

# Sumitomo Metals aims to accelerate distinctiveness in the energy sector

With an extensive range of products for the energy sector, Sumitomo Metals has long been at the forefront of the seamless pipe industry. The earliest beginnings of the company lie in the 19th century, when the Sumitomo Metals Copper Plant was established in 1897. In 1912 the copper plant was augmented with a steel tube factory: the first private company in Japan to manufacture seamless steel pipes. In 1919 the foundations were laid for the Amagasaki plant close to Osaka, which today is a modern, spacious and well laid out facility as Stainless Steel World saw during a recent visit.

By David Sear

To give an impression of scale, my trip around Sumitomo Metals' Amagasaki facility lasted well over an hour and required several taxi journeys! With hindsight that's hardly surprising, because Amagasaki is a world-scale site and Sumitomo Metals' managers told me it is the world's first truly straight-line operation, encompassing steelmaking, continuous casting, mill rolling, heat treatment and final inspection. The site even boasts its own extensive company railway for the easy movement of billets, bars and whatever else is

required during tube and pipe production. The tour definitely included some real highlights. Take the brand new mill for boiler tubes, for example, commissioned to meet strong growth in demand. Says Section Manager Mr Anada: "as of October 2007, output of super high-end boiler tubes was raised from 12,000 to 18,000 tons per year thanks to this new mill. We plan to leverage this additional capacity to accelerate our distinctiveness in the energy sector." Export Manager Mr Kouda adds:

"Sumitomo Metals has captured fully 80% of the worldwide market for high-end boiler tubes, which are used in ultra super critical (USC) boilers at coal-fired power plants. Demand for such tubes has risen sharply in recent years thanks to a surge in power plant construction, mainly in China but also in Europe. In a drive to increase efficiency, cut fuel consumption and reduce CO<sub>2</sub> emissions, more and more of these plants are adopting USC technology. This is raising demand for the high performance seamless tubes from Sumitomo Metals."



type of pressurized-water reactor units in China and the US. This nicely builds on Sumitomo Metals' enviable track record in supplying heat exchanger and steam generator tubes for more traditional pressurized water reactors and stick elbows for boiling water reactors. Comments Mr Anada: "rising demand for power and the need to reduce CO<sub>2</sub> emissions have caused many nations to consider building new nuclear power stations, of which pressurized-water reactors comprise 70%. Advanced nuclear reactors have larger steam generators for better economy and safety, and these require steam generator tubes with tighter inner radii than previous models." To accommodate these needs, Sumitomo Metals has invested ¥ 2.3 billion in Amagasaki to modify its steam generator tube manufacturing equipment. Construction work finished in October 2008, boosting production capacity for this niche market by 30%.

### Sophisticated alloys

One of Sumitomo Metals' strong selling points is the sophisticated alloys developed through its strong and active R&D department. Amongst other innovations, this department was responsible for grades such as 347AP, DP28W and DP3W.

347AP is an austenitic stainless steel with an optimum amount of carbon, nitrogen and niobium. It is widely used for desulfurizing plants in petroleum refineries. The carbon content has been lowered to prevent the grain boundary precipitation of chromium carbonitride, which causes intergranular stress corrosion cracking - a serious problem in heating furnaces and reactors.

Grade DP28W, a super duplex stainless steel specially developed for use in urea plants, gets its excellent corrosion resistance from the high chromium content plus the addition of tungsten.

DP28W is already being used in two plant projects in Trinidad and Venezuela, in a reactor, strippers and condensers, and as parts of stripper equipment in Indonesia, China, Pakistan and Japan.

Finally, DP3W super duplex stainless steel contains 2% tungsten to improve weldability of the alloy. DP3W has been widely used for application of sub-sea umbilical.

The advantage of these alloys, specially developed in Sumitomo Metals' own R&D facilities, is that they offer superior corrosion resistance for specific applications, explains Technical Manager Mr Higuchi. "In our domestic market, for example, we have already sold well over 2000 tons of 347AP grade tubing, making it a very familiar and trusted product amongst Japanese end users. That is the message we hope to spread to potential customers world-wide - to inform them that 347AP has an extensive track record and we are a trusted partner for a great many clients. Our credibility as a long-term supplier is something we view as of the utmost importance."

### Green credentials

Environmental awareness has always been a key concern for Sumitomo Metals. Go back about a century and you'll find that Director General Teigo Iba was a real "green pioneer", taking decisive action to replant the mountains in the Besshi area in Shikoku Island following the

### Nuclear tubes

Another memorable moment during the tour came when standing in the control room of an extrusion plant. Here, mother tubes are made for seamless cold working. The hydraulic forces are simply tremendous, and the control room floor literally shakes as the billets of hot metal are forced through a die and a mandrel. Power without precision is next to useless, of course, and so further down the line a straightening machine ensures that the resultant tubes and pipes are dimensionally perfect. Finally, in the spick and span finishing area, Sumitomo Metals staff explain how tubes can be U-bent to exact specifications before being inspected and packaged. The only part of the finishing shop that was off-limits was the area for nuclear power plant tubes. Here, Sumitomo Metals' standards for cleanliness would do a hospital proud. Whilst looking over this particular section, Mr Anada points out that Sumitomo Metals recently won orders for steam generator tubes for a new



An aerial view of the Amagasaki plant near to Osaka in Japan.





Inside the Amagasaki plant.

development of a copper mine. Sumitomo Metals also tackled the problem of air pollution through an improvement in copper refining technology, and the lush mountains and fields were restored.

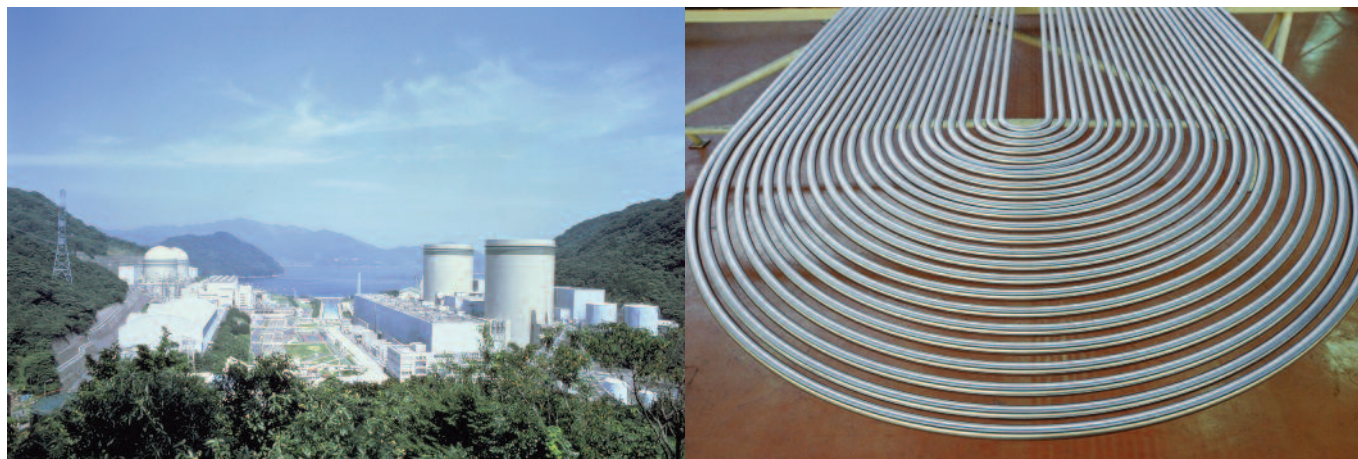
It is the mission of the current management to build on this dedication. Fully 80% of the R&D expenses are allocated to environment-related research. As a result of these efforts, Sumitomo Metals now has one of the world's lowest levels of CO<sub>2</sub> emissions per ton of crude steel production and blast furnaces with the longest life in the world. In 2008 Sumitomo Metals received the highest rating of "companies with particularly impressive environmental programs" in the environmental rating loan system of the Development Bank of Japan, the only steelmaker ever to receive that rating. Sumitomo Metals'

products are calculated to have the effect of reducing CO<sub>2</sub> emissions by 120 million tons a year - almost five times as much as the CO<sub>2</sub> that the company itself generates in making those products.

"We are also supporting green efforts in power plant technology," Mr Higuchi says. "Engineers are looking to raise the temperature at the turbine inlet from 600 to 700°C, which will boost efficiency and reduce CO<sub>2</sub> emissions. However, that poses extra challenges for the tube suppliers, such as how to maintain the creep strength." Mr Higuchi adds that Sumitomo Metals is already doing extensive research in this area. Similarly, he notes that as temperatures and pressures are raised in chemical plants, there is an attendant need for tubes with superior corrosion resistance. Mr Higuchi : "Again, we are looking at new alloy

compositions to achieve this, as well as to extend the period between shut-downs to maximize production. As users switch more and more from standard grades to higher alloys with better corrosion resistance, Sumitomo Metals is on hand to meet their requirement with their specialised products."

The oil refining industry is also facing its own challenges and is turning to Sumitomo Metals for support. As Mr Higuchi explains, as existing wells reach maturity the quality of the oil is changing, with higher levels of contamination such as chlorides and hydrogen sulphide. In turn, this leads to greater corrosion problems, giving good opportunities for Sumitomo Metals' corrosion-resistant products. Another marketing opportunity is the increase in demand for natural gas for power generation. Natural gas releases less CO<sub>2</sub> than petroleum when it is

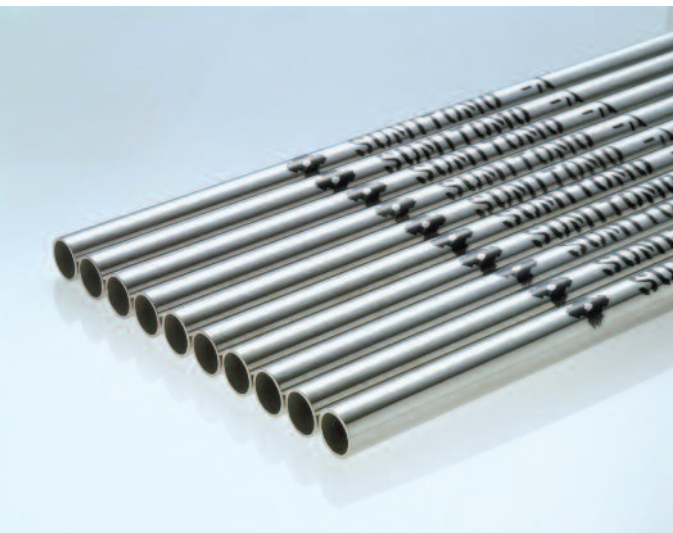


Sumitomo's heat exchange tubes are used in various applications such as in atomic power plants, but also in fossil, boiler, and chemical plants. A lot of Sumitomo's experience in steam generator tubes exists in corrosion resistant duplex stainless steels pure nickel and nickel-based alloys.





Heat treatment furnace



The demand for USC boiler plants is increasing rapidly. Our super high-end tubes (Super 304H, HR3C, TP347HFG) are used in super heaters where the highest temperature and pressure are borne in such boilers.

used for power generation, thereby helping prevent global warming. The technical challenge, however, is that at many gas-field drilling sites the environment is much more corrosive than for crude oil. These factors have created a need for special pipes. Says Mr Higuchi: "Sumitomo Metals is the only supplier of pipe that offers the extra strength and high resistance to the effects of the hydrogen sulphide present in such environments. This further underpins our credentials as the world leader in technical; development, product quality and product range. We have an unparalleled presence in the global high-end seamless pipe market."

### Prevailing spirit

Despite the current economic challenges, Sumitomo Metals is firmly committed to further developing its business. "We have been investing to raise our capacity," Mr Kouda says. "For example, we are expanding in high-end stainless steel for the petrochemical industry." He further explains that the petrochemical market essentially comprises 80% standard grades and 20% critical grades; it is this latter section where Sumitomo Metal's strength lies. "We can offer real benefits to clients who face challenging corrosion issues. We have the right technology and proven products. Even though all our tubes and pipes are made to order, we can still provide standard lead times of just three to four months. A recent target has been to further improve our on-time delivery record, which now stands at 90%," comments Mr Kouda. Sumitomo Metals is taking steps to seize overseas growth opportunities, aiming for growth by choosing

reliable partners and pooling technological capabilities and local know-how. For example, a new joint venture in Brazil, together with the French company Vallourec, will enable supply to customers in North America, West Africa and the Middle East. It is an integrated steel plant in Minas Gerais State for production of OCTG (Oil Country Tubular Goods), seamless pipe for drilling in oil and gas development projects. Sumitomo Metals and Vallourec have agreed to manufacture the optimum volume of 600,000 tons of seamless pipe and sell 300,000 tons each. The furnace, scheduled for completion in 2010, will use eucalyptus-wood charcoal purchased on a contract with local plantation owners. The production will be effectively CO<sub>2</sub>-neutral, as the total amount of CO<sub>2</sub> that the trees absorb in their lifetime is equivalent to the amount of CO<sub>2</sub> emitted by the furnace. The economic downturn of course will inevitably have an impact on all sectors. In his 2009 New Year's message, Mr Hiroshi Tomono, Representative Director and President of Sumitomo Metals, confirms that he anticipates a difficult year all round. Nevertheless, he remains optimistic, noting that the current challenging period can be taken as a chance to engage in issues that busier times left no opportunity for, such as research and skill development. The key issues are environmental awareness, communication, and flexibility. Sumitomo Metals is still aiming for balance between quality and scale. "Our aim is to earn the trust of all stakeholders through the enhancement of our intangible assets," Mr Tomono says. "Sumitomo

Metals shall place prime importance on integrity and sound management. A man of noble character esteems wealth, and is scrupulous in seeking the way to acquire it."

### Facts and Contacts

**Name:** Sumitomo Metal Industries, Ltd.

**Founded:** 1897 (Incorporated 1949)

**Businesses:** Pipe & Tube  
Steel Sheet, Plate,  
Titanium & Structural Steel  
Railway, Automotive,  
Machinery Parts & Other  
Steel



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