

The Sizing of Artificial Silk

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Nitro, acetate, viscose, and cuprammonium silk are used for weaving, all of them products which A. Rosenberg correctly terms long fibres and which have faults more or less, that make them unsatisfactory for this purpose. On its way to the loom this still imperfect textile fibre is subjected to strain in winding, warping, beaming, and sizing. For coloured goods the yarn is sized in the hank, which has the advantage that there is less loss in winding and beaming on the cone warping machine, than when working with unsized yarn for the sizing machine. If there is not much yarn to be dealt with, it can be passed by hand through the size, but if any large quantity is being worked up it is advisable to use an automatic sizing machine with from 4 to 6 rollers, or a machine with two rollers. This mechanical treatment is not so hard on the fibres and machines of this type have recently been constructed with conspicuous success. Warps of from 10 to 30,000 yards in length are sized from the beams on the air-drying sizing machine. A number of sizing and also air-drying machines of the old type have the fault that gelatine sizes and the other sizes on the market do not penetrate the yarn perfectly, which is due partly to the nature of these products, partly to the yarn being run too rapidly through the machine, so that the sizing material on the thread falls off to some extent after drying and when being woven. Goods of this kind show in places even after finishing glossy and rough patches,

and a German and a Swiss machine works which have made a speciality of this field have built a particularly suitable air-drying sizing machine without fans which does away with these faults. Other steps also can be taken such as taking particular care in preparing the size, a point that applies to the sizing of other textile fibres also. There are still a great many weaving mills that do not have their sizing done properly by the use of practically tested and simple means, although this is one of the most important preparatory operations. Without regard to the nature of the textile fibre to be sized, it can be said that alterations intended to improve the sizing fail owing to the management often being loath to give up old methods. In many works the weaving sheds look like a flour mill and most of the starch is on and under the looms. The reason of this is that the size in the sowbox is continually kept at the boil, and if besides this there is direct steam in the box the starch and the other additions to the size will all the sooner become unusable.

The equipment necessary consists of a boiling vat of soft wood holding from 300 to 400 litres, fitted with a measuring rod showing the content from 10 to 400 litres by 10 litres at a time, a copper heating worm, indirect steam, a stirrer with 120 r. p. m., a three-inch outlet tap, fitted either on the bottom or at the lowest part of the vat in such a way that the contents can completely run off. The vat must be easy to clean and rinse out and must

be so high that an enamelled pail of 15 litres content can be set under the tap. For use with a number of sizing machines, larger vats must be employed, from which the size is led through pipes to the size troughs. Besides this three or four enamelled pails holding 15 litres, a fine sieve of brass wire, and a thermometer are also required.

None of the various preparations now on the market should be used for the preparation of a really good size, for not many of them are of any value. When different products are mixed together and allowed to stand for some time, the size is inclined to decompose and one or other of the components is rendered inactive, so that it is of advantage to purchase the very best material and mix and boil it just before use. Such basic products are farina, wheat starch, dextrin, and water-soluble oil. The starch granules must be completely broken up before being boiled, for which purpose only a high-grade diastase is suitable. This statement is not to be regarded as an advertisement for the product, but practical tests extending over years have demonstrated that Diastafor is much superior to other sizing and desizing agents, ferments, and the like. The fibre is protected and the colours are brigher. *Starch is broken up in the following way.* Farina is dissolved in cold water, dextrin and Diastafor in lukewarm water. These mixtures are added to the vat through a sieve and heated to from 55—60° C, then the steam is shut off for 10 minutes. Other additions, such as oil and weighting agents, are also added through a sieve, avoiding alkalis, and then the whole is boiled till ready. A size prepared in this way must not be boiled any more during use, but simply kept at about the temperature of the hand. Coloured and bleached yarn should even be sized at a lower temperature.

The various kinds of long fibres have been sized more or less successfully with all sorts of materials and compositions without having been able to please the weaver. Much practical experience is needed to size properly all the various types of nitro, acetate, viscose, and cuprammonium silk, because the

material, coming as it does from different artificial silk mills, is not always of the same composition. One and the same size cannot be used for all long fibre yarns, but one must be chosen which is suited to the nature of the yarn to be sized, and this causes the sizer some difficulty, and trouble.

Twisted yarns are not always suitable for a fabric of good quality, and it is of great importance to use open weft yarn for the warp. Yarn which has been really well sized offers the weaver the advantage of a fabric with a better cover and a more pliable, softer handle than with twisted yarn, which is also more expensive. The weaver also wants the yarn after having been woven to have its original lustre and softness, and the colours must not be cloudy. It must be possible completely to desize goods which have been dyed in the piece and aftertreated. It has not yet been possible to produce an artificial silk yarn which could be woven perfectly after having been sized with preparations containing gelatine, ferments, and the like. This can readily be understood, because these products have not the property of penetrating the fibre thoroughly. As already mentioned, careful practical and scientific investigations have shown that Diastafor of a certain high capacity of a light colour is best suited to reduce the hygroscopicity of the long fibres and sizes them well by the action of the maltose together with a certain oil emulsion, so that it is practically impossible for the thread to become fuzzy. The thread can be made stiffer or more pliable just as the weaver would like to have it by properly regulating the additions made to the size.

The purpose of these lines is to give a few hints derived from practical experience upon the sizing of artificial silk, which is not yet perfectly understood. Practical tests will be further carried on in an experimental station in Vienna with all materials at disposal and with the assistance of high authorities in this field of investigation. Any inquiries will be answered and tests carried out with samples of yarn sent. The address may be had from the Editor.