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INFLUENCE OF SHEETING UPON THE HEAT-RETAINING PROPERTIES OF BLANKETS

The influence of sheeting upon the heat-retaining properties of blankets has been studied at the Bureau of Standards in connection with the investigation of the comforting value of blankets and other textile materials. Previous studies have shown that the arrangement of the fibers in the material is the most important factor influencing the ability of the fabric to retain heat. The question naturally arose as to how this might be influenced by placing a more closely woven material over the blanket. Cotton bed sheeting was selected for the experiments, since it is used to some extent for this purpose in households, and it was believed that results obtained would be comparable with other types of spreads and coverings.

The following table shows the results of tests on seven blankets, both the original thermal resistance (R) (see footnote) and the per cent increase in thermal resistance (I) brought about by the addition of a single layer of sheeting over one side of the blanket.

Results of Tests

Specimen No.	(R)	(I)
		per cent
1.....	1110	5
3.....	1090	10
3.....	980	16
4.....	1350	17
5.....	850	18
6.....	790	23
7.....	1080	27

The thermal resistance of the more closely woven blankets was less affected by the layer of sheeting than that of blankets of loose weave and high nap. For instance, specimens Nos.1 and 7 originally had approximately the same thermal resistance, yet after placing a layer of sheeting over the specimens it was found that the thermal resistance of No.7 increased 27 per cent and No.1 only 5 per cent. No.1 was more closely woven than No.7. This result is quite in accord with the proposition that the heat retaining qualities of textile materials depend

largely on the still air enmeshed within their structure.

The user of blankets will find that sheeting or similarly closely woven materials may profitably be used as a covering for blankets and that such procedure is most effective in the case of blankets of loose low-density construction.

It should be pointed out that the experiments, following the usual procedure, were carried out in still air, and hence correspond closely to the actual case of indoor use. The presence of air currents would doubtless influence the results, but under such conditions the effect of the layer of sheeting should be even more marked.

Note:

Refer to Bureau of Standards Technologic Papers Nos. 366 and 369 for method. The values of (R) in the above table are expressed in degrees c/cal. per 1000 sq. cm per sec. but are not to be compared with the values given in the technologic paper for the following reason. In the formula $R = \frac{T_1 - T_2}{H}$, T_2 was originally taken as the temperature of a thermal junction located at the exterior surface of the test fabric. In computing the above data, however, the temperature of the surrounding air in the room was used as T_2. This change was necessary because the contrasting nature of the blanket and sheeting surfaces rendered the corresponding values of (R), as originally computed, incomparable. It is thought, moreover, that the heat-retaining performance of a blanket in service is most directly expressed in terms of the total temperature drop between the body to be kept warm and the surrounding atmosphere which tends to cool it, regardless of the intermediate local temperatures.