International Journal of Textile and Fashion Technology (IJTFT)
ISSN(P): 2250-2378; ISSN(E): 2319-4510
Vol. 4, Issue 1, Feb 2014, 25-34

OPTIMISING VORTEX COOLING TIME FOR INDUSTRIAL LOCKSTITCH SEWING MACHINES

ADNAN MAZARI, ANTONIN HAVELKA & FUNDA BUYUKMAZARI

Department of Textile Clothing, Technical University of Liberec, Faculty of Textile Engineering,

Student Ska 2 Liberec, Czech Republic

ABSTRACT

Forced air or vortex cooling is the most common method for cooling sewing needlesin heavy industrial sewing machines, for example, in the automobile industry. The vortex tube separates compressed air into hot and cold streams, with the cold stream being continuously pointed at the sewing needle, decreasing the needle temperature. In this research, the impact of air cooling is determined for sewing without cooling, sewing with continuous cooling and sewing with optimised cooling times. For the optimised cooling time, the cooling is performed only at the time of stoppage during the sewing process. The results show that the impact of continuous cooling and cooling before sewing stoppage aresimilar, thus it is unnecessary to maintain continuous cooling.The sewing process is performed using two polyester core-spun threads with classic denim fabric, and the tensile properties of the threads are compared at different speeds of sewing (from 1000 to 4700 r/min) at continuous cooling, the optimised cooling time and without cooling. The resultsshow a 30% decrease in the tenacity of the thread when sewing without cooling, followed by the continuous and optimised cooling time, which decreases the needle temperature by almost 100°C and the tenacity of the thread by just 14%. Cooling only during machine stoppage or deceleration can save 60-80% of the energy consumption.

KEYWORDS: Sewingneedle, Needle Temperature, Needle Heat Cooling