

I. INTRODUCTION

The textile industry has played an important role in the development of human civilization over several millennia. Technological developments from the second part of the eighteenth century onwards led to an exponential growth of the textile industry. The production of synthetic fibers started at the beginning of the twentieth century and grew exponentially (Schönberger & Schäfer, 2003).

Acrylic fibers are man-made textile material. They are made primary from acrylonitrile a petrochemical. Acrylic fiber is the best alternative of wool and cashmere, its price is lower than wool. It can be blended with polyester fiber, viscose fiber, cotton and other fibers to make a variety of fabrics as well as, artificial fur and industrial products. It is widely used and has a wide range of application: sweaters, socks, circular knit apparel, sportswear and children wear. Also it is used in home furnishings: blankets, area rugs, upholstery, pile, outdoor furniture and carpets. Industrial include: asbestos replacement and concrete (Xibin, 2010).

The production volume in the world textile industry in 2012 rose by 1.9% to reach 88.5 million tons. This includes increase in manmade fiber segments while natural fibers were down. Manmade fibers went up from 2011 statistics by 6.0% to reach 56.0 million tons of textile production (Engelhardt, 2013).

Africa and Middle East are emerging as important consuming regions, accounting together for about 25% of total global demand for acrylic fibers (World Acrylic Fiber: Industry report, 2013).

As for Egypt, it is well-known in the world not only for its old heritage but also for its valued presence in superior quality of textiles. According to the Egyptian Central Agency for Public Mobilization and Statistics, the total production of synthetic fibers reached 109,200 ton in 2011 and increased to 114,700 ton in 2012 (CAPMAS, 2014). The growing demand in Egypt and the Arab region is met by importing acrylic fiber from European and South East Asian countries (AFCO-EIA, 2007).

Consequently, the acrylic industry has witnessed a great development in manufacturing and exporting as well. Export of acrylic fiber from Egypt has been growing fast. Egypt is witnessing an 8-10% annual growth in acrylic production due to superior quality and services. This growth is supported by 32 spinning mills inform of many small and medium size knitters and some large size acrylic blanket manufacturers who export their high quality products to many countries (TEC, 2010).

One of the most important points addressing the acrylic fiber industry in the world is to develop an eco-friendly technology and accelerate sustainable development (Xibin, 2010). The textile industry is known to be both energy intensive and highly polluting (Rock and Angel, 2007). The production of textiles often requires high levels of energy and water consumption. The energy usage in the textile industry is inefficient, industrial processes of textile use large amounts of fuel and electricity. In the same time, it emits large quantities of pollutants to the environment (Lo *et al.*, 2012). Therefore, it is very important to optimize its energy consumption

and perform energy conservation, through the adoption of proper energy management system and also minimize its impact on the environment (Ozturk, 2005).

Therefore, more studies are needed for energy utilization and waste handling in the textile industry.