

# Type FX

STRETCH

## Product Description

3M™ Thinsulate™ Stretch Insulation (Type FX) utilizes a blend of unique elastomeric fine olefin fibers and larger staple fibers to impart a four directional stretch of up to 40%. The product is designed for use in applications where stretch and recovery are important.

- “Four-way” stretch
- Breathable
- Moisture-resistant
- Washed or dry-cleaned depending on individual manufacturers’ recommendations

## Intended Uses

Outerwear, sportswear, gloves and accessories.

Some 3M™ Thinsulate™ Insulation products are compliant under the Berry Amendment. Please work with your Sales Representative to obtain formal Berry certification for the items of interest.

## Fiber Composition

### U.S. Convention:

*Insulation:*  
65% Olefin  
35% Polyester

### ISO Convention:

*Insulation:*  
65% polyethylene  
35% polyester

## Flammability

Class 1 — Normal Flammability per procedure in 16 CFR Part 1610, Federal Flammable Fabrics Act.

## Warmth While Damp

Retains most of its insulating ability even under damp conditions. Individual fibers absorb less than 1% by weight of water. Easily dried.

## Restricted Substances

3M™ Thinsulate™ Stretch Insulation (Type FX) meets the harmful substances requirements of OEKO-TEX® Standard 100 and has been awarded the OEKO-TEX® Certificate for Product Class 1 by Hohenstein Institutes (meets the human-ecological requirements of the standard presently established for baby articles).



## Available Widths

60" (1.52 m) roll width (nominal) with a 2" (5.1 cm) or 3" (7.6 cm) inside diameter core.

## Properties

Typical Values*	3M™ Thinsulate™ Stretch Insulation (Type FX)						
	Basis Weight		Thickness ASTM D 5736 @ 0.002 psi		Thermal Resistance (R <sub>ct</sub> ) ASTM F 1868		
	g/m <sup>2</sup>	oz/yd <sup>2</sup>	cm	inch	clo	R-value	m <sup>2</sup> °K/W
FX40	43	1.3	0.32	0.12	0.6	0.5	0.09
FX70	74	2.2	0.50	0.20	0.8	0.7	0.12
FX100	105	3.1	0.55	0.22	0.9	0.8	0.14

\* Values represent the averages of the population of lots at date of publication

$$\text{Clo (R}_{ct}) = \frac{(0.18 \text{ °C} \times \text{m}^2 \times \text{hr})}{\text{K cal}} \quad \text{R-value} = \frac{(\text{hr} \times \text{ft}^2 \times \text{°F})}{\text{BTU}}$$

## Construction Guidelines

### GENERAL MANUFACTURING GUIDELINES

3M™ Thinsulate™ Insulation products need to be properly used in order to produce their intended benefits in apparel and related articles. For this reason, specifiers, garment manufacturers and converters need to abide by the construction guidelines and care instructions in this Technical Data Sheet, as well as by the proper end-article placement and coverage guidelines in the *Product Usage Requirements (PUR)* brochure. It is primarily the garment manufacturer's/designer's responsibility to assure their end customers' satisfaction by:

1. Selecting appropriate shell and lining fabrics, including findings and recommended scrims for the intended application.
2. Following the construction guidelines supplied by 3M for the design and manufacture of each garment.
3. Determination of the proper care instructions (taking into account 3M recommended care instructions) and creation of the appropriate label to be sewn into each garment.

### GENERAL FABRIC RECOMMENDATIONS

The 3M™ Thinsulate™ Insulation family of products does not require downproof fabrics in most instances. However, when using 3M™ Thinsulate™ Insulation with fabrics that are not downproof, the potential for fiber migration should be determined.

- Fiber migration due to wash durability can be detected by sewing a pillow of the garment components — following the construction guidelines — and washing it five times as recommended. Observe the fabric surface for protruding fiber ends.
- Fiber migration caused by other mechanisms can be assessed by submitting fabric samples to the 3M laboratory through 3M sales representatives.

The use of fiberproof scrims to separate the insulation from textured shell or lining fabrics, coated, micro-coated, or waterproof breathable fabrics is required when needed to prevent fiber migration. This can be accomplished by adding scrim(s) during the garment construction process when necessary.

When using coated, micro-coated, or waterproof breathable fabrics, the durability of the insulation is decreased because of surface friction and because water cannot be flushed through the garment and an intervening layer of scrim should be used against such fabrics. Durability may also be enhanced by providing a means via openings or vents at the bottom of a garment through which water can be easily expelled to minimize stress on the insulation during agitation and water extraction.

### CONSTRUCTION GUIDELINES FOR GARMENTS

Allow 24 hours for recovery of 3M™ Thinsulate™ Stretch Insulation (Type FX) after removal from packaging.

3M™ Thinsulate™ Stretch Insulation (Type FX) should be laminated; Quilted applications are not recommended.

Single pass laminated constructions may be used in applications up to 12" × 18". Dual pass laminated constructions (tri-laminates) may be used in applications up to 22" × 22". Please consult your 3M sales representative for constructions outside these recommendations.

### GUIDELINES FOR THE LAMINATING AND PROCESSING OF 3M™ THINSULATE™ STRETCH INSULATION (TYPE FX)

3M™ Thinsulate™ Stretch Insulation (Type FX) is a unique elastomeric insulation which provides stretch and recovery in addition to warmth. This makes it ideal for activewear and handwear applications which may call for lamination of the insulation to stretchable, flexible shell fabrics and linings.

To provide the recovery properties necessary for compatibility with stretchy, flexible fabrics, a low-melt temperature component has been incorporated into the 3M™ Thinsulate™ Stretch Insulation (Type FX) product. Therefore, anyone using high temperature processes should be aware of the temperature sensitivity of 3M™ Thinsulate™ Stretch Insulation (Type FX).

It is important to retain the initial warmth and elastomeric properties of 3M™ Thinsulate™ Stretch Insulation (Type FX). Typically, other 3M™ Thinsulate™ Insulation products have melt temperatures falling between 150-170 °C (302-338 °F). In contrast, 3M™ Thinsulate™ Stretch Insulation (Type FX) has a melt temperature of 98 °C (208 °F). Thus, the melting point of 3M™ Thinsulate™ Stretch Insulation (Type FX) is approximately 52 °C (94 °F) lower than other 3M™ Thinsulate™ Insulation products. Exposure to excessive heat will result in loss of properties and noticeable stiffness. Thus, lamination and/or manufacturing processes should be adjusted accordingly and monitored to achieve optimum results.

3M™ Thinsulate™ Stretch Insulation (Type FX) has been successfully laminated to stretch fabrics including fleece, tricot, stretch wovens, and spandex blends using either traditional water-based, hot-melt, solvent-based or flame lamination processes. Successful laminations have been performed at processing temperatures of 80-85 °C (176-185 °F). This includes both single and double pass lamination processes. 3M™ Thinsulate™ Stretch Insulation (Type FX) should not be placed in direct contact with any heated process surface. Instead, place the other lamination substrate (fleece, spandex, tricot, etc.) between the insulation and the processing equipment. This will help reduce the effects of high temperatures on the insulation. Wash durable, water-based adhesives are recommended; other adhesives have also been found successful.

**NB: For details pertaining to proper placement in apparel, gloves or other accessories, please consult the brochure: *Product Usage Requirements (PUR)*.**

For questions, contact 3M Home Care Customer Service at 651-575-6694.

**CAUTION**

To reduce the inhalation of fibers or airborne dust, always use an appropriate respirator when the cutting or processing of rolls is expected to produce fibrous or airborne dust.

## Care Instructions



Garments made with 3M™ Thinsulate™ Stretch Insulation (Type FX) may be home machine washed or professionally dry-cleaned depending on the garment manufacturer's recommendation. Care instructions from the garment manufacturer need to be followed to ensure integrity of the overall garment.

### INSTRUCTIONS FOR: MACHINE WASH ONLY GARMENTS:

+ Machine wash warm (40 °C, 105 °F), delicate cycle. Use only non-chlorine bleach when needed. Tumble dry, low heat. Do not steam press. Steam only. Do not iron.

### DRY-CLEAN ONLY GARMENTS:

+ Professionally dry-clean only. Tumble dry, low heat. Do not steam press. Steam only. Do not iron.

### WASH OR DRY-CLEAN GARMENTS:

+ Machine wash warm (40 °C, 105 °F), delicate cycle. Use only non-chlorine bleach when needed. Tumble dry, low heat. Do not steam press. Steam only or professionally dry-clean. Do not iron.

**IMPORTANT NOTICE**

**WARRANTY:** In the event any 3M™ Thinsulate™ Insulation product is found to be defective in material, workmanship or not in conformance with any express warranty for a specific purpose, 3M's only obligation and your exclusive remedy shall be to repair, replace or refund the purchase price of such parts or products upon timely notification thereof and substantiation that the product has been stored, maintained and used in accordance with 3M's written instructions.

**EXCLUSIONS TO WARRANTY: THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY OR CONDITION OF QUALITY, EXCEPT OF TITLE AND AGAINST PATENT INFRINGEMENT.**

**LIMITATION OF LIABILITY:** Except as provided above, 3M shall not be liable or responsible for any loss or damage, whether direct, indirect, incidental, special or consequential, arising out of the sale, use or misuse of 3M™ Thinsulate™ Insulation products or the user's inability to use such products. **THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.**

3M's general terms and conditions also apply to the sale of this product.

3M may change the product, specifications and availability of the product as improvements are made: therefore, user should contact 3M for latest information before specifying the product.

All 3M™ Thinsulate™ Insulation rolls and 3M™ Thinsulate™ Featherless Insulation bags are produced within strict dimensional and weight tolerance specifications. However, changes in environment and other factors may cause the final dimensions and/or bag weights to shift, shrink, or otherwise change up to a maximum of ±4% during handling or shipment.

Please allow products to recover 24 hours after vacuum pack is removed.

**Home Care Division**

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