

FINN

FILL

T H E R M A L

I N S U L A T I O N

**A superior new thermal insulator for clothing
which retains its warmth from wash to wash**

A NEW TYPE OF THERMAL INSULATOR – A RESULT OF THE WORLD'S LEADING RESEARCH AND DEVELOPMENT WORK.

When new, most of the nonwoven insulation materials on the market perform satisfactorily. But they are not designed to stand up to laundering. Washing may flatten the material and even disintegrate it. With every wash, nonwoven insulation materials also lose some of their warmth retention. After five washes, nonwoven insulators may have lost as much as 30% of their thermal insulation.

The solution to these problems is Finnfill, the ultimate in thermal insulation. The following features make Finnfill unique:

Ease of care. The product's thermal insulation remains constant after washing cycles and can even improve after dry-cleaning cycles (P).

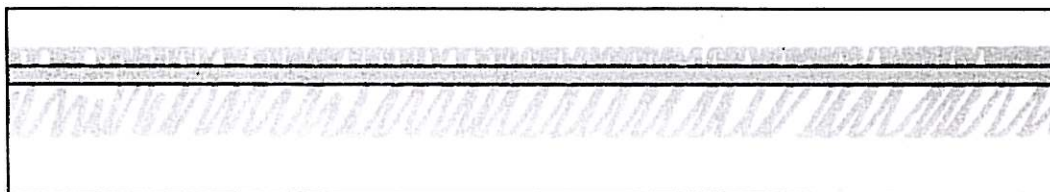
Efficient thermal insulation. The innovative structure and very high air space of Finnfill make this material the ultimate in warmth.

Excellent draping qualities. Finnfill has excellent draping qualities, making for comfort and ease of movement.

Easy to process. Finnfill is easy to process in garment manufacturing, and thus provides new opportunities for the garment designer.

Price. Finnfill is substantially more economical than competing microfibre insulators.

Finnfill insulation material was developed by the Finnish company Finnpile Oy, which is Europe's leading manufacturer of synthetic fur fabrics. Product development has been carried out in cooperation with the world's top research institutes as well as with leading polymer producers and garment manufacturers.

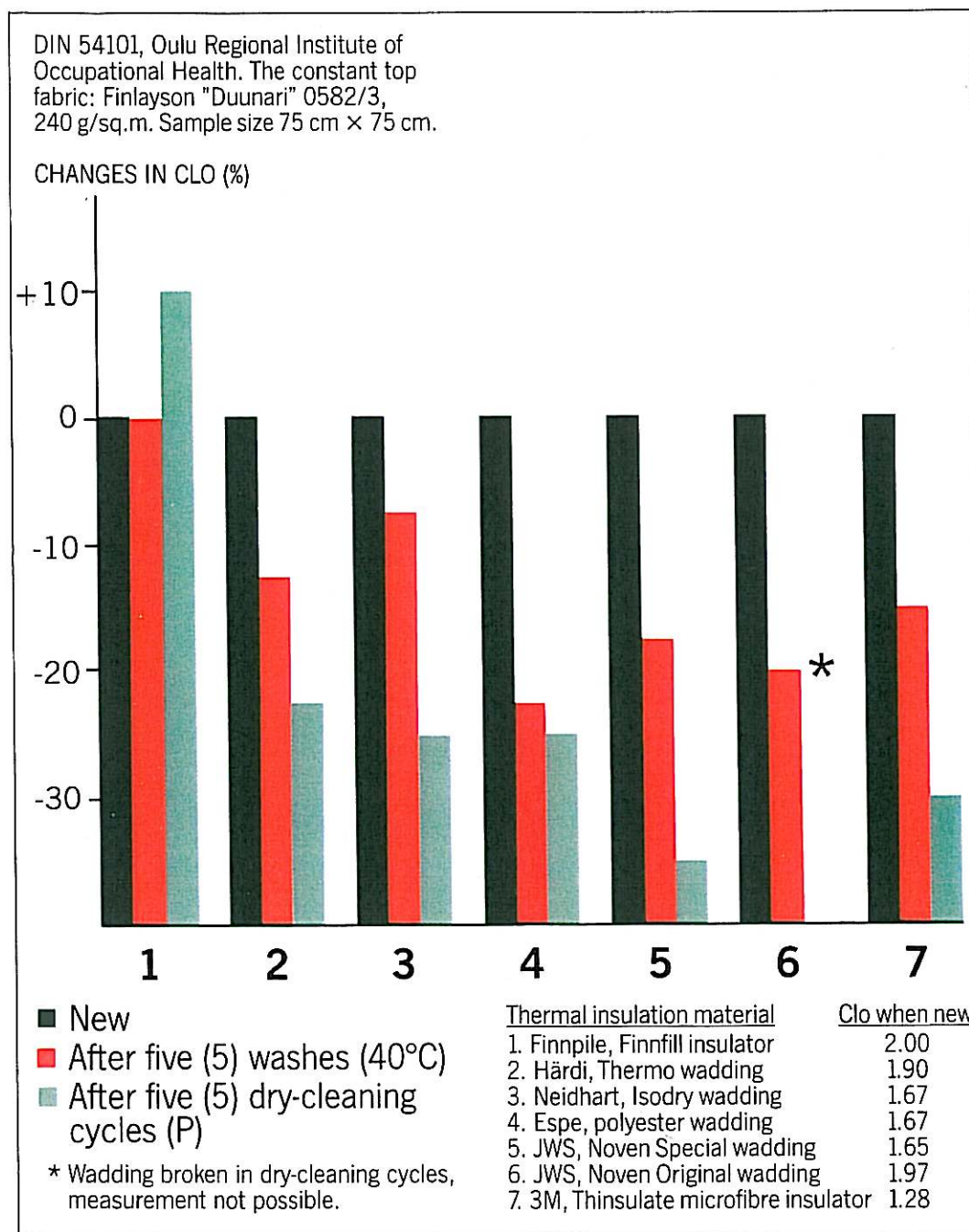


Unique structure.

The bonding element of the Finnfill insulator is located in the middle of the structure, resulting in a pliable, lightweight material. This is a significant difference between Finnfill and other fibrefills, in which the bonding element may be on the top or on the bottom surfaces of the product.

FINNFILL RETAINS ITS THERMAL INSULATION PROPERTIES.

The following diagram illustrates the changes in the thermal insulation of various insulating materials after laundering. Without exception, the thermal insulation of fibrefills (the clo value) decreases after washing. After five washes, the insulation of Finnfill is unchanged, and after five dry-cleaning cycles it has increased by 10%.



INFRARED PHOTOGRAPHY REVEALS HEAT LOSSES THROUGH DIFFERENT TEXTILE INSULATORS.

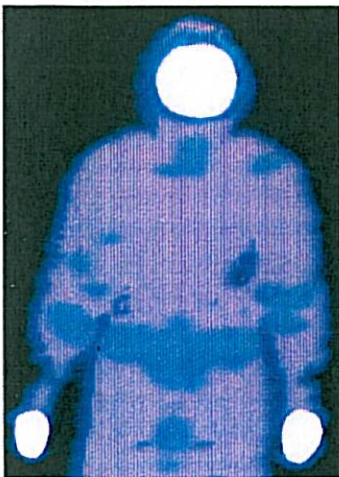
Infrared photography, or thermography, is an ideal technique for studying the heat flows from the human body through the clothing to the cold environment. The following pictures demonstrate the cold protection properties of three different insulators, Finnfill, Espe polyester wadding and Thinsulate microfibre insulator (3M). The top pictures were taken when the garments – all of the same design – were new. The pictures below were taken after five washes at 40°C.

The shades of the pictures illustrate the sites and amount of heat loss (see scale). These pictures confirm other research results indicating Finnfill's superior stability during laundering. In contrast to the other materials, heat is not lost through Finnfill, even after laundering.

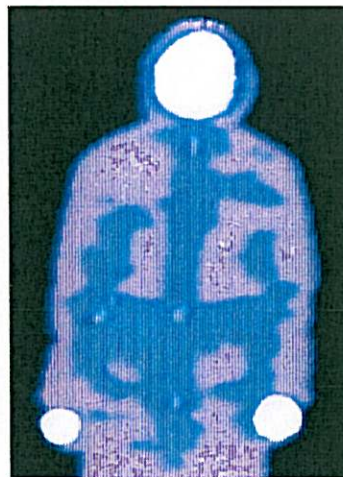
Finnfill insulator

Espe polyester wadding

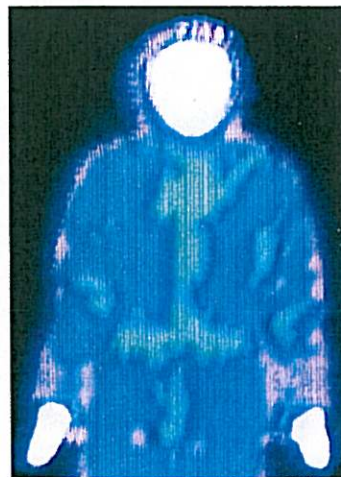
Thinsulate insulator



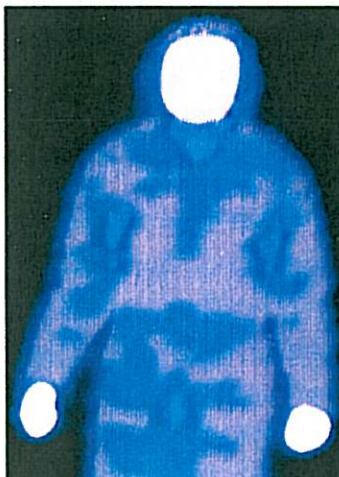
■ New



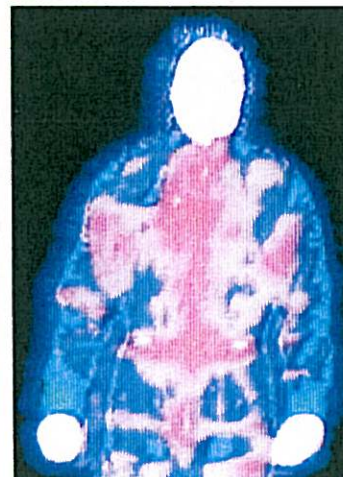
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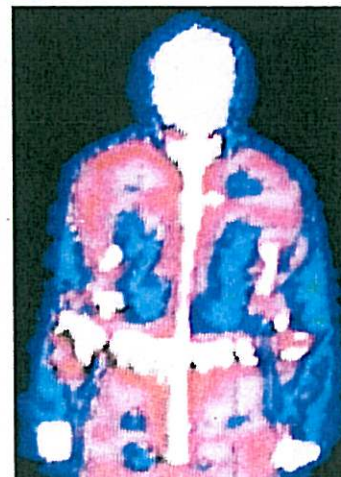
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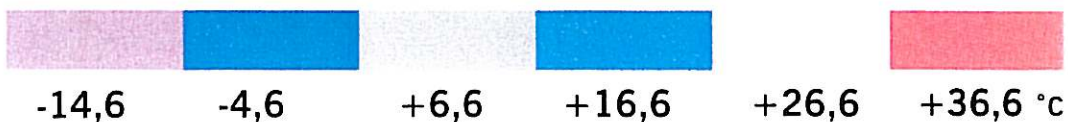
■ After five washes (40°C)



■ After five washes (40°C)



■ After five washes (40°C)



The heat measurements were made in Tampere, Finland on August 31, 1988.
The ambient temperature was -23°C.