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COTTON TEXTILES FOR ELECTRICAL INSULATION

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INTRODUCTION

Since the earliest days of electrical engineering, cotton, in one form or another, has been largely used for insulation purposes. A hundred years ago Michael Faraday wound up coils of wire which he insulated with twine and calico. Cotton tapes were also used by him and other early experimenters, particularly for insulating windings such as magnet coils. They found then, as we still do now, that cotton products were readily available, strong, flexible, and most adaptable to various shapes and forms, and these outstanding features have naturally been taken advantage of for numerous difficult and intricate coverings and protections of electrical conductors and windings. From those early days the growth of the electrical industry has been very much dependent upon the successful use of cotton textiles, and they have naturally entered more and more into the construction of motors, transformers, cables, and other apparatus.

Electrical engineers have generally had to adopt, for insulating work, materials primarily produced for other purposes by various industries; this has been particularly the case with textiles, papers, ceramics—such as porcelain—varnishes, and oils. In many cases, especially in the early days, engineers had to adapt to their uses products such as tapes and fabrics, papers and pressboards, manufactured without any regard for their ultimate use in electrical apparatus, and, consequently, considerable risks were often taken or the best possible use was not made of the materials available. The increasing demands of the electrical industry have, however, gradually enabled and, to some extent, induced other manufacturing industries to consider carefully these requirements, and, as time went on, to produce materials specially suited for the severe conditions to be met. Progress is naturally very dependent upon the industry, which manufactures the materials, understanding fully the particular uses to which its products will be put by the electrical engineer, and the technical requirements involved. At the same time, it is necessary for the user to study the conditions under which his materials are manufactured so that he can have confidence in them and utilise them to the best advantage.

This paper is intended to provide those in the textile industry with a general idea of the extent to which cotton products are used as electrical insulating materials, details of the main purposes for which they are required, and information concerning the technical aspect of the properties and other features affecting the successful employment of cotton goods for such purposes.

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