



Deepu Balasubramaniam

SMST-Tubes: a key supplier of pipes & tubes to the nuclear industry

The beginnings of a heat exchange tube for the nuclear power generation industry. – hot extrusion at the SMST-Tubes plant.

Salzgitter Mannesmann Stainless Tubes (SMST-Tubes) – previously DMV – has more than thirty years of experience in the production of tubes and pipes for nuclear power plants in a wide variety of countries. These tubes are produced in a number of alloys including various stainless steels and nickel and are used for heat exchangers, instrumentation – including in-core instrumentation tubing, tubing for reactor coolant pumps, piping for primary, secondary, and auxiliary steam and water-cooling supply systems, and pipes for fittings, etc. Their main focus for the nuclear industry is the production of class 1 and 2 tubing and piping. Mr. Balasubramaniam, a Key Account Technical Manager at SMST-Tubes, talks to us about their work in this industry.

By John Butterfield

“In thirty years we have been able to build up invaluable experience”, says Mr. Balasubramaniam a Technical Key Account Executive at SMST, “in developing products to meet the challenging technical and quality requirements of the nuclear industry, and in providing materials that have become an integral part of the supply chain for vessel and piping systems, fuel fabrication and wastewater treatment facilities. The knowledge that has been acquired, combined with internal R&D work, has led us to the forefront of technological

developments in producing tubes and pipes of uncompromised quality to meet the requirements of new generation III+ or IV design as will be used in the ITER project in Cadarache, France”. It is part and parcel of this commitment that SMST strives to achieve higher quality levels than those foreseen in specifications. This enables them to be fully

confident in their products when they leave the factory for nuclear applications.



The SMST-Tubes plant in Italy taken from the air.

Manufacturing specialities

It appears that SMST-Tubes is, moreover, one of the few manufacturers in the world, able to produce U-bend tubes without colouration and with very low residual stresses. "This," says Mr. Balasubramaniam "can be largely attributed to the R&D activities that have been taking place over the past year. Stress corrosion cracking is one of the major causes of failure of heat exchanger tubes in service. Therefore it is mandatory to have as low residual stresses as possible on the tubes after all the cold working operations have been carried out. The big advantage of tubes with low residual stress is that their in-service lifetime can be considerably extended. This, naturally, then reduces the need to instigate a vigorous replacement cycle for the tubes and pipes in the systems in which they are in operation. At the same time this reduces maintenance costs". At SMST-Tubes the specialty tubes can, for example, sustain a boiling magnesium chloride solution without cracking for several hours. "This work has been a fruitful development" says Mr. Balasubramaniam "and has been well received by our customers – in fact, it has led to a lot of back-to-back orders". Other measures that have been taken to increase the possibilities for clients are improving the tight tolerances of the tubes, ensuring low eccentricity, producing high surface finishes, and generally guaranteeing high straightness.



SMST-Tubes always includes additional quality checks throughout their production lines so that quality expectations of clients can always be achieved

Moreover, special attention has been paid to 'tube cleanliness' for the critical primary or secondary circuit tubes in a plant. Mr. Balasubramaniam takes up the story: "It is essential to manufacture tubes with a high degree of cleanliness on both their inside and outside in order to avoid low-melting point materials, produced from lubricants or other processes, sticking to the tubes". Apparently, when this happens it can lead to embrittlement of the in-service tubes, which may lead to catastrophic failures. At SMST-Tubes a special cleaning process is in place that

guarantees a critical surface cleanliness. This is particularly important for all kind of reactor technologies.

Quality for the nuclear industry

Sales to the nuclear power generation industry have been increasing again over the past five years as the industry picks up. SMST-Tubes' involvement has meant that vital new investments have been made in equipment not only to increase tube productivity but also to meet the very stringent requirements for nuclear applications, particularly with regard to U-bend tubes for heat exchangers. "The new equipments have helped us to consistently maintain quality standards that in turn are essential requirements for production of bigger volumes", says Mr. Balasubramaniam.

Another key area being addressed is that of 'project management'. By this is meant the high levels of service that SMST-Tubes offers to clients when it comes to following-up on orders, preparing complete documentation, audits, inspection, and final certification. Quality assurances are also worth mentioning. This is one of the controlling tools by which SMST-Tubes make sure that client specifications are completely implemented on the shop floor. For this the company has just received an ASME III (NCA 3800) audit on their mills in France and Italy during January 2011.



SMST-Tubes in Montbard, France.

In addition, it appears that they are one of the few Western tube manufacturers that are qualified by NNSA of China through HAF 604 certification. This is required in order to be able to supply tubes for Chinese nuclear power plant projects. Whilst talking about standards, it appears that SMST's mills have gained much valuable experience working with the RCCM code of Areva (SMST-Tubes has been nominated as one of the few suppliers of the group of 'Label fournisseur AREVA' in Paris the 15th of June 2010), thanks to them being chosen to supply heat exchanger tubes for recent Areva projects: namely Flammanville 3, and Taishan 1&2. They have, moreover, also supplied class 1 piping for Flammanville 3 and Oikiluoto 3. Providing in-core instrumentation tubing for Areva is just one type of unique, state-of-the-art products ensuing from their mill in Italy. Looking at inspection, the company always includes additional quality checks



A certificate confirming qualification by the NNSA of China for nuclear safety registration.

throughout their production lines so that quality expectations can always be achieved. "We, further, believe that the supply chain of the nuclear industry needs to fully adapt a 'safety culture' (on the safety of every products in service), which

we see as being essential to building safe power plants anywhere in the world. A high level of surveillance avoids risks of disrespecting specifications, downgrading them, or overestimating capabilities", says Mr. Balasubramaniam. Finally, to further increase the service to customers, SMST ensure that nuclear grade raw materials are kept in stock, ready for production when an order is placed. This enables them to provide short deliveries times. Mr. Balasubramaniam continues: "The application of our tubes is not limited to new nuclear power plants. We also supply products for maintenance work within existing plants, and our 'historic' knowledge of codes, norms, and specifications often comes in handy in during replacement and refurbishing work". "In short", he concludes "with the industry booming and builds becoming more complicated we feel that we are in the ideal position to service our customers with our knowledge and skills in this niche market".