

## STEAM GENERATOR TUBES

A wide range of premium tubular solutions for Nuclear Island

### Challenge

Our main activity is the fabrication of steam generator tubes, heat exchanger tubes and other nuclear environment products.

Since 1974, we have delivered our tubes to 500 nuclear power plants' steam generators (SG) worldwide.

Today, Framatome's Montbard is an international leader supplier of seamless steam generator tubes thanks to 45 years experience and reliable manufacturing process.

### Solution

#### The steam generator at the heart of the reactor

Steam generators are heat exchangers used to convert feedwater into steam from heat produced in a nuclear reactor core.

To increase the amount of heat transferred and the generated power, the heat exchange surface must be maximized. This is obtained by using tubes. Each steam generator can contain anywhere from 3,000 to 11,000 tubes, between 12 and 22mm diameter.

#### Superior quality

Steam generator tube performance criteria are established to ensure safe operation and to maintain the safety margins implied in the design and licensing basis for the nuclear pressure boundary for nuclear power plants.

#### Premium integrity

Steam generator tubes comprise a substantial portion of the reactor coolant pressure boundary (RCPB) and also play a role in fission product containment. Their integrity is important to the safe operation of a pressurized-water reactor. As a result, regulatory authorities around the world have established requirements to ensure SG tube integrity is maintained.



### Customer benefits

- Processes are under control
- A unique and reliable manufacturing route
- The behavior of the material at final anneal can be anticipated
- Better ability to detect small indications during ECT in services inspections due to very low signal-to-noise level in the straight and bent part

**Your performance**  
is **our** everyday **commitment**

## Technical information

### Alloy 690 SG

It is a high chromium-nickel alloy with excellent corrosion resistance and high-temperature atmospheres. It has high strength and good manufacturing characteristics. The high chromium content confers resistance to oxidizing chemicals and oxidizing gases at high temperatures. The high nickel content confers resistance to stress corrosion cracking in chloride-containing environments and to sodium hydroxide solutions.

In addition to its corrosion resistance, alloy 690 has high mechanical strength and good metallurgical stability.

### Alloy 800 CWSP SG

The INCOLOY® 800 series of alloys, invented by the Special Metals Corporation group of companies, is the result of years of controlling and maintaining the ultimate chemical properties for resistance to oxidation, carburization and other types of high-temperature corrosion. Each a further development of its predecessor, these alloys have set the industry standard for high-temperature applications requiring optimum creep and fracture properties.

The nickel-iron-chromium superalloy has a melting temperature of between 1450 and 1560°C, which varies according to the alloy.

**An alloy is a metal made by combining two or more metallic elements, especially to give greater strength or resistance to corrosion.**



## Key figures

Over the last **45 years**, more than **500** Steam Generator tube bundles have been delivered around the world.



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