

# Production of 2G HTS tape at Faraday Factory Japan

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Faraday Factory Japan (FFJ) has established the world's largest facility for manufacturing of 2G HTS tape and is ready to further expand production capacity with anticipated demand growth. At present, the factory capacity exceeds 1,000 km of 12 mm wide tape per year (or 3,000 km of 4 mm wide tape).

Over more than a decade on the 2G HTS tape market, the selling price of FFJ HTS tape halved with each ten-fold increase of production and sales. This has been possible thanks to the approach we take to scale-up. When increasing the production volume, we improve all three elements that determine the capacity of a manufacturing line: (1) throughput (tape line speed), (2) process up-time, and (3) manufacturing yield. This has been an ongoing effort at FFJ that secures the continuous reduction of production cost with scale-up, as opposed to the alternative approach of merely multiplying identical production units that has a limited potential to cost reduction.

Today, the vast part of demand on HTS tape comes from high-field compact fusion. We strive to satisfy the needs of other HTS applications, maximising the use of synergies in requirements to tape among different applications. At present, all tape at FFJ is produced to fusion specifications, and for other applications we post-process the already made "fusion-specs" tape, to the extent technically possible and economically reasonable, in order to keep the low price.

The mass-produced FFJ tape contains YBCO superconductor, is based on Hastelloy substrate with the nominal thickness of 40 microns and the width of 4 and 12 mm, and is electrically stabilised with 5 microns of copper per side. Offered post-processing includes thicker copper layer, solder plating, soldered stacks of two tapes, and insulation.

With demand from fusion dominating the market, it is not economically reasonable to make tape with significantly different parameters, for instance, on substrates with a thickness other than 40 microns, or in widths other than 4 or 12 mm, or with different REBCO composition. With future appearance of large-volume demand on tape with different specifications, however, FFJ is ready to diversify the product offer accordingly, up to building factories dedicated to making tape for specific HTS applications.

## Submitters Country

Japan

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