

Introduction to Textile Fabrics

Knitting

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KNITTED FABRIC STRUCTUES

- There are two main industrial categories of machine knitting : **warp knitting** and **weft knitting**. Fabrics in both these categories consist essentially of a series of interlinked loops of yarn.



Warp Knit



Weft Knit

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WARP KNITTING (經織)

- **Warp knitting** is the process of making a fabric in which the loops form in a vertical or warpwise direction; the yarn is prepared as warp on beams with one or more yarns for each needle. The fabric has a flatter, closer, less elastic knit than weft knit and is very often run resistant.

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WEFT KNITTING (緯織)

- **Weft knitting** is the most common type of knitting, it is the process of making a fabric by forming a series of connected loops in a horizontal or filling-wise direction; produced on both flat and circular knitting machines.
- Most of the sweaters, cardigans, and other knitted outerwear are weft knitted “fashioned” garments, produced with a minimum of linking from shaped, generally flat garment pieces.

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INTRODUCTION TO (WEFT) KNITTING (1)

- Knitting is a method of constructing fabric by intermeshing series of loops of one or more yarns.
- Knitted fabric is unique in that it possesses a high order of elasticity and recovery. It can be stretched to a considerable length and yet will gradually return to its original shape or conformation. It is this feature of the fabric, plus its air permeability arising from its looped structure, that imparts to it such desirable and appealing properties from the consumer's point of view as:

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INTRODUCTION TO (WEFT) KNITTING (2)

- (a) A diversity of constructions, and the variety of fibres and finishes available.
- (b) Generally soft and light weight.
- (c) Good drapability. Knitted fabrics conform to the figure without constricting the wearer.
- (d) A high order of wrinkle resistance. Creases in knitted fabric brush right out.
- (e) Comfort. The knitted structure is porous. It allows the skin to breathe freely. Its elasticity permits greater freedom of body movements
- (f) Ease of care. Knitted apparel launders without difficulty.

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Principle of Knitting

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PRINCIPLE OF KNITTING

- LOOP AND STITCH

The *loop* is the fundamental element of all knitted fabrics. It is a basic unit consisting of a loop of yarn meshed at its base with previously formed basic units (stitches). Components of a knitting loop are the needle loop and the sinker loop.

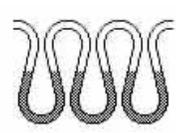
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LOOP

- A *needle loop* is one which has been drawn through a previous loop.



- A *sinker loop* is one which connects adjacent needle loops.



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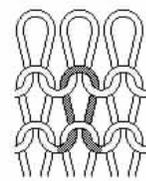
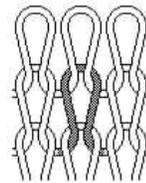
STITCH

- The *stitch* is the smallest dimensionally stable unit of all knitted fabrics. It consists of a yarn loop, which is held together by being intermeshed with another stitch or other loops. There are three basic knitted stitches : KNIT, TUCK and MISS (float or non-knit) which form the starting point for the entire range of weft knitted structure.

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KNIT AND PURL

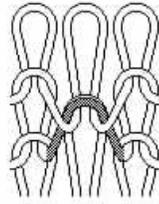
- Knit stitch (technical face) is of V-shape appearance where the shanks are above, and the feet are below the head of the preceding stitch.
- Purl stitch (technical back) is of the semi-circle appearance where the legs are below, and the feet are above the head of the preceding stitch.



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TUCK

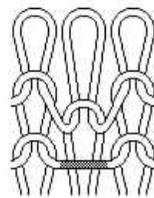
- Tuck stitch is made when a needle rises to take a new loop without casting off the old. It consists of a held loop and a tuck loop, both of which are intermeshed in the same course.



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MISS (NON-KNIT)

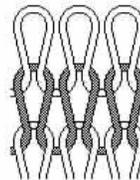
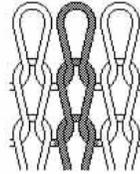
- A length of yarn not received by a needle and connecting two loops of the same course that are not in adjacent wales.



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WALE AND COURSE

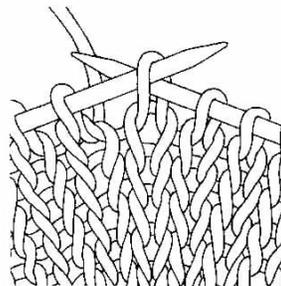
- The series of loops that intermesh in a vertical direction are known as 'Wale'.
- The loops that are inter-connected widthwise are known as 'Course'. (one traverse is equal to two courses.)



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KNITTING METHOD

- Knitting was originally done by hand on straight or round needles by slipping stitches from one needle to the other and making a new stitch with each change. Hand pins of wood or plastic are used for hand knitting and crochet.



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Knitting Methods

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KNITTING METHOD

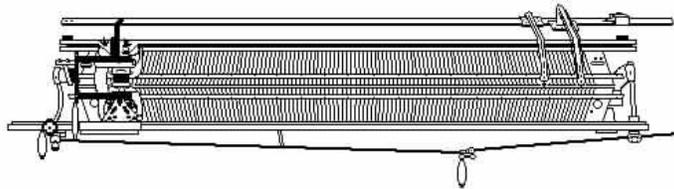
While hand knitting continues, the main commercial product now is turned out by machine.

- Knitting Machine - *V-bed flat machine (扁機)*
The latch needles, mounted in beds opposed in an inverted "V" formation, are operated by cams in a reciprocating carriage. Machines are built with E1½ - E18 (needles / inch), in several cm (for rib trims) to about 210 cm. The V-bed flat machine is probably one of the most versatile machines for the production of knitwear.

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HAND FLAT MACHINE

- Hand operated machines were not expensive and could be found in many developed countries around the world. Great skills were developed by the knitters and soon small businesses flourished



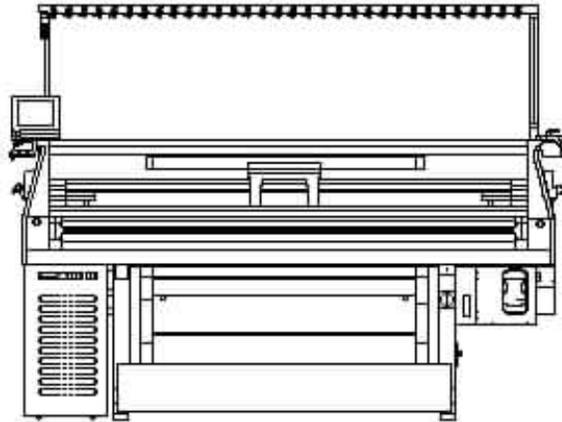
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ELECTRONIC FLAT MACHINE

- Because of the almost unlimited patterning scope available with electronic flat machines, considerable numbers are used for the production of patterned fabrics and garment lengths and some models are being offered with full fashioning capability.

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ELECTRONIC FLAT MACHINE

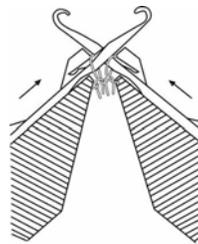
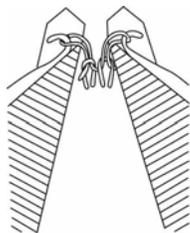


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FORMATION OF KNIT STITCH

(1) Start position

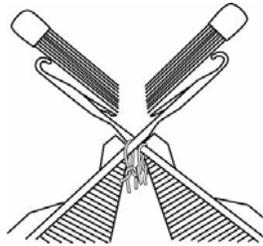
(2) Clearing



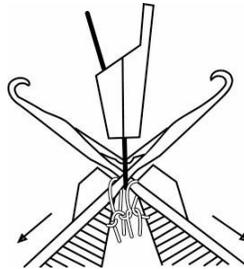
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FORMATION OF KNIT STITCH

(3) Latch opening



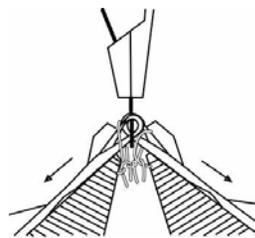
(4) Feeding



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FORMATION OF KNIT STITCH

(5) Drawing



(6) Knock over

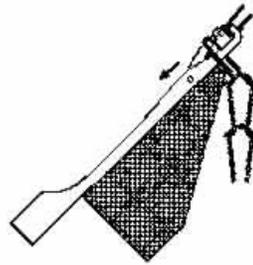


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FORMATION OF TUCK STITCH

- *Tuck on latch*

The formation of tuck stitch on a machine which is not equipped with movable upper clearing or tuck cams is only possible by raising the stitch cam. This prevents knocking over taking place and is known as 'tucking on latch'.

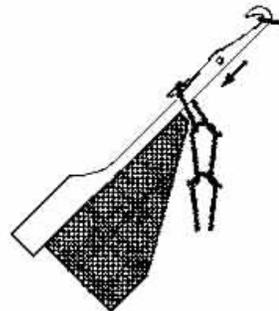


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FORMATION OF TUCK STITCH

- *Tuck on hook*

A tuck stitch is formed on a machine equipped with movable upper clearing or tuck cams by withdrawing the tuck cams and preventing the needles from being raised to the clearing position. This is a safer way of forming tuck stitches, and is known as 'tucking in the hook'.



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Discussion

- What are warp and weft knitting
- Discuss the formation of Knit, Tuck and Miss stitches
- What are wale and course in knitting