S1.3.1 COMPUTER SIMULATION OF STRING WOUND FILTERS

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The author will describe a computational model for predicting the winding pattern of string wound filters - and describe the application of the model to real world manufacturing scenarios.

Stringwound filters are made from filter media in the form of yarns rather than roll goods. During the filter manufacturing process, the yarn is collected onto a center core, and the manner of collecting the yarn onto the core will impact the density of the filter and consequent particulate removal efficiency. Manufacturers of wound filters often rely on equipment manufacturers to provide winding machine settings for various filter "micron ratings", and each filter rating corresponds to a unique visible pattern in the filter's winding. A winding pattern in a wound filter can appear as series of diamonds, where the number and size of the diamonds can vary depending on the specific pattern; the pattern can appear as a series of "holes" where the size and distribution of the holes can vary; and a number of other patterns are possible. The author has developed a mathematical / computational model to predict the string pattern that results from the interaction of the filter's rotation and a string-guide's linear motion. The model is used to provide independence to the filter manufacturer in developing filter manufacturing machine settings. The model is used to reduce filter development time and lessen "trial and error" consumption of materials. The model is also used to develop machine settings for new equipment and new filter types.