纺织高等教育教材

针织英语

（第二版）

ZhenZhi YingYu

刘正芹 汪黎明 等 ◎ 编著

中国纺织出版社

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内 容 提 要

本书以针织用纱线、纬编、经编、织袜、成衣、针织品后整理等内容为框架，系统地介绍了针织的基本理论知识，针织生产设备、工艺与产品质量控制等内容，同时，还概括地介绍了针织品后整理、针织服装设计与生产、针织品贸易等方面的内容。书中每篇课文后都附有生词、重点句注释以及相关思考题，可供学生练习使用。书后附有总词汇表，便于查阅。

本书可作为纺织院校针织及相关专业的专业英语教材，也可作为针织企业或从事针织品商贸、检验及管理人员参考用书。

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第一版前言

随着我国针织工业的飞速发展，新设备、新技术、新产品的国际交流日趋频繁，产品的进出口贸易不断扩大，作为纺织学科的高等院校迫切需要提高针织专业学生的专业外语水平，以适应国家经济建设的高速发展，并且从事针织生产、检验、贸易等方面的技术与管理人员也迫切需要掌握一定水平的专业外语知识，从而更好地完成本职工作。为此受中国纺织出版社的委托，并经纺织高教委员会针织专业委员会讨论，由我校组织了长期从事专业教学的同志，根据社会需求，参考国内同类相关专业外语教学的经验，并结合我校多年来专业外语教学的体会，编写了《针织英语》一书。本书在内容的选择和安排上力求系统、全面，并兼顾教学与自学的特点，不仅适合作为针织专业学生的课堂教学用书，而且还可作为从事针织生产、商贸、检验等方面技术与管理人员的自学参考用书。

本书主编人员为青岛大学纺织服装学院汪黎明、王秋美、刘正芹、李显波、韩光亭。并由汪黎明作最后统稿。在本书的编写与修改过程中，得到了中国纺织大学金玉燕教授、陈南樑副教授的大力支持，同时承蒙中国纺织出版社刘士弢同志仔细审阅和指导，特此致谢。

由于编者水平有限，错误和缺点在所难免，欢迎读者批评指正。

编　者

1997 年 5 月于青岛

第二版前言

《针织英语》(第一版)于1997年出版以来,一直深受读者欢迎。随着我国针织工业的国际交往不断扩大、对外工程技术合作和国际贸易的飞速发展,新技术、新设备、新产品不断涌现,第一版的《针织英语》已不能适应新时期的发展需求。为了精益求精,跟踪国内外针织科技发展的动向,满足纺织院校针织专业师生的要求,编著者再次组织长期从事针织专业教学工作的同志,在第一版的基础上,以原版教材和杂志为素材,进行了大幅修订。《针织英语》(第二版)主要适用于纺织院校针织及相关专业的专业英语教学。书中涵盖了针织用纱线、经编、纬编、织袜、成衣、针织品后整理、针织服装设计与生产、针织品贸易等内容,包括了针织行业常用的基本词汇。

与第一版相比,本书内容更系统、全面,因此更适合学生对专业英语的需求。

本书编写人员为刘正芹、汪黎明、谭磊、杨晓、赵澍。

本书在编写过程中,得到了浙江纺织服装职业技术学院刘立华、河南纺织高等专科学校张一平、成都纺织高等专科学校、南通纺织职业技术学院相关教师的支持和帮助,在此一并表示感谢。

本书由刘正芹、汪黎明最后统稿,由天津工业大学杨昆审稿。

因编者水平有限,错误和缺点在所难免,欢迎读者批评指正。

编　者

2007年3月于青岛大学

目　　录

Lesson One　Knitting Yarns …… (*1*)

Lesson Two　Packages and Winding …… (*5*)

Lesson Three　Basic Knowledge of Weft Knitting (1) …… (*8*)

Lesson Four　Basic Knowledge of Weft Knitting (2) …… (*11*)

Lesson Five　The Knitting Elements …… (*14*)

Lesson Six　Loop Formation and Gauge …… (*19*)

Lesson Seven　Circular Jersey Latch Needle Machine …… (*22*)

Lesson Eight　Flat Machines …… (*25*)

Lesson Nine　The Weft Knitted Base Structures (1) …… (*29*)

Lesson Ten　The Weft Knitted Base Structures (2) …… (*33*)

Lesson Eleven　Tuck and Cardigan Stitches …… (*37*)

Lesson Twelve　Jacquard, Accordion and Float Stitches …… (*41*)

Lesson Thirteen　Plating, Laying-in and Plush Stitches …… (*45*)

Lesson Fourteen　Other Fancy Stitches in Weft Knitting …… (*50*)

Lesson Fifteen　Weft Knitting Machine Adjustments (1) …… (*54*)

Lesson Sixteen　Weft Knitting Machine Adjustments (2) …… (*58*)

Lesson Seventeen　Pattern and Selection Devices …… (*61*)

Lesson Eighteen　Aspects of Knitting Science …… (*65*)

Lesson Nineteen　Basic Knowledge of Warp Knitting …… (*69*)

Lesson Twenty　Warping …… (*73*)

Lesson Twenty-one　Compound Needle Tricot Knitting Machine …… (*77*)

Lesson Twenty-two　Bearded Needle Tricot Machine and Double-needle-bar Raschel Machine …… (*81*)

Lesson Twenty-three　Guide Bar Shogging Mechanism …… (*85*)

Lesson Twenty-four　Fabric Quality Control …… (*89*)

Lesson Twenty-five　Basic Designing Knowledge …… (*93*)

Lesson Twenty-six　Basic Lapping Movement …… (*96*)

Lesson Twenty-seven　Two-bar Plain Fabrics …… (*101*)

Lesson Twenty-eight Miss-lapping and Openwork Structures …… (*105*)
Lesson Twenty-nine Laying-in and Fall-plate Technique …… (*109*)
Lesson Thirty Pile Fabrics …… (*114*)
Lesson Thirty-one Jacquard Technique …… (*118*)
Lesson Thirty-two Analysis of Tricot Fabrics …… (*122*)
Lesson Thirty-three Technical Textiles …… (*126*)
Lesson Thirty-four Electronics in Warp Knitting …… (*129*)
Lesson Thirty-five Standards and Specifications for Hosiery …… (*133*)
Lesson Thirty-six Production of Heels and Toes …… (*136*)
Lesson Thirty-seven Knitting of the Fashioned Garment Piece …… (*139*)
Lesson Thirty-eight Scouring and Bleaching …… (*142*)
Lesson Thirty-nine Carbonizing, Singeing, Mercerization and Heat Setting …… (*145*)
Lesson Forty Fabric Dyeing …… (*149*)
Lesson Forty-one Printing Processes …… (*153*)
Lesson Forty-two Finishing …… (*157*)
Lesson Forty-three Anti-pilling Finishes and Antistatic Finishes …… (*161*)
Lesson Forty-four Other Functional Finishes …… (*164*)
Lesson Forty-five Textiles and the Environment, Health, and Safety …… (*167*)
Lesson Forty-six Knitted Garments (1) …… (*172*)
Lesson Forty-seven Knitted Garments (2) …… (*177*)
Lesson Forty-eight Fashion Style and Design …… (*181*)
Lesson Forty-nine Cut Stitch-shaped Garments …… (*184*)
Lesson Fifty Cutting …… (*187*)
Lesson Fifty-one Stitch Geometry …… (*190*)
Lesson Fifty-two Seams and Seaming …… (*196*)
Lesson Fifty-three Machinery for Seaming Knitted Garments …… (*201*)
Lesson Fifty-four Stitch Formation (1) …… (*206*)
Lesson Fifty-five Stitch Formation (2) …… (*209*)
Lesson Fifty-six Clothing Technology (1) …… (*214*)
Lesson Fifty-seven Clothing Technology (2) …… (*218*)
Lesson Fifty-eight Quality Control of Knitted Garments …… (*222*)
Lesson Fifty-nine Order …… (*226*)
Lesson Sixty Asking for Permission to Go Directly to Mills and Check on Production …… (*231*)

Lesson Sixty-one　Refusal to Pay Bills Because of Gloves Being Small …… (*234*)
Lesson Sixty-two　Requesting the Sellers to Make Counter-Samples According to the Supplied Samples …… (*237*)
Vocabulary …… (*240*)
References …… (*253*)

Lesson One

Knitting Yarns

Yarns are the raw materials manipulated during knitting, a yarn is defined as "an assembly of substantial length and relatively small crosssection of fibres or filaments with or without twist". The term thread is loosely used in place of yarn and does not imply that it is as smooth, highly twisted and compact as a sewing thread.

Yarn may be composed of one or more continuous filaments or of many noncontinuous and rather short fibers (staple). To overcome fiber slippage and to be formed into a functional yarn, staple fibers are usually given a great amount of twist or entanglement. Yarns made from staple fiber are often referred to as spun yarns. Two or more single yarns can be twisted together to form ply or plied yarns. Plied yarns can be further twisted into various multiples. Combination yarns are plies of dissimilar components such as staple and continuous-filament yarns. Through subsequent processing of a chemical or mechanical nature, basic staple or continuous-filament yarns can acquire substantially different structural features that can dramatically change the appearance and functional performance of the original yarns.

In the manufacture of man-made filaments, a solution is forced through very fine holes of a spinneret, at which point the solution solidifies by coagulation, evaporation, or cooling. Usually the number of holes in the spinneret determines the number of filaments in the yarn. Also, the size of each hole and the amount of drawing, if any, determine the diameter of each filament. As the individual filaments solidify, they are brought together with or without slight twist or entanglement to form a continuous-filament yarn.

If the filaments are to be processed on a staple yarn system, several thousand are brought together into a twistless linear assemblage known as tow, for subsequent crimping and cutting. One of the advanteges of the man-made fibers is the control that it is possible to exercise over each step of the production process. Fibers can be tailored to fit a wide variety of end-uses that require physical or chemical properties not found in the parent fiber or in the natural fibers.

Continuous-filament yarns in fabric form usually have excellent strength and uniformity. As indicated by the fine monofilament and multifilament yarns that have found commercial acceptance, continuous-filament yarns can be made much finer in linear density and diameter than staple yarns. In an untextured form, however, continuous-filament yarns are not thought to possess a combination of good covering power, tactile qualities, comfort, and a pleasing appearance, except for limited apparel applications such as sheer hosiery and lingerie.

The introduction of synthetic fibers which can be heat set in a permanent configuration has

led to the development of texturing processes which directly convert these filaments into bulked yarns thus by-passing the staple fiber spinning process. During texturing, the filaments are disturbed from their parallel formation and are permanently set in configurations such as crimps or coils which help to entrap pockets of air and confer properties such as bulkiness, soft handle, porosity, drape, cover, opacity and if necessary elasticity, to the resultant yarn. Examples of yarns of this type include false twist nylon and Crimplene which is a registered trade name for a technique whereby the properties of the textured polyester yarn are modified during a second heat setting operation so that the stitch clarity, handle and stability of the fabric is improved.

To properly describe a specific yarn for communicative purposes, a great deal of information is required. First, the fiber content must be identified generically, and in the case of a blend, by proportion of the total weight of the yarn. The physical properties of the constituent fibers (fiber length, fineness, crimp, cross-sectional shape, delusterant, etc.) should be described also. Second, the yarn constructional features (staple or continuous filament; singles, ply or combination) should be indicated. In the case of a stretch or a bulky yarn the technique for texturizing should be made clear. Third, the linear density of the yarn should be expressed. If the yarn is a ply or combination yarn, the linear densities of the individual components and of the resulting structure should be stated. Furthermore, twist direction and frequency should be identified in singles yarn and in the individual components in the case of ply yarn. Certain performance characteristics should also be given. Whereas indications of strength and breaking extension might be appropriate for some yarn, industrial and special end-use yarns would require much more information relative to mechanical and chemical properties. Staple yarns usually require an expression of the evenness and appearance of the structure. Finally, it should be realized that the yarns that are dyed or finished before conversion into fabric or textile products require considerably more stated specifications in a description than do unfinished (greige) yarns.

Knitting requires a relatively fine, smooth, strong yarn with good elastic recovery properties. Since an object of knitting is to construct an elastic, porous fabric, the yarns are more loosely twisted than they are for weaving. Since some knitted fabrics must have napped surfaces, slackly twisted yarn is preferable. Yarn types include flat and textured filament, spun, and blends of natural and man-made fibers.

The knitting industry's consumption of fibers and yarns has changed considerably over the years. Today, the principal raw material of the knitting industry is textured polyester yarn. It is used primarily in circular-knit (largely double-knit) fabrics and to a somewhat more modest extent in warp-knit (principally tricot) fabrics. For sweaters, the prime raw material is acrylic fiber, followed by wool. In knit sport shirts, the major fibers are cotton and polyester/cotton, with the latter gradually displacing the former because it shrinks less, is stronger, and resists abrasion. Acrylic fibers are also used in this product area, in 100 percent form as well as in blends. In the manufacture of tricot fabrics, the major raw materials are acetate, nylon, polyester, and rayon. Polyester is now an established yarn in that field and is used in either flat or textured form.

In the construction of fabrics (on the Raschel machine) knitters employ a wide range of raw materials, both spun and filament, with the latter either flat or textured. The chief raw material in the manufacture of fine-gauge women's hosiery is textured nylon. Spandex is also used, particularly in the manufacture of support stockings and pantyhose and in the newer, more popular contour-top pantyhose. In half-hose and other similar types of casual hosiery, virtually all the previously mentioned fibers are used, with man-made fibers significantly more important than either cotton or wool. The worsted system has proved particularly suitable for spinning yarns used for knitwear, outwear and socks and the combed cotton system for underwear, sportwear and socks.

New Words and Expressions

twist 捻度;加捻
staple 短纤维
spun yarn 短纤纱
plied yarn 股线
coagulation 凝结,凝固
tow 丝束,纤维束
linear density 线密度(单位长度的重量)
tactile 触觉的
lingerie 女式贴身内衣裤,女内衣
texturing 化纤变形工艺
crimp 卷曲,皱缩,织缩
coil 纱圈;条圈
bulkiness 膨松性
handle (织物)手感
porosity 多孔性
drape 悬垂性
cover 密满性
opacity 不透明性
multiples 复合纱
false twist 假捻
Crimplene 克林普纶(变形聚酯丝,商品名,英国制)
delusterant 褪光剂,消光剂
stretch yarn 弹力丝(纱)
bulky yarn 膨体纱
Spandex 斯潘德克斯(聚氨基甲酸乙酯弹性纤维属名),氨纶
support stocking 护腿长袜
pantyhose 连裤袜

Notes to the Text

1. a yarn is defined as "an assembly of substantial length and relatively small cross-section of fibers or filaments with or without twist":纱线可定义为大量的有一定长度和截面积较小的纤维或长丝的集束(它可以有捻度,也可以没有捻度)。
2. chemical properties not found in the parent fiber: 母体纤维没有的化学性质。
3. The introduction of synthetic fibers which can be heat set in a permanent configuration has led to the development of texturing processes which directly convert these filaments into bulked yarns thus by-passing the staple fiber spinning process: 合成纤维通过热定形能够固定形态,由此而导致了对合成纤维变形工艺的研究,这种变形工艺,直接把合纤长丝转化为膨化变形纱,因此,可不经过短纤纱的纺纱过程。

Questions to the Text

1. What is the definition of a yarn?
2. How are yarns formed?
3. Say something about the texturing.
4. When describing a specific yarn what information is required?
5. What properties of yarn are required during knitting?
6. What are the principal knitting yarns?

Lesson Two

Packages and Winding

Packages

Most of the commoner packages are stated respectively as follows:

1. Intended mainly for overend yarn withdrawal.

Cop: A tubeless package having a short, medium-quick traverse. The package is formed during mule spinning, as well as wound especially for use in a shuttle.

Pirn: Short, medium-quick traverse, for use in a shuttle.

Ring Bobbin: Produced during ring spinning in different builds, cop build, roving build (medium traverse rate), combination build (medium traverse rate).

Filament Spinning Tube: A medium traverse rate is used for nylon and Terylene.

Bottle Bobbin: Type is produced on spinning and doubling machines with a medium traverse rate.

Cone: The most common package for continuous yarn supply of all types, wound with a quick traverse. Cones are popular for package dyeing.

Cone Bobbin: A slow traverse rate, sometimes used for filament yarns.

Cake: A tubeless package produced with a medium traverse rate in a "Topham's box" during filament spinning.

2. Intended mainly for side yarn withdrawal.

Double Flanged Bobbin: A slow traverse rate, suitable for all yarns, may be parallel sided or barrel shaped.

3. Intended for either overend or side yarn withdrawal.

Cheese: A quick traverse rate, suitable for all yarns. The taper-ended cheese is used for fine filament yarns.

Conical Flanged Bobbin: A slow traverse rate suitable for all yarns.

Methods of Package Driving

On almost all winding and warping machines the package is rotated by one of three methods:

(a) By package surface contact with a driving drum or roller, giving a constant surface speed;

(b) By driving the package spindle at constant angular velocity;

(c) By driving the package spindle at an angular veloeity inversely proportional to the package radius, resulting in a constant surface speed.

Methods (a) and (c) give an approximately constant yarn speed during winding and method

(b) gives a yarn speed proportional to the package radius. Method (a) is only suitable for yarns which are not easily abraded, while method (c) results in an expensive machine due to the variable spindle drive. In general, method (a) is used for common staple yarns, method (b) for expensive sp un and cheaper filament yarns, and method (c) for expensive filament yarns.

Yarn Winding and Withdrawal

Yarn may be wound on to a package (ⅰ) by rotating the package, or (ⅱ) by rotating a yarn guide around the stationary package.

Method (ⅰ), which is utilized on most winding and warping machines, does not affect yarn twist. Method (ⅱ) inserts a little twist into the yarn, except in the unusual instance when the supp ly package is mounted on a turntable to rotate, together with the yarn guide, around the stationary p ackage. Inserting twist while winding on a stationary package is a special case of flyer twisting.

Yarn may be withdrawn from a package either (Ⅰ) from the side by rotating the package, or (Ⅱ) by overand (or axial) withdrawal from the stationary package.

Method (Ⅰ) has no effect on yarn twist and was once very common in textile manufacture, but due to the difficulty of controlling package rotation at high speeds, is generally being replaced by method (Ⅱ). However, method (Ⅱ) inserts some twist into the yarn.

Of the four possible combinations of a method of winding with a method of withdrawal, all are feasible but the combination (ⅰ), method (Ⅱ) is the more common with modern machinery.

Yarn Tension of Withdrawal

Whichever method of withdrawing yarn from a package is used, some yarn tension must be introduced. With method (Ⅰ), the torque to rotate the package provided by the yarn tension must overcome a variable retarding torque made up from three components:

(1) Due to friction at the package bearings, and varying with the weight of yarn on the package.

(2) Due to package inertia, of importance during acceleration and retardation.

(3) Due to additional friction applied to increase yarn tension.

If this takes the form of a "paddle" rubbing on the yarn surface, the effect on the yarn tension will be constant, but the method is unsuitable for easily abraded yarns. If the friction is applied to the package spindle, the retarding torque will increase the yarn tension directly as the package radius decreases. In brief, yarn tension cannot be kept low and reasonably regular at high speeds with method (Ⅰ).

With method (Ⅱ) withdrawal, yarn tension fluctuates considerably, but the maximum value is usually lower than that required by most preparation processes, and additional tension must be applied. At low unwinding speeds the yarn tension is due to dragging over the package surface, but as the speed is increased the yarn forms a "balloon", throwing itself clear from the package, yarn tension being due to centrifugal, Coriolis and air drag forces. The tension fluctuations are caused

by changes in the shape and size of the yarn balloon. The overwhelming advantage of method (Ⅱ) over method (Ⅰ) occurs with changing yarn speed, particularly during acceleration and retardation.

New Words and Expressions

package 卷装
withdrawal 退绕
cop 管纱,纬管
traverse 导丝钩
mule spinning 走锭纺
pirn 纬纱管,纡子
ring bobbin 细纱管,(环锭细纱机的)纱管
build 卷绕,成形
roving 粗纱
terylene 涤纶
bottle bobbin 瓶形筒子
cone bobbin 锥形筒子
cake 丝饼
Topham's box 托范式离心纺丝罐
double flanged bobbin 有边筒子
barrel 筒管,花筒;桶
cheese 管子纱,扁柱形筒子(通常直径大于高度)
spindle 锭子,纺锤
flyer 锭翼
torque 力矩
inertia 惯性
paddle rubbing 搅拌式摩擦
balloon 气圈
Coriolis force 哥氏力

Notes to the Text

1. overend yarn withdrawal: 纱线轴向退绕。
2. medium-quick traverse: 中速导纱。
3. termed a "pineapple cone": 称为"菠萝形筒子"。
4. side yarn withdrawal: 纱线侧向退绕(退绕方向与纱管垂直)。
5. At low unwinding speeds the yarn tension is due to dragging over the package surface, but as the speed is increased the yarn forms a "balloon", throwing itself clear from the package, yarn tension being due to centrifugal, Coriolis and air drag forces: 纱线以低速退绕时,张力由纱线在筒子表面上拖移而产生,但随着退绕速度增加,纱线形成气圈,完全从筒子上摆离,纱线张力则由离心力、哥氏力和空气阻力所产生。

Questions to the Text

1. Which packages are mainly used for overend withdrawal?
2. How is the package rotated on most winding machines?
3. How is yarn wound on a package?
4. Which combination of a method of winding with a method of withdrawal is more common?
5. How is yarn tension introduced?

Lesson Three

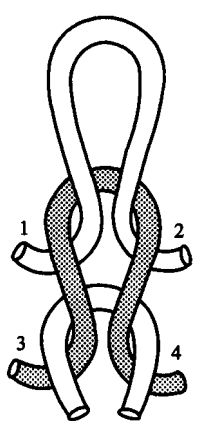
Basic Knowledge of Weft Knitting (1)

Another method of fabric construction to be developed is knitting. We are unable to place it as a contribution of any one period but it seems to have been used not earlier than the fifteenth century. It appeared as the result of a demand for cloth possessing sufficient elasticity to conform to the lines of the figure. Originally this was used only for hosiery and underwear but during the latter part of the nineteenth century a less elastic knitted material suitable for outerwear was developed. Although not manufactured in the United States untill the twentieth century, knitted fabrics have become a staple, popular for outerwear.

Knitting is that method of fabric construction in which yarns in the form of loops hang one upon the other. Only one set of yarns is necessary although more may be used. In weft-knit fabric a single yarn travels in loops across the cloth. The grand-mother knitting a baby's sock is producing a weft-knit fabric. Hand knitting may be found even today as a home industry among certain people.

Knitted structures are progressively built up by converting newly fed yarn into new loops in the needle hooks, the needles then draw these "new loops" head first through the "old loops" which they have retained from the previous knitting cycle.

The knitted stitch is the basic unit of intermeshing and usually consists of three or more inter-meshed loops (Fig.), the center loop having been drawn through the head of the lower loop which had in turn been intermeshed through its head by the loop which appears above it. A repeat unit of a stitch is a minimum repeat of intermeshed loops which can be placed adjoining other repeat units to build an unbroken sequence in width and depth. Whenever a new loop is intermeshed as a single loop through an old loop, its side limbs will be restricted at the base of the loop by the head of the old loop.



Three intermeshed loops

The term stitch is also unfortunately, frequently used in knitting terminology to refer to the configuration of yarn associated with a single needle as in the case of stitch length. Stitch length is theoretically a single length of yarn which includes one needle loop and half the length of yarn (half a sinker loop) between that needle loop and the adjacent needle loops on either side of it. Generally, the larger the stitch length the more elastic and lighter the fabric, and the poorer its cover opacity and bursting strength.

The needle loop is the simplest unit of knitted structure. When the tension in the fabric is balanced and there is sufficient take-away tension during knitting it is an upright noose which was originally formed in the needle hook. It consists of a head and two side limbs or legs. At the base of each leg is a foot which meshes through the head of the loop formed at the previous knitting cycle of that needle. In weft knitting the feet are normally open because the yarn supply usually continues in the same direction across the hooks and does not return across the backs of the needles. Closed loops may be produced on bearded needle weft knitting machines by twisting a loop over as it is transferred to another needle or by using a twizzle beard which closes onto the back of the needle so that the loop twists over as it is cast off—the former is occasionally still employed on sinkerwheel machines.

The sinker loop is the piece of yarn which joins one weft knitted needle loop to the next. It is so termed because on bearded needle frames it is the loop-forming sinker which forms the needle loop and as a consequence also produces a sinker loop. Sinker loops are, however, automatically produced by the action of the latch needle as it draws its own needle loop. A sinker loop will show on the opposite side of the fabric to the sides of the loop because the needle loop is drawn onto the opposite side from which the yarn was originally fed. The terms sinker loop and needle loop are convenient descriptive terms but their precise limits within the same loop length are impossible to define exactly.

The Face Loop Stitch: This side of the stitch shows the new loop coming through towards the viewer as it passes over and covers the head of the old loop. Face loop stitches tend to show the side limbs of the needle loops as a series of interfitting "V"s. The face loop-side is the underside of the stitch on the needle.

The Reverse Loop Stitch: This is the opposite side of the stitch to the face loop-side and shows the new loop meshing away from the viewer as it passes under the head of the old loop. Reverse stitches show the sinker loops in weft knitting most prominently on the surface. The reverse loop-side is the nearest to the head of the needle because the needle draws the new loops down-wards through the old loops.

The properties of a knitted structure are largely determined by the interdependence of each stitch with its neighbours on either side and above and below it. Knitted loops are arranged in rows and columns roughly equivalent to the warp and weft of woven structures termed "courses" and "wales" respectively.

A course is a predominantly horizontal row of loops (in an upright fabric) produced by adjacent needles during the same knitting cycle (The last five words reduce confusion when describing complex weft knitted fabrics).

A wale is a predominantly vertical column of needle loops produced by the same needle knitting at successive knitting cycles and thus intermeshing each new loop through the previous loop. Wales are joined to each other by the sinker loops.