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Effect of Sewing Speed on the Physical Properties of Firefighter Sewing Threads

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Abstract : This article experimentally investigates various physical properties of special fire retardant sewing threads under different sewing speeds. The aramid threads are common for sewing the fire-fighter clothing due to high strength and high melting temperature. 3 types of aramid threads with different linear densities are used for sewing at different speed of 2000 to 4000 r/min. The needle temperature is measured at different speeds of sewing and tensile properties of threads are measured before and after the sewing process respectively. The results shows that the friction and abrasion during the sewing process causes a significant loss to the tensile properties of the threads and needle temperature rises to nearly 300^oC at 4000 r/min of machine speed. The Scanning electron microscope images are taken before and after the sewing process and shows no melting spots but significant damage to the yarn. It is also found that machine speed of 2000r/min is ideal for sewing firefighter clothing for higher tensile properties and production.

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