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EFFECT OF PROCESS PARAMETERS ON THE POLYETHYLENE MELT IMPREGNATION OF E-GLASS ROVING IN A RADIAL SLIT DIE

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Thermoplastic composites because of their inherent advantages than thermoset composites are attracted since 1980s. Improved toughness, recyclability, short production cycle and unlimited shelf time of the thermoplastic prepregs are some reasons for this growth. Impregnation of reinforcing materials by thermoplastic melts is a new way for manufacture of semi finished and final parts in composite industry. Different methods are applied for melt impregnation of the reinforcement fibers, e.g. radial slit die, pin chamber and cross head die. In this research work, a comprehensive experimental study on the impregnation of E-glass roving by using a radial slit die was conducted. The melt flow rate, the pulling speed of glass roving and the number of slits on the quality of impregnated glass roving were evaluated. Results showed that decrease in pulling speed of roving improves the quality of impregnation. Also, increasing the number of slits and melt flow rate up to where the roving didn't pushed by the melt are the ways for better impregnation.