other nickel alloys and titanium, but 80-20 nickel-chromium – the first alloy they tried – proved to work best for the base layer. Colahan says that the chromium addition helps to vaporize the nickel.

There also appears to be benefits for the natural environment with the new process. Each wheel uses less nickel and chrome than a conventionally plated wheel. Thus there are material savings when the wheel is made and less nickel and chromium lost when the wheel is eventually recycled.

"You get a highly reflective chrome look that can hold up to corrosion," Goodrich says. The coating adheres to various substrates – steel, magnesium, bronze, brass, aluminum and plastic – and can be used any place where corrosion is a factor. The coating has been successfully tested on porthole rings, vents and other deck fittings of a U.S. Coast Guard cutter.

A PermaStar coating boasts two important advantages: the application process does not use hexavalent or trivalent chromium or other hazardous compounds, and claims to have significant cost savings (Colahan projects that a production line capable of turning out 100 wheels per hour could apply the coating for US$8.75 per wheel, compared with at least $45 for conventional plating).

Goodrich Technology patented its application process in 2002 and obtained a patent for its coating compositions in December 2006. A California manufacturer has been licensed to use the process, and the company is negotiating with other potential licencees in the U.S. and Canada.

MORE INFORMATION:
www.nickelmagazine.org/permastar

THE CHRYSLER DIVISION of Daimler Chrysler has approved the finish for its vehicles.

GOODRICH TECHNOLOGY CORP.

Decision Time For America's Utilities

Coal-fired utilities in the U.S. weigh the material options for FGD units.

The race is on for power plants in the United States to meet dramatic reductions in sulphur dioxide (SO_2) and other emissions required by the Clear Skies Act of 2003 and related legislation. Nickel alloys and nickel-containing stainless steels are helping them reach their goal.

Clear Skies legislation designed to reduce power plant emissions of SO_2, nitrogen oxide (NOx) and mercury has yet to pass the U.S. Congress, but in 2005 the Environmental Protection Agency issued the Clear Air Interstate Rule (CAIR), which caps emissions in the eastern U.S. When fully implemented, CAIR will reduce SO_2 emissions in these states by more than 70%.

Currently, all fossil fuel-fired stations larger than 25 megawatts (MW) are limited to emissions of 1.2 pounds of SO_2 per million BTUs (British Thermal Units) of heat input and require an allowance for each ton of SO_2 they emit. The owners of new power plants are required to meet New Source Performance Standards by installing the latest flue gas desulphurization (FGD) technology, and each existing unit must undergo review as a new source if the unit is upgraded to the point where emissions increase significantly.

As a result, U.S. utilities are expected to spend tens of billions of dollars by 2010 to install and upgrade FGD systems, or "scrubbers," in their power plants. Nickel-containing materials are playing a significant role in these projects.

AIRPOL 2007 will be held in June 2007 to help utilities choose appropriate materials for FGD units. (See page 15 for details.)

iStock photo

For example, Ohio-based American Electric Power (AEP), one of the largest electric utilities in the U.S., is spending more than US$3.4 billion to retrofit more than 48% of the company's 25,746 MW of coal-fueled generation by 2010. The program includes both replacement of old scrubbers and new scrubber installations.

The utility chose N06022 and duplex stainless steel S32205 to retrofit the FGD system at Unit 5, a 400-MW generating unit at the Conesville Plant in Ohio, which had previously been lined with rubber. The plant has four operating units capable of generating a total of 1,745 MW of electricity.

"The rubber had been in there for almost 30 years and reached the end of its useful life," says Ron Balawajder, senior engineer for AEP. "We felt that the alloy technology out there would be a better solution for lining the absorber, rather than trying to install the current generation of rubber that would never last 30 years."

Although the company is using various materials in its scrubber projects, including fiberglass, the units at Conesville are well-suited to nickel alloys and duplex stainless steels because of the hot and corrosive environment created by high-chloride contents and low pH condensates.

"When we evaluate our upcoming retrofits, we look at what options are out there, and nickel alloys are one," says Balawajder. "We use them in parts of the system where we feel it would be the best, most cost-effective solution."

At Unit 5, for instance, AEP replaced carbon steel ducts with 150 tonnes of N06022, as well as 100 tonnes of stainless steel S32205 in the less corrosive areas. The absorber was also sheet-lined, or "wallpapered," with these nickel-containing materials.

The scrubber at Unit 6 is next in line for a retrofit, followed by the installation of a whole new FGD system at Unit 4 in 2009. The retrofitted wet scrubbers will reduce SO_2 emissions by 95%, compared with 92% currently, while the new system at Unit 4 will reduce emissions by up to 98%.

MORE INFORMATION:
www.nickelmagazine.org/airpol

U.S. Dollar Coin Contains 2% Nickel

Could images of presidents on a dollar coin convince Americans to drop their beloved dollar bill?

The new George Washington coin, the first of a series of one dollar coins honouring deceased U.S. presidents, began circulating at the end of February 2007.

The new coin is identical in colour, weight and size to the Golden Dollar, minted in 2000, which features Sacagawea, the Indian woman guide on the Lewis and Clark expedition of the western United States in 1803-06.

The composition of both coins is 88.5% copper, 6% zinc, 3.5% manganese and 2% nickel. That alloy combination provides resistance to both corrosion and wear-and-tear without compromising the desired golden colour, according to corrosion scientists responsible for testing the durability of the Golden Dollar.

By adding manganese, the composition also duplicates the electromagnetic signature of the Susan B. Anthony copper-nickel coin that was released in 1979 and put to rest in 2000, sparing retailers the expense of having to retro-fit vending machines and other coin-operated devices.

Although the U.S. government waged a multi-million-dollar marketing campaign to urge citizens to use the first Golden Dollar in their day-to-day transactions, the coin never took off as an object of commerce. The U.S. Mint ceased making the coins for general circulation in 2002, though it continues to mint some for collectors.

This time, the Mint hopes things will be different. "Americans will soon be receiving presidential dollar coins in their change and will find them convenient to use at retailers, car washes and vending machines," says Mint Director Edmund Moy in a press release.

INITIAL RUN: $300 million

The government would save hundreds of millions of dollars annually if dollar coins were to replace the paper dollar, according to a 2002 U.S. Government Accounting Office report. The Golden Dollar coin costs 12 cents to make and was expected to last 30 years. A dollar bill costs less much less to make but lasts only about 18 months in circulation.

The Federal Reserve has ordered 300 million George Washington dollar coins for the initial run. After Washington, the coin will feature portraits of U.S. presidents in the order that they served at a rate of four presidents per year until 2016. This year, John Adams will be next to grace the face of the coin, followed by Thomas Jefferson and James Madison.

The dollar coins are being introduced as a result of the Presidential $1 Coin Act of 2005, which requires the Secretary of the Treasury to mint and issue dollar coins honoring the United States presidents. Their success is expected to mirror that of the 50 State Quarters Program, a 10-year initiative that began in 1999 whereby every 10 weeks a new state is honoured on the quarter in the order that states were admitted into the Union. The U.S. Treasury makes a profit of about 20 cents on every quarter issued under the program.

MORE INFORMATION:
www.nickelmagazine.org/golddollar

The corrosion scientists responsible for developing a durable dollar coin developed this composition because it provides resistance to both corrosion and wear-and-tear.

U.S. MINT

More Efficient Turbines

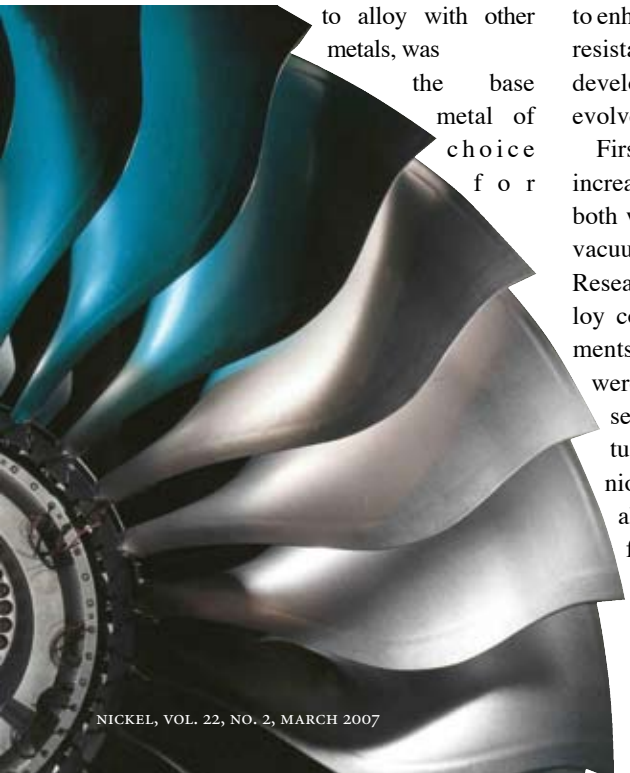
The evolution of gas turbines is linked to nickel alloy development

A typical jet engine today contains about 1.8 tonnes of nickel alloys and includes a long list of tailor-made nickel-base alloys to meet specific needs. The useful life of a modern commercial jet engine is about 20,000 operating hours between overhauls, compared with just 5 hours for prototype engines in the late 1940s.

Sixty years ago, Germany and England began experimenting with gas turbines as a source of power for aircraft. The intake fan of the turbine compressed air and fed it into a combustion chamber where the burning of a liquid fuel caused the hot gas to expand; this expansion drove the hot section turbine and the air intake fan. Today's gas turbines function in much the same way.

The life of the early gas turbines was limited to about 5 hours because the steel alloys available then could not withstand the high temperatures (950-1,100°C) in the combustion section of the jet engine. The engine functioned, but its practical use was limited by the corrosion of the materials then available for the hot gas section. For the gas turbine to become the efficient and reliable engine it is today, improved alloys were needed.

Nickel, because of its inherent strength, resistance to corrosion, and ability to alloy with other metals, was the base metal of choice for the development of better alloys for jet engine use. Metallurgists in the 1940s and '50s were aware that nickel-chromium and nickel-chromium-cobalt alloys were stronger and more resistant to corrosion and oxidation than the stainless steel alloys then in general use. These nickel-chromium and cobalt alloys were austenitic stainless steels and could extend the life of gas turbines. The improved performance of early nickel alloys, such as N06600 (containing 72% nickel), encouraged metallurgists to develop more efficient alloys.



ROLLS ROYCE

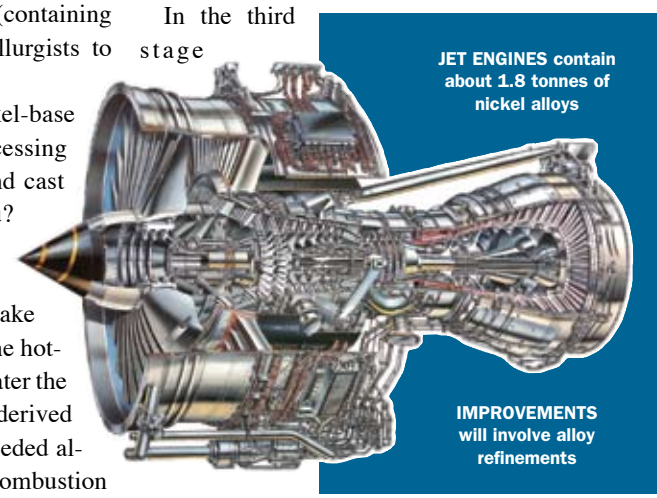
Has the development of nickel-base alloys and subsequent processing techniques for their wrought and cast product forms reached a plateau?

The efficiency of a gas turbine depends on the difference in temperature between the air intake and the combustion chamber. The hotter the combustion zone, the greater the amount of energy that can be derived from the fuel. That's why we needed alloys that could handle hotter combustion temperatures in the combustion chamber. As the metallurgical industry evolved, new alloys were developed to meet this challenge. These were mostly nickel-base alloys with additions of chromium and other elements to enhance strength and oxidation/corrosion resistance at higher temperatures. Alloy development, as with the gas turbine itself, evolved in three stages.

First, the alloys were improved by increasing nickel and chromium content in both wrought and cast alloys and by using vacuum melting to reduce harmful oxides. Researchers then considered enhanced alloy compositions. Alloy additions of elements other than nickel, chromium or cobalt were the next step for higher-temperature service. In particular, the addition of tungsten, vanadium, molybdenum and niobium led to the creation of complex alloys containing as many as 12 different metallic elements. Among the alloys created was N06102 (containing 68% nickel). Improvements in vacuum melting techniques made the creation of such complex alloys possible while maintaining alloy cleanliness and a homogenous microstructure.

Next came the use of coatings, such as aluminides (CoAl or NiAl for example), which could be applied to the basic alloy parts for better resistance to corrosion or oxidation.

In the third stage of development, cast alloy components, such as the hot section turbine blades, were a weak point, owing to grain boundary segregation of some elements during solidification of the molten metal. This problem was resolved by the development of new casting techniques for the hot section turbine blades. Directional solidification and single crystal castings, for example, allowed gas turbines to operate at even higher temperatures, which translated into greater efficiency.



Today we await further metallurgical refinements that will take gas turbines to the next level. Such improvements will rely on the continued evolution of nickel-base alloys.

MORE INFORMATION:
www.nickelmagazine.org/turbinehistory

BUILT FOR PUNISHMENT

The Solid Stainless Steel Reactor is a Watch for All Occasions

Crafted from solid S31603 stainless steel, the sleek and rugged Reactor would be the perfect wristwatch for a budget-minded James Bond.

007 could spend the day grappling with the bad guys underwater, change into a tuxedo for dinner, and not have to bother changing his watch . . . and he'd have money left over to gamble at the casino.

"We build the best water-sport watch, period," says Jimmy Olmes, founder of California-based Reactor Watches, the only watchmaker to use solid S31603 in the cases, case backs and bands of every timepiece it produces.

"We pride ourselves on producing a high-quality watch that people can put on in the morning, do whatever activity they enjoy most, be it diving, surfing, snow skiing or snowboarding, then go out in the evening without ever having to take the watch off their wrist."

Solid-stainless steel construction is a major selling point for Reactor's fashionable, durable watches. "They're virtually indestructible," says Olmes, who created the Reactor line in 2003 after more than two decades in the business.

"We chose S31603 for its wear and corrosion resistance, durability and ruggedness and because it's reasonably easy to machine. It's now the standard in the industry for sports performance watches." And like most stainless steels, its corrosion resistant quality means that it is appropriate for use by those who may be allergic to nickel.

Reactor watches can withstand daily immersion in salt water. The stainless bands are attached with Allen-head screws, rather than traditional spring bars, to ensure they won't separate, and some models have been depth-tested to 200 metres. The hardened mineral glass used to protect the face is stronger than the sapphire crystal used in most sports watches.

Reactor's web site features testimonials from surfers, divers, firefighters and a martial arts instructor, all of whom praise the watch's ability to withstand punishment on the job or at play. Olmes says customers should be able to wear their Reactor every day for 10 years, and, other than a few surface scratches, "it should look just like it looked the day you bought it."

S31603 stainless steel was chosen for it's wear and corrosion resistance.

Olmes' goal is to offer the look and quality of high-performance Swiss-made watches at affordable prices. The company produces more than 40 styles for men and women, starting at US$200. Most models sell in the range of $200-500 range. A diamond-studded version sells for $3,500.

REACTOR WATCHES

Reactor's watches are constructed with stainless steel cases, casebacks and bands.

The stainless steel bands are attached with Allen-head screws.

istock

Why "Reactor"? Olmes chose the name because he planned to use tritium, a byproduct of nuclear reactors, to illuminate the dial. He opted instead for Superluminova, a non-radioactive material that glows brighter than tritium when underwater. But the name stuck, and is reflected in models with names like Fallout, Meltdown, Critical Mass and Heavy Water.

Reactor builds its watches in China but relies on a Japanese supplier for its S31603 stainless. The company expects to produce close to 100,000 watches in 2007 and Olmes is now thinking about using a stainless steel alloy that can out-perform S31603 and further distinguish Reactor from its competitors.

"We're evaluating stainless steel grades that are harder and more durable than S31603," he says. "The alloy should also be more resistant to corrosion, especially in saltwater environments."

MORE INFORMATION:
www.nickelmagazine.org/reactor

PERSONALITY PROFILE

Setting The Course

ENIA's secretary-general skillfully combines science and advocacy.

The year 2006 was a pivotal year for the European nickel industry. The European Union's new chemicals regulation policy, REACH, moved closer toward implementation and more stringent water quality standards were established. And 2007 promises to be even more important for the industry. In the months ahead these programs and others will start to have a direct effect on nickel producers and downstream users. If all that sounds like too much for one man to take on his shoulders, think again.

As secretary-general of the Brussels-based European Nickel Industry Association (ENIA), Hugo Waeterschoot is charged with overseeing these programs on behalf of the world's nickel producers. It's a job that involves building bridges between industry, the scientific community and policy-makers. Given his background and experience in these very fields, perhaps no one is better qualified to build those bridges.

Hugo Waeterschoot
Secretary-General, ENIA

JAMIE VEENEMAN FOR NICKEL INSTITUTE

Born in 1961 in Antwerp, north of Brussels, Waeterschoot received master of arts degrees in biology (from the University of Hasselt and Ghent), environmental sanitation (also Ghent) and middle management (from the Vlerick Leaven Ghent Management School) and got his professional start as environmental manager at the Hoboken smelter in Antwerp. His 17 years of industrial experience included various jobs in the environment and health fields, among them, product safety manager and co-ordinator of the Belgian environment and health activities of the Union Minière Group, and science and environmental policy manager of the Umicore Group.

At Umicore, he got deeply involved in EU metal risk assessment work covering such metals as cobalt, lead, zinc and copper, and persuaded the group to join the Nickel Producers Environmental Research Association (NiPERA). Prior to his appointment to ENIA in 2005, Hugo was the director of environment, health and safety (EHS) for Eurometaux (under a 3-year secondment from Umicore), where he helped develop the organization's EHS policy and was the principal negotiator for the metals industry on REACH with the policy institutions of the EU.

In 2003, Hugo became vice chair of the organization representing the interests of the industry at the OECD level.

"My experience at Eurometaux brought me into contact with the European Commission services, the European Parliament and the Council of the European Union, as well as with national metal organizations," says Waeterschoot, "and these contacts are part of an extensive network I continue to participate in at ENIA."

His background in science combined with a keen interest in policy and management have made it possible for Waeterschoot to influence international metals regulation.

"The fact is ENIA is at the helm, and that means we are setting the course. We have been anticipating the application of REACH more than anyone else and have carried out good risk assessment and risk management. The other commodity associations know that the policies we negotiate will be applied to them too, so they co-operate by helping us. As a result, we have tremendous leverage for gaining support. Our collaboration in Europe with stakeholders in copper, zinc and the various other metals co-ordinated by Eurometeaux is ongoing and extremely close.

"Working together is one of the key components of successful business advocacy," he stresses. "ENIA is continually building long-term relationships with our stakeholders so that we can anticipate their problems or concerns. Once we anticipate them, we can find solutions and have them in place."

Internationalization of the regulations affecting the nickel industry is widening the scope of such relationships. "Regulations are not made in Europe alone anymore, or if they are, they are immediately internationalized," says Waeterschoot. "For example, the results of the nickel risk assessment, when they're made available (in June 2007), will be posted immediately on the web site of the Organization for Economic Co-operation and Development. Consider also that Europe has traditionally specialized in aspects of chemicals management whereas the U.S. has specialized in other areas, such as agriculture; although these specializations are not regionally exclusive. What all this means is that we now have to work on the worldwide level, because the boundaries are gone."

Waeterschoot, though he resides in Brussels with his wife and three teenage sons, is frequently on the move. As secretary-general, he is also responsible for ENIA's Nickel Use Support Group, which is based in Alvechurch, Birmingham, U.K., and he serves on the Management Committee of the Nickel Institute in Toronto.

The staff in Brussels and Alvechurch is increasingly involved in large, multi-year projects such as REACH, which requires them all to work closely together (this collaboration also includes Waeterschoot's colleagues in the Toronto offices of the Nickel Institute and in the Raleigh, North Carolina, offices of NiPERA).

"I'm essentially the coach of the European team and the motivator who provides enthusiasm and direction. I love providing organization and momentum for large multi-office projects and I hope I can contribute to the Nickel Institute."

MORE INFORMATION:
www.nickelmagazine.org/hugo

What Business Wouldn't Boast About Being Green?

If your business uses stainless steel, you're using one of the world's most recycled materials.

The European public, for the most part, is unaware that steel is as recycled as other commonly-used materials such as paper, glass and aluminum, according to a survey by the International Stainless Steel Forum (ISSF). The same misperception probably prevails in the other large markets for stainless, namely Asia and the Americas.

Fact is that austenitic stainless steels, because of their valuable nickel content, were recycled long before it became fashionable for other materials to be recycled.

More than 80% of all stainless steel products are recycled. It's also worth noting that a stainless steel product made of S30400 contains 60% recycled material. Not many other commonly-used materials can say that.

In an attempt to inform the public of stainless steels' green credentials, the Nickel Institute and the ISSF have launched a campaign consisting of print advertisements, online videos and stickers.

The campaign is designed so that businesses can take, without charge, the advertising materials and use them to educate their customers. For example, three short videos are available online for downloading and distribution.

Also, simple stainless steel recycling logos

have been developed for use by businesses in their product brochures or as stickers placed directly on products. The logos state: "Recycled for Lasting Value."

The advertising campaign stresses that recycled stainless steel is just as strong, ductile, and corrosion-resistant as stainless steel made from virgin materials (and it remains just as recyclable).

Perhaps, since users are not in the habit of putting kitchen sinks and the like into their curb-side recycle bins, they don't normally think of stainless steel as a highly recyclable material. Another reason could be that stainless steel products are so durable they have long useful lives, compared with paper, glass and aluminum products.

Indeed, the durability of stainless steel products is another green credential for business to communicate to their customers.

THESE TWO-MINUTE VIDEO CLIPS offer recycling messages in five languages. They, and the logos shown below, are available from the Nickel Institute.

PRINT ADVERTISEMENTS designed by the Nickel Institute for use by the stainless steel industry to promote recycling credentials.

MORE INFORMATION:
www.nickelmagazine.org/recycle

SUITE DELIVERY

NEW YORK CITY'S PLAZA HOTEL OPTS FOR STAINLESS STEEL WATER PIPES

ROBERT LOWELL FOR NICKEL INSTITUTE

Stainless steel pipe will soon be used to deliver potable water to 24-karat-gold-plated Sherle Wagner faucets in bathrooms at a prestigious address in New York City. Currently under restoration at a cost of US$350 million, the 100-year-old, 18-storey building at Fifth Avenue and Central Park South features 182 private-residence condominiums priced in the range of US$1.6-6 million.

Contractor Bass Plumbing of College Point, N.Y., selected 150 DN (diameter nominal) x 3.4 mm (millimeter wall thickness), S31600 and S31603 stainless steel riser pipe to handle incoming potable water for the historic building. The incoming water is pumped to holding tanks on the roof using two pumps situated in the basement. 100 DN lines supply the water, fed by gravity, that is used to service the building. Hot water is supplied through 75 DN S31600 and S31603 stainless steel lines, whereas the hot water return lines are 50 DN x 2.8 mm pipe.

Whether used in building conversions or new buildings, stainless steel can offer significant savings in plumbing costs. Applications may involve the handling of incoming waters, such as the case for risers servicing the Plaza Hotel or the cold water lines for the Veterans' Administration hospital in Minnesota, to the waste water plumbing systems extracting drainage of sanitary wastes and building water run-off. In all these applications, the piping is installed rapidly using couplings and rolled and grooved fittings or hydraulic press-fit couplings for the small diameter feeder lines (75 DN).

In the case of the Plaza Hotel, which overlooks Central Park, the building is now a shell, making way for a new, smaller hotel and luxury apartments. Installation involves two men and a hoist handling light-weight rolled and grooved piping connected together with Victaulic® couplings. Ease of construction is reflected in the speed of installation.

Other installations of stainless steel pipe in New York City include supply lines servicing the U.S. Lawn Tennis Center, the Pfizer Building, Sloan Kettering Experimental Station, and Hanson Place, to name but a few.

The stainless steel piping installation complies with New York City Code RS16P102.4 for piping systems. Stainless steel also meets the ANSI/NSF Standard 61 requirements, without exception, and is suitable for the handling of drinking waters. Virtually all building codes in the United States now acknowledge and invoke ANSI/NSF requirements, with Michigan, Wisconsin and New York all acknowledging these new materials for use in plumbing applications.

MORE INFORMATION:
www.nickelmagazine.org/plaza

The Plaza Hotel overlooking Central Park renovates using stainless steel water pipes for durability and low maintenance

Stainless steel pipe delivers hot water to private suites.

"Light weight stainless steel pipes help to lower costs of installation." says Nickel Institute consultant Stephen Lamb

Nickel REACH Consortia Launched

On January 23, 2007, the nickel industry launched three consortia to assist companies implement the European Union's new chemicals policy, Registration, Evaluation and Authorisation of Chemicals (REACH).

An event was held in Brussels, Belgium to mark the occasion and a new web site, *www.nickelconsortia.org,* was launched. Forty people representing nickel producing companies, importers and downstream users attended. This proactive, voluntary initiative was sponsored by the Nickel Institute. The launch event was also attended by representatives of stainless steel producing companies, chromium-nickel platers, nickel battery manufacturers, and other metals associations.

"All nickel-related companies doing business in the EU need to take steps immediately to implement REACH," says Hugo Waeterschoot, secretary-general of the European Nickel Industry Association (ENIA), a division of the Nickel Institute.

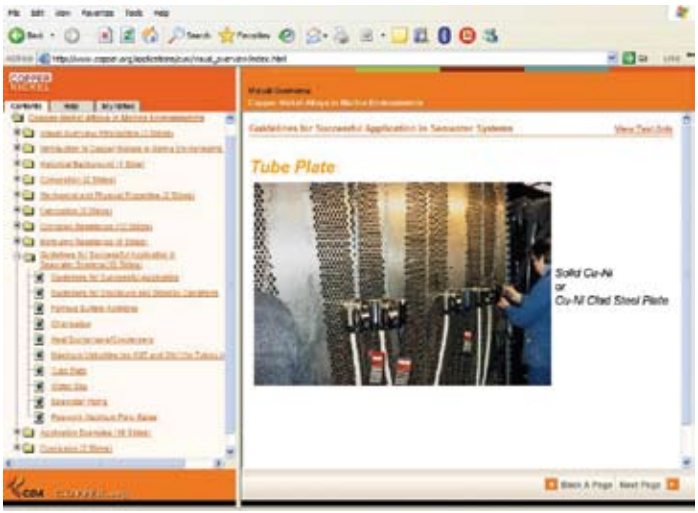
The nickel consortia have been structured to ensure there is effective co-operation throughout the nickel supply chain, Waeterschoot says. Three consortia are being formed for the following three types of nickel substances: nickel risk assessment substances (nickel metal, nickel chloride, nickel carbonate, nickel sulphate and nickel nitrate), nickel inorganic compounds (such as nickel oxide), and complex materials (such as ferronickel and nickel matte).

Starting the process early creates several advantages for nickel producers, importers and users.

"Good supply chain communications are critical to achieving success," says Elina Karhu, DG Enterprise. The current EU Risk Assessment of nickel and nickel compounds will form the basis for the implementation of REACH.

Dmitry Ryshkov, senior market analyst for Norilsk Nickel Europe, reminded the audi-

Copper-Nickel Alloy Training Available



COPPER DEVELOPMENT ASSOCIATION

The Copper Development Association (CDA) has launched an online training module that introduces the many benefits of copper-nickel alloys to offshore, marine and naval engineers and designers as well as fabricators and educators.

The module, which consists of 74 slides (including photos, diagrams and tables), was developed by the Copper-Nickel Tube and Pipe Steering Committee of the CDA. It is accompanied by an audio file, and takes about 20 minutes to view in its entirety. A print option is available.

Topics presented include: mechanical and physical properties, fabrication, corrosion resistance, bio-fouling resistance, alloy selection, desalination applications, boat hull applications, and ship cooling and fire suppression system applications.

MORE INFORMATION:
www.nickelmagazine.org/coppernickel

UNS details

Chemical compositions (in percent by weight) of the nickel-containing alloys and stainless steels mentioned in this issue of Nickel.

Alloy	Al	B	C	Cb	Co	Cr	Cu	Fe	H	Mn	Mo	N	Ni	O	P	Pb	S	Si	Tl	V	W
N06600 p. 7	-	-	0.15 max	-	-	14.00-17.00	0.50-max	6.00-10.00	-	1.00 max	-	-	72.0 min	-	-	-	0.015 max	0.50 max	-	-	-
N08926 p. 5	-	-	0.020 max	-	-	19.0-21.0	0.5-1.5	rem	-	2.00 max	6.0-7.0	0.15-0.25	24.0-26.0	-	0.030 max	-	0.010 max	0.50 max	-	-	-
N10276 p. 5	-	-	0.02 max	-	2.5 max	14.5-16.5	-	4.0-7.0	-	1.0 max	15.0-17.0	-	rem	-	0.030 max	-	0.030 max	0.08 max	-	0.35 max	3.0-4.5
S30400 p. 9	-	-	0.08 max	-	-	18.0-20.0	-	-	-	2.00 max	-	-	8.0-10.50	-	0.045 max	-	0.030 max	1.00 max	-	-	-
S31600 p.10	-	-	0.08 max	-	-	16.0-18.0	-	-	-	2.00 max	2.00-3.00	-	10.00-14.00	-	0.045 max	-	0.030 max	1.00 max	-	-	-
S31603 p.12	-	-	0.030 max	-	-	16.0-18.0	-	-	-	2.00 max	2.00-3.00	-	10.00-14.00	-	0.045 max	-	0.030 max	1.00 max	-	-	-
S31726 p. 5	-	-	0.03 max	-	-	17.0-20.0	0.75 max	-	-	2.00 max	4.00-5.00	0.10-0.20	13.5-17.5	-	0.030 max	-	0.030 max	0.75 max	-	-	-
S32205 p. 16	-	-	0.030 max	-	-	22.0-23.0	-	-	-	2.00 max	3.00-3.50	0.14-0.20	4.50-6.50	-	0.030 max	-	0.020 max	1.00 max	-	-	-
S34565 p. 5	-	-	0.03 max	0.1 max	-	23.0-25.0	-	-	-	5.0-7.0	4.0-5.0	0.4 0.6	16.0-18.	-	0.030 max	-	0.010 max	1.0 max	-	-	-

Consortia cont'd from pg. 14

ence at the launch event of the contribution nickel makes to society, especially in the areas of health and environmental protection. "The nickel industry intends to implement REACH in a timely and responsible manner," he asserted.

The launch day presentations and additional information about the nickel consortia, including timetables, functions of the consortia and how to join the consortia, can be found at the nickel consortia website.

MORE INFORMATION:
www.nickelconsortia.org

THE NICKEL INSTITUTE ON:

YouTube™

www.youtube.com/profile?user=NickelInstitute

NICKEL IN TRANSPORT
RUNNING TIME **02:00**
NUMBER OF VIEWERS: **82***

NICKEL IN CONSUMER GOODS
RUNNING TIME **02:00**
NUMBER OF VIEWERS: **45***

NICKEL IN ARCHITECTURE
RUNNING TIME **02:00**
NUMBER OF VIEWERS: **25***

STAINLESS STEEL
RUNNING TIME **03:46**
NUMBER OF VIEWERS: **64***

ONE OF THE WORLDS MOST RECYCLED MATERIALS
RUNNING TIME **00:48**
NUMBER OF VIEWERS: **33***

RECYCLING IS EVERYONES RESPONSIBILITY
RUNNING TIME **00:48**
NUMBER OF VIEWERS: **57***

MORE RECYCLED THAN PAPER AND GLASS
RUNNING TIME **00:48**
NUMBER OF VIEWERS: **33***

*AS OF MARCH 16, 2007

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COMING EVENTS

Mint Directors to Meet

U.S. MINT

The 2007 Mint Directors Conference will be held in Amsterdam, April 23-26, 2007. The event is for professionals in the minting and vending machine industries and will address health and sustainability concerns. Nickel plays an important role in coinage worldwide and will occupy a significant part of the conference. Michel Vander Straeten, EU Policy Manager, for the Nickel Institute, will chair the environmental sub-committee portion of the meeting. For more information, see: http://www.fnmt.es/en/html/lc_in_mi.asp

RECYCLING The International Nickel Study Group's Nickel Recycling Conference will be held in Lisbon, Spain, May 10-11, 2007. End-of-life issues and recycling will be discussed for an audience of government and industry people. http://www.insg.org

ELECTRONICS & THE ENVIRONMENT An international symposium on electronics and the environment will be held May 7-10, 2007 in Orlando, Florida, U.S.A. The event will be of interest to engineers, managers and others in the research, development, manufacturing, recycling and marketing of electronic products, many of which contain nickel. It is sponsored by IEEE and the International Association of Electronics Recyclers. See: http://www.regconnect.com/content/isee/

NICKEL/COBALT-12 The metallurgical consulting firm ALTA Metallurgical Services will host this conference in Perth, Australia, on May 21-23, 2007. It will include presentations on the atmospheric leaching of nickel laterite ores. Matters relating to plant design and operation, new technology, materials of construction, and tailings disposal will be discussed. See: www.altamet.com.au

STAINLESS STEEL Asian nickel demand and continued growth prospects is on the agenda of the 3rd Asian Stainless Steel Conference which will be held in Hong Kong on June 6-8, 2007. Organized by Metal Bulletin and SMR, this conference offers an opportunity to network and do business with the main players in the Asian and international stainless steel industry. Please see: http://www1.metalbulletin.com/mbevents/conference.asp?id=170&cat=2

AIRPOL 2007 will be held in Louisville, Kentucky, U.S.A. on June 26-28, 2007. This 3-day event, co-sponsored by NACE International and the Electric Power Research Institute, is designed for the suppliers and users of materials for the construction of flue gas desulphurization systems in coal-fired electric generating stations. These materials include nickel alloys. For more information, please see article on page 5 of this issue and: http://www.nace.org/nace/content/conferences/airpol2/

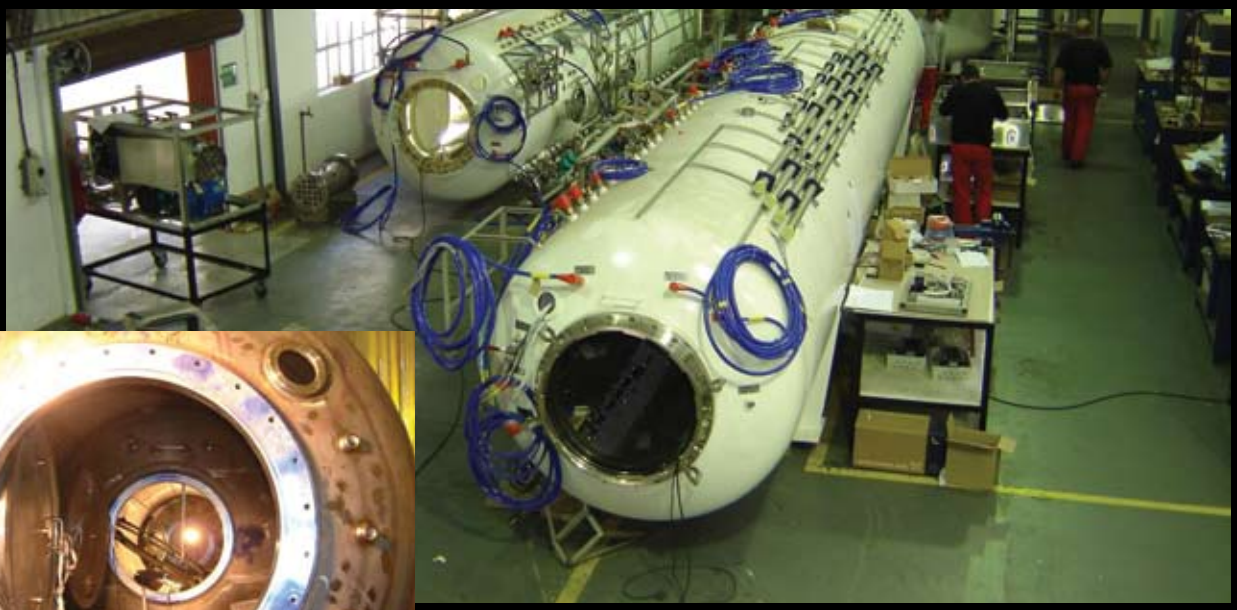
METALS RECYCLING A short course and workshop on the practical aspects of recycling metals from industrial wastes will be held June 26-28, 2007, in Golden, Colorado, U.S.A. Sponsored by the Colorado School of Mines, the event will focus on current plant practices for converting metal-containing wastes (including nickel in batteries) into useful products. Three processing techniques will be emphasized: physical, hydrometallurgical (including the aqueous recovery of nickel), and pyrometallurgical. See: http://www.mines.edu/Outreach/Cont_Ed/heavy.shtml"

LIFE CYCLE MANAGEMENT The 3rd International Conference on Life Cycle Management will be held at the University of Zurich on August 27-29, 2007. Researchers, academics and professionals from various industrial sectors and public institutions will share their experience and knowledge. Presentations will focus on the application and implementation of life-cycle approaches for sustainability, and on scientific approaches to life-cycle management. Please see: http://www.lcm2007.org

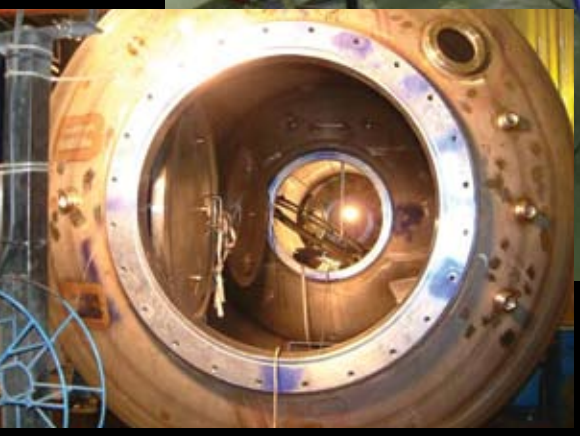
OFFSHORE EUROPE The Nickel Institute will have a stand at the largest oil & gas conference and exhibition outside of North America, which will be held Sept. 4-7, 2007, in Aberdeen, Scotland. Engineers, technical specialists and industry leaders at the international gathering will meet to discuss exploration and production technology and work out solutions to the industry's problems. More than 32,000 people attended the last such conference, in 2005. For more information, see: http://www.oe2007.co.uk

UP from the DEEP

MOLENAAR'S SUBMARINE RESCUE SYSTEM USES STAINLESS STEEL TO SAVE LIVES



Rescue chambers made of S32205 duplex stainless steel, containing 5.5% nickel.



Precision welding

A South African supplier of food-processing and canning equipment might seem an unlikely choice to build hyperbaric chambers to rescue submariners from the ocean floor. But H.G. Molenaar & Co.'s expertise in building pressure vessels was exactly what was needed for NATO's new submarine rescue system.

"In a way, it's a natural progression for us," says Martin Molteno, technical manager of the engineering and equipment firm based in Paarl, in the heart of South Africa's fruit-growing region. Molenaar has designed and built massive pressure vessels and some of the largest rotary cookers in the world. "And now we've drifted into more high-technology applications," says Molteno, "including small decompression chambers for divers."

The rescue system consists of three stainless steel tubular chambers providing 100 cubic metres of interior space, which can accommodate and treat up to 72 people rescued from a stricken submarine. The system is installed on the deck of a rescue ship. A submersible vehicle ferries submariners to the surface in groups of eight for treatment and decompression.

A Scottish firm, Divex Ltd., designed the system to be airlifted anywhere in the world, for deployment on the nearest compatible surface ship within 48 hours of a submarine emergency. S32205, a duplex stainless containing 5.5% nickel, was specified to reduce the weight of the pressurized chambers without compromising their strength. "It's tough and it's strong, and therefore you can go thinner [in this case to as thin as 5 mm]," Molteno says of the alloy.

Molenaar's expertise in manual tungsten inert gas welding was vital, especially in regards to avoiding distortion of the S32205 plates. One of the chambers measures 5 metres (m) long with a diameter of 2.1 m; the others are 12 m long and 1.8 m in diameter.

"The weld has to be carefully prepared," Molteno says, noting that the shape of the pieces must correspond exactly and the distance between them must be precise. "If you have a slight variation in the distance apart, then point A will pull in more than point B and the whole thing will twist.

"All our welds are checked for quality by a third party," he adds. "They're X-rayed and tested so we can certify that they're completely acceptable."

MORE INFORMATION:
www.nickelmagazine.org/rescue

H.G. MOLENAAR & CO.