ENERGY SAVINGS IN SHOE SOLE PRODUCTION PROCESS

Ivana ŠPELIĆ¹*, Alka MIHELIĆ – BOGDANIĆ¹, Rajka BUDIN²
¹University of Zagreb, Faculty of Textile Technology, Prilaz baruna Filipovića 28a, 10000 Zagreb, Croatia, *email: ispelic@ttf.hr
²University of Zagreb, Faculty of Chemical Engineering and Technology, Marulićev trg 19, 10000 Zagreb, Croatia

ABSTRACT
The synthetic rubbers production started in World War II and today synthetic rubber accounts for the majority of rubber production. Energy savings in rubber processing plants are of great importance since the thermosets and elastomers (rubbers) encompasses around 30% of the tonnage of all synthetic polymers produced. Today, the synthetic rubbers exceed the tonnage of natural rubber. There are several industries involved in the rubber processing, but one of the main rubber processing industry is the shoe sole production. The shoe soles are usually made from synthetic polymers such as Polyisoprene (IR), Thermoplastic Polyurethane (TPU), Polyurethane foams or Ethylene Vinyl Acetate (EVA), which all fall in the scope of synthetic rubbers. Ethylene vinyl acetate (also known as EVA) is the copolymer of ethylene and vinyl acetate. This paper analyses the potential of energy savings in shoe soles production process made of Ethylene Vinyl Acetate (EVA), since these are the most popular soles currently. EVA shoe soles are known for their excellent properties. They are lightweight, easy to mould, have good water and moisture resistance, high elasticity, great shock absorption, great thermal insulation properties, high durability, low-temperature toughness, stress-crack resistance and great resistance to UV radiation. The energy savings using the process return condensate in shoe sole production process are presented. Using the return condensate results in lower make up water consumption, substantial fuel savings needed to produce steam and lower chemical consumption. Returning hot process condensate to the boiler results in oil savings of 14,9%. Also, the thermal pollution is reduced by 95,3%, while the volume of the flue gases is lowered from 17,11 m³/kg to 14,57 m³/kg, or by 14,8%. Such a system enables both the oil savings and reduces the thermal pollution.

KEYWORDS
Energy savings, return condensate; shoe sole production, Ethylene Vinyl Acetate (EVA), thermal pollution reduction