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Wed-Mo-Po.03-01: Implementation of a Standardized Quality Control Process for Commercial HTS Tape

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The large-scale design and manufacture of HTS magnets will require the production and use of thousands of kilometres of HTS tape, supplied by various manufacturers worldwide. A critical step in enabling the production of these magnets is establishing a robust quality control (QC) procedure that can be consistently applied to all received batches of HTS tape before their use in Tokamak Energy's (TE) magnet projects. While several studies have previously reported on characterizing the individual properties of HTS tape relevant to magnet design and construction, there is currently no standardized procedure for controlling the quality of these tapes.

We report here on our efforts to implement a standardized set of quality control processes developed to assess the suitability of commercially produced HTS tapes for TE's magnet development projects. These processes are part of TE's broader HTS tape quality control program. The tests are designed to screen received tapes for dimensional non-conformities and to ensure that the mechanical, thermal, and electrical properties of the tapes meet TE's specified requirements.

TE has employed a combination of commercially supplied and bespoke measurement rigs to perform reel-to-reel visual inspection, 90-degree peel tests, internal resistance measurements and measurements of the residual resistivity ratio of the copper stabiliser. These tests are routinely applied each spool received from a commercial supplier and enable TE to comprehensively evaluate the suitability of each received batch of tape for our magnet applications.

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