



KNOWLEDGE OF TEXTILE GOODS

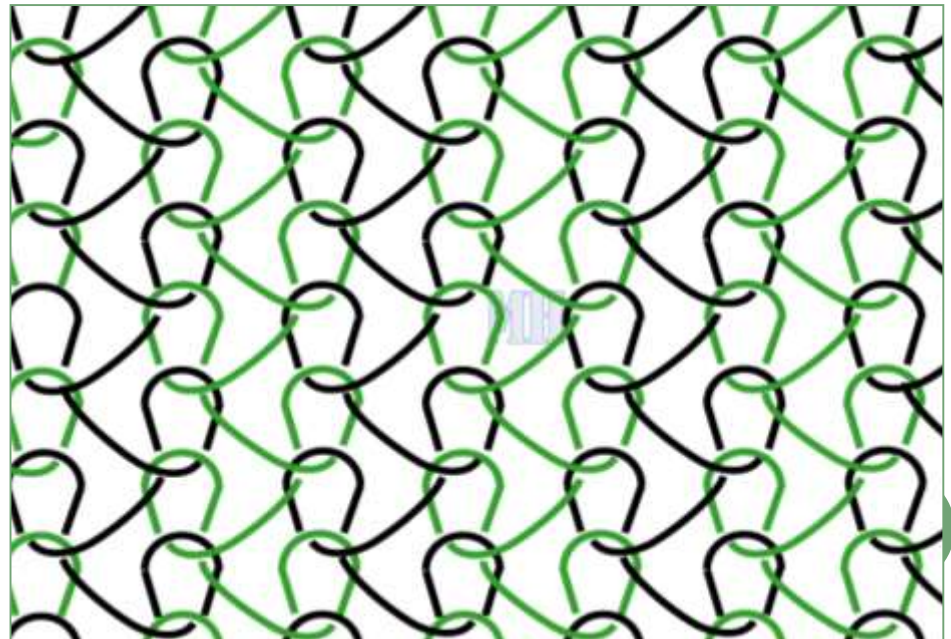
ING. MARIE HAVLOVÁ, PH.D.

Lecture No. 10:

Warp-knitted fabrics

GENERAL TERMS

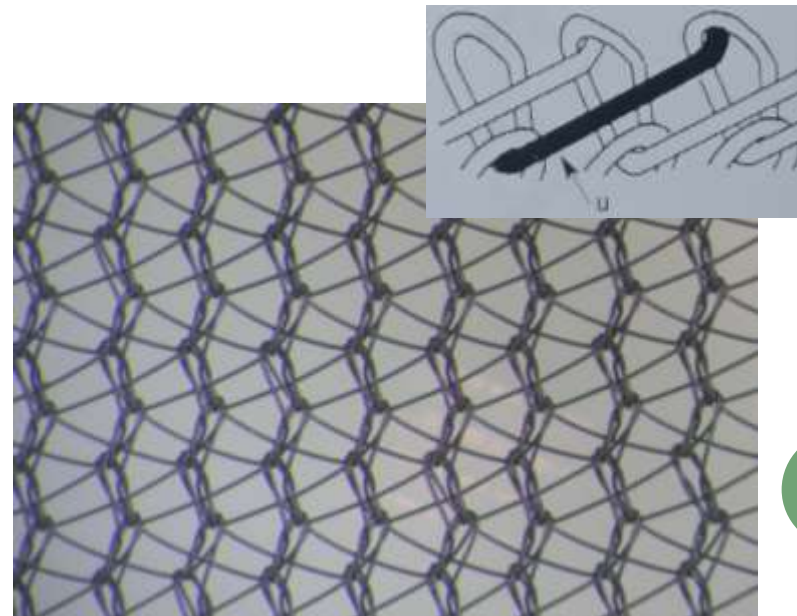
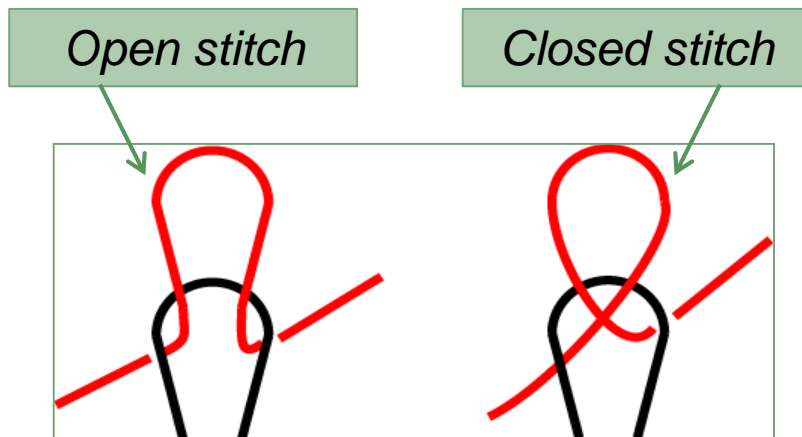
- **Warp-knitted fabrics** – is generic name applied to knitted fabrics in which the stitches made from each warp thread are formed substantially **along the length** of the fabric.
- Warp-knitted fabrics are characterised by the fact that each warp thread is fed more or less in line with the direction in which the fabric is produced.

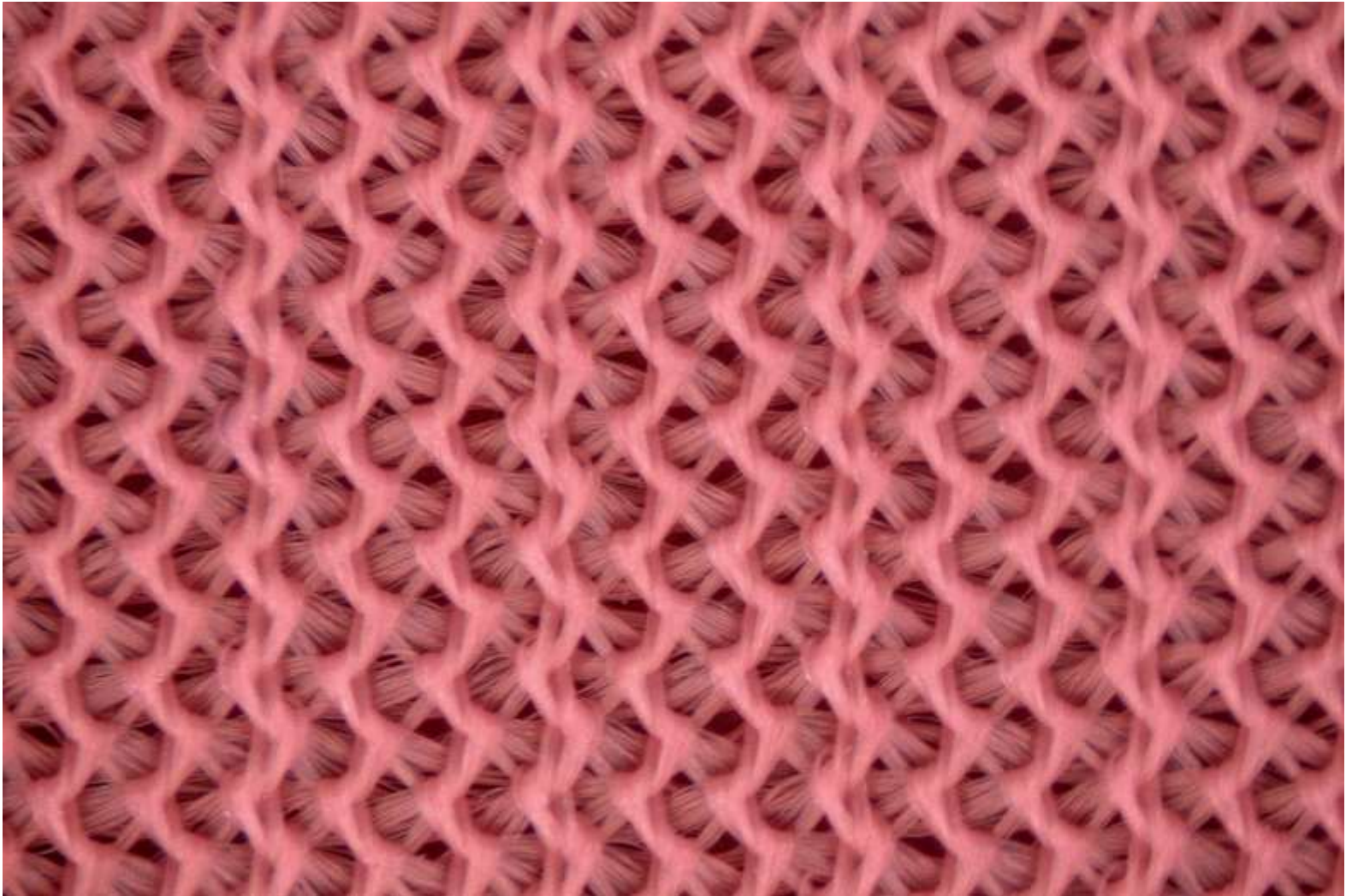


JERSEY-BASED FABRICS (*WARP-KNITTED*)

SINGLE NEEDLE BAR FABRICS

- Generic name applied to warp-knitted fabrics, the technical face side of which shows warp-knitted face stitches, while the technical back shows **underlaps**.
- These fabrics are produced **on one set of needles**.
- Warp-knitted face stitches can be closed or open, can be inclined sideways and are often double- or multiple-thread stitches.



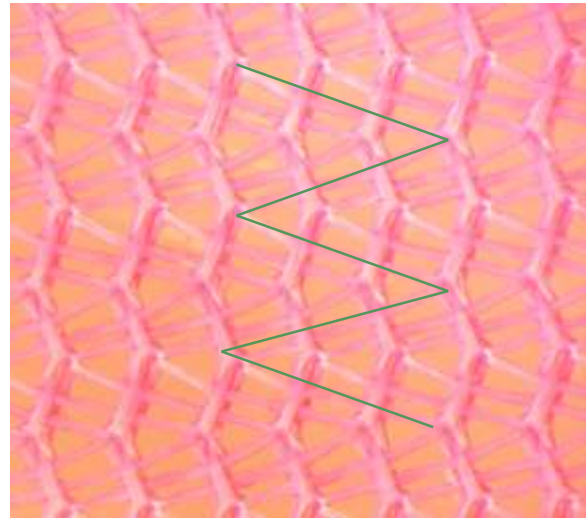
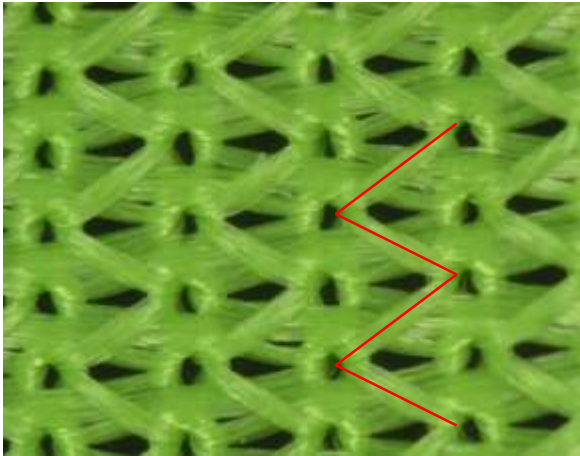


Warp-knitted stitches are often double- or multiple-thread stitches.



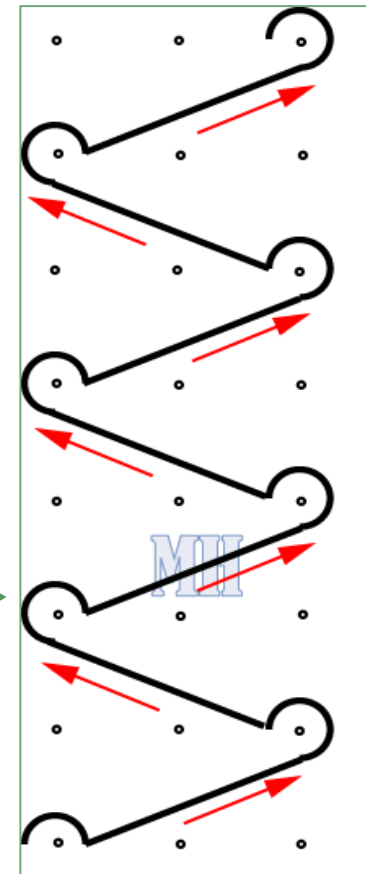
TECHNICAL BACK

- That surface of the fabric on which the underlaps are prominent.



YARN PATH NOTATION

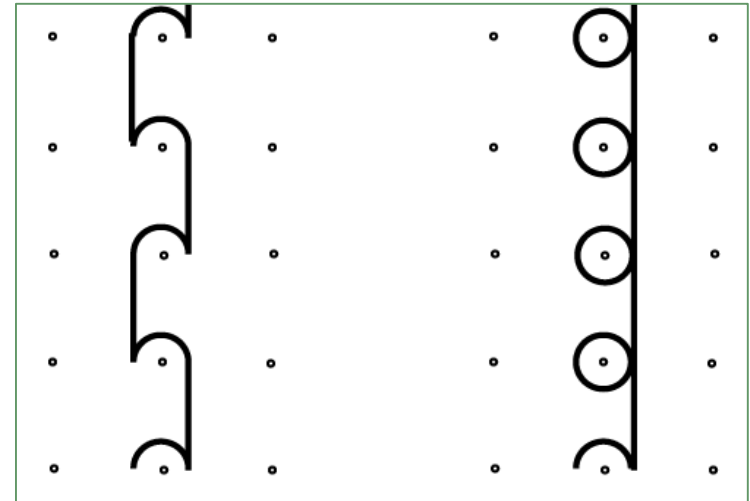
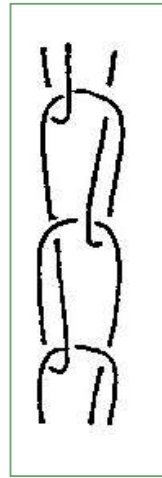
- For the **lapping notation** of warp-knitted fabrics, **parallel point paper** is used.
- The notation is a plane view of the movement of one single thread of one guide bar.



PILLAR STITCH

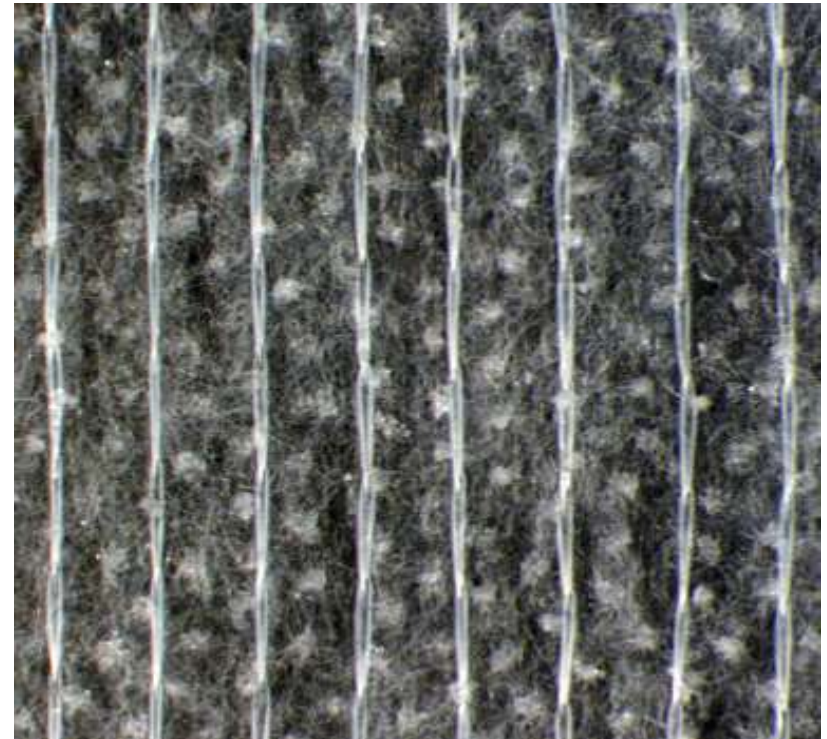
CHAIN STITCH

- An arrangement of two selvedge stitches knitted in the same wale in consecutive courses.
- If this structure is used alone, it not created the fabric (**adjacent wales are not connected**).
- It is used for stitch-bonded fabric production or in combination with some another warp-knitted structure.



Open loop

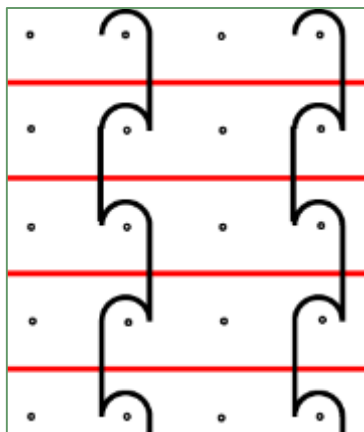
Closed loop



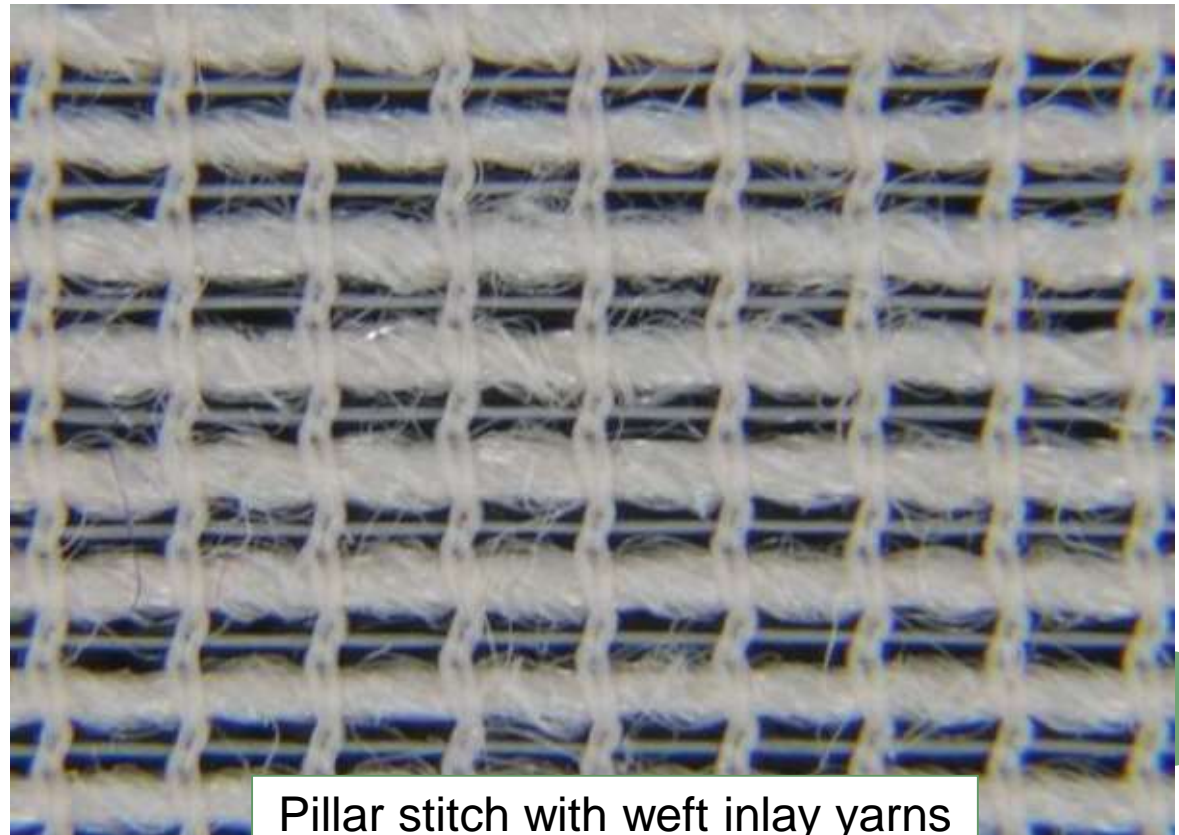
WEFT INLAY FABRIC

FULL WIDTH WEFT INLAY FABRIC

- Warp-knitted jersey-based fabric that **contains weft inlay threads across the full width** of the fabric and positioned between the face loops and the underlaps of the ground construction.



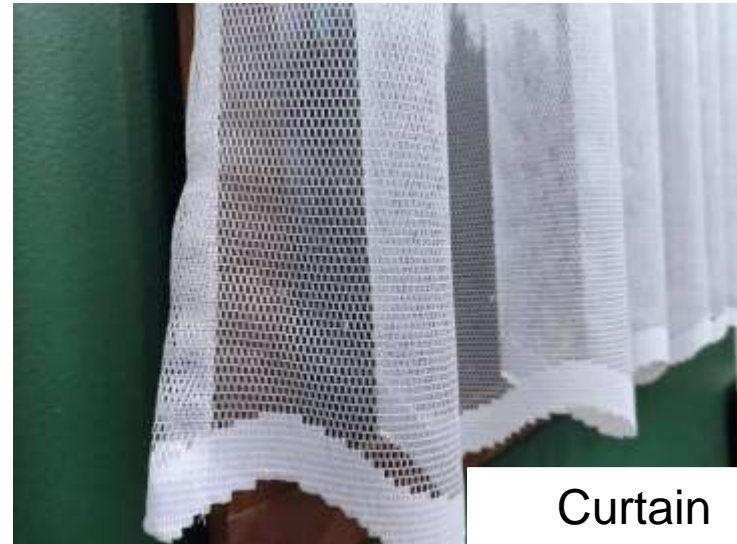
Yarn path notation



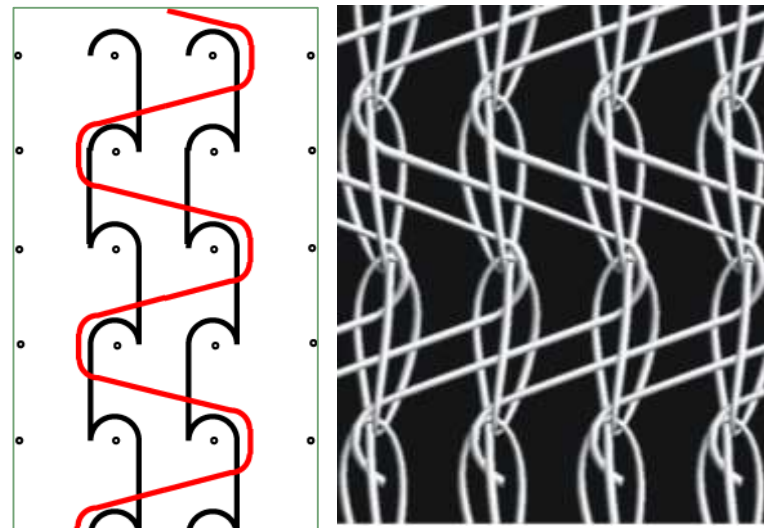
Pillar stitch with weft inlay yarns

PILLAR INLAY NET

- Warp-knitted jersey-based fabric in which **pillar stitches are connected by inlay threads**, giving the impression of a net structure.
- The front guide bar makes open pillar laps and **the back guide bar laps under two or under three needles** in the opposite direction.
- Both guide bars are fully threaded and the impression of a net structure is achieved by the use of yarns which are finer than normal for the gauge of the machine.



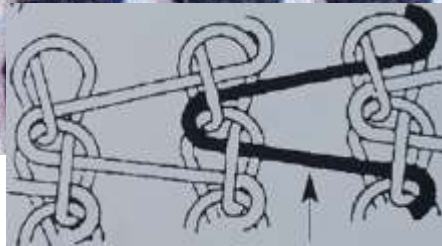
Curtain



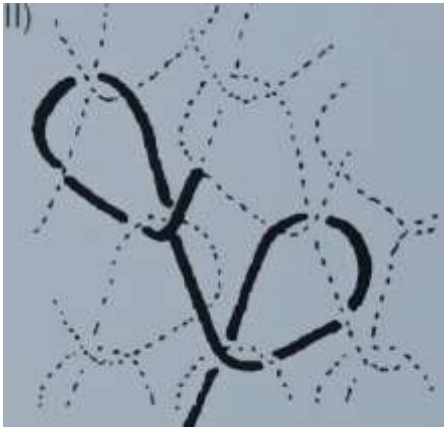
Yarn path notation



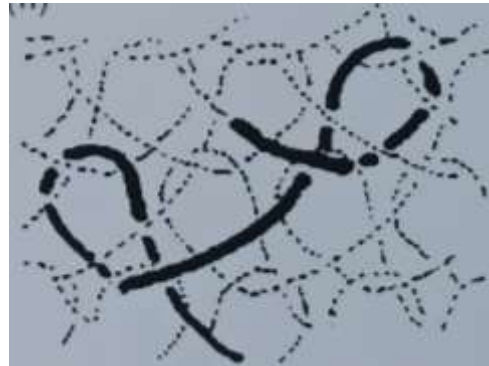
Potato sack



Inlay – a length of yarn that is incorporated into a warp-knitted fabric by means of guide bar underlaps only.



Tricot stitch



Cord stitch



Satin stitch



Velvet stitch

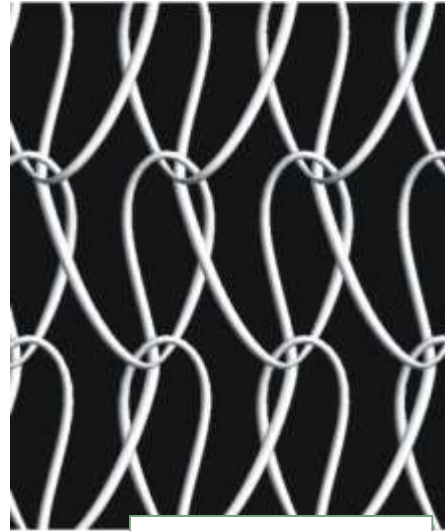
The guide bar moves alternately to the left and to the right.



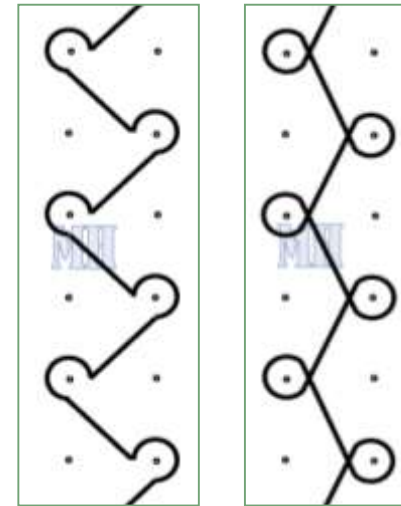
SINGLE BAR TRICOT

SINGLE TRICOT

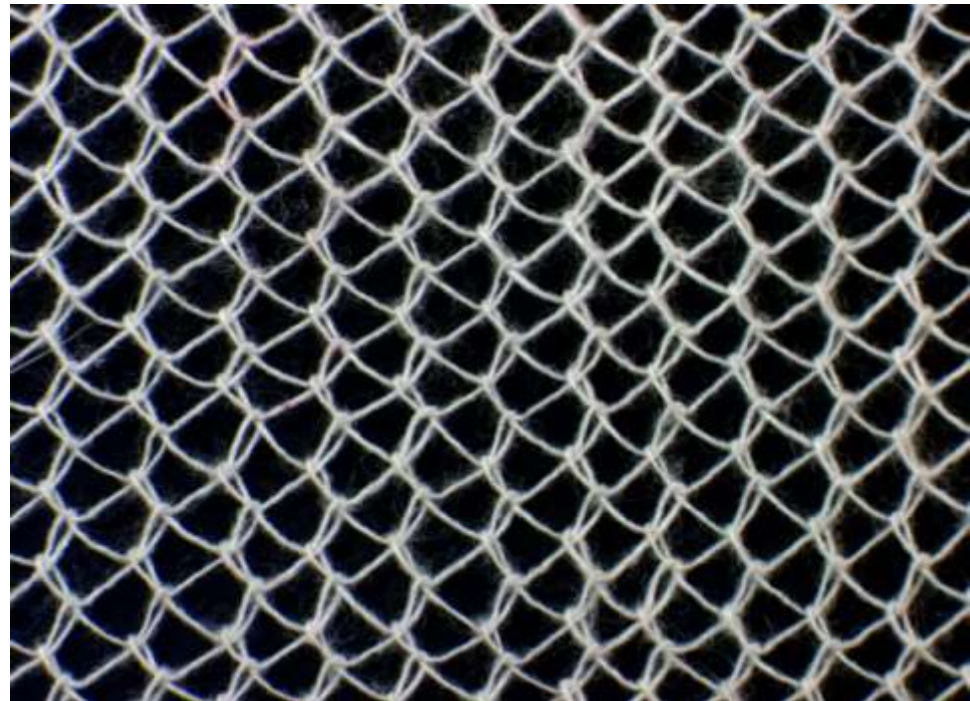
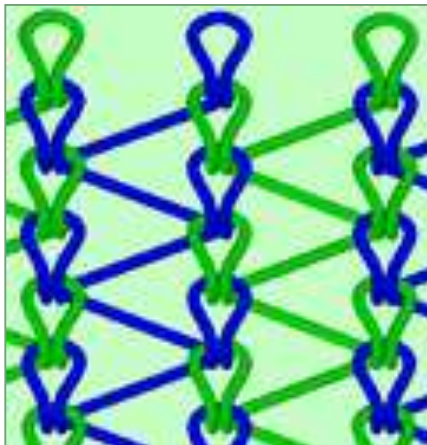
- Warp-knitted jersey-based fabric that consists of one system of tricot stitches.
- The fabric is made by tricot laps of one full set of warp threads (*one guide bar*) on one set of needles.



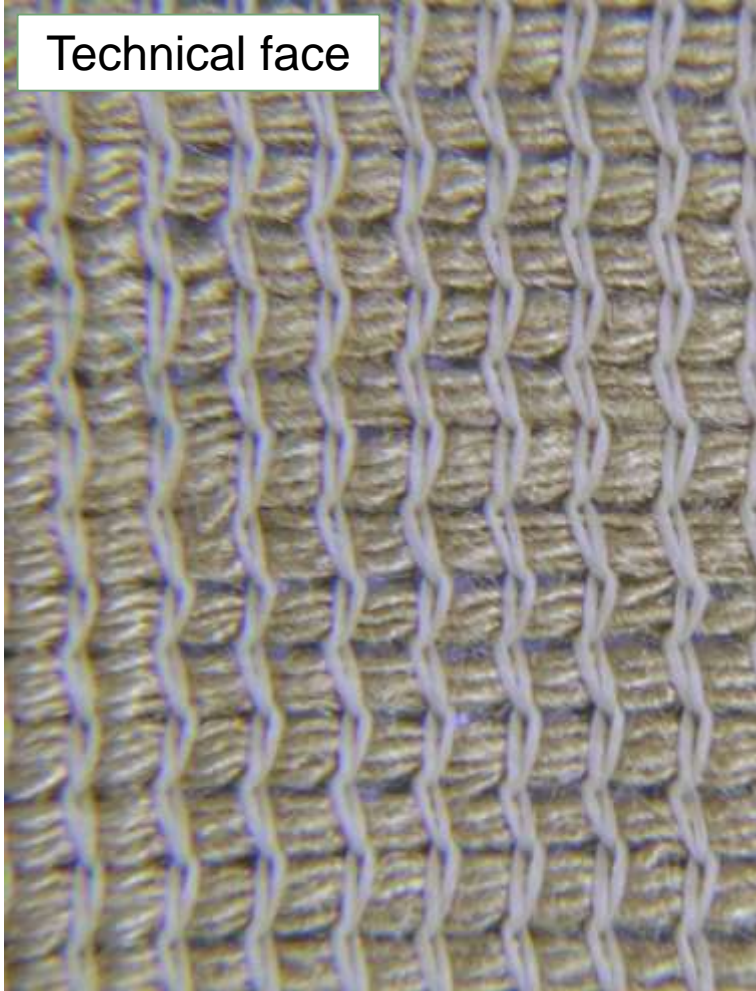
Tricot stitch



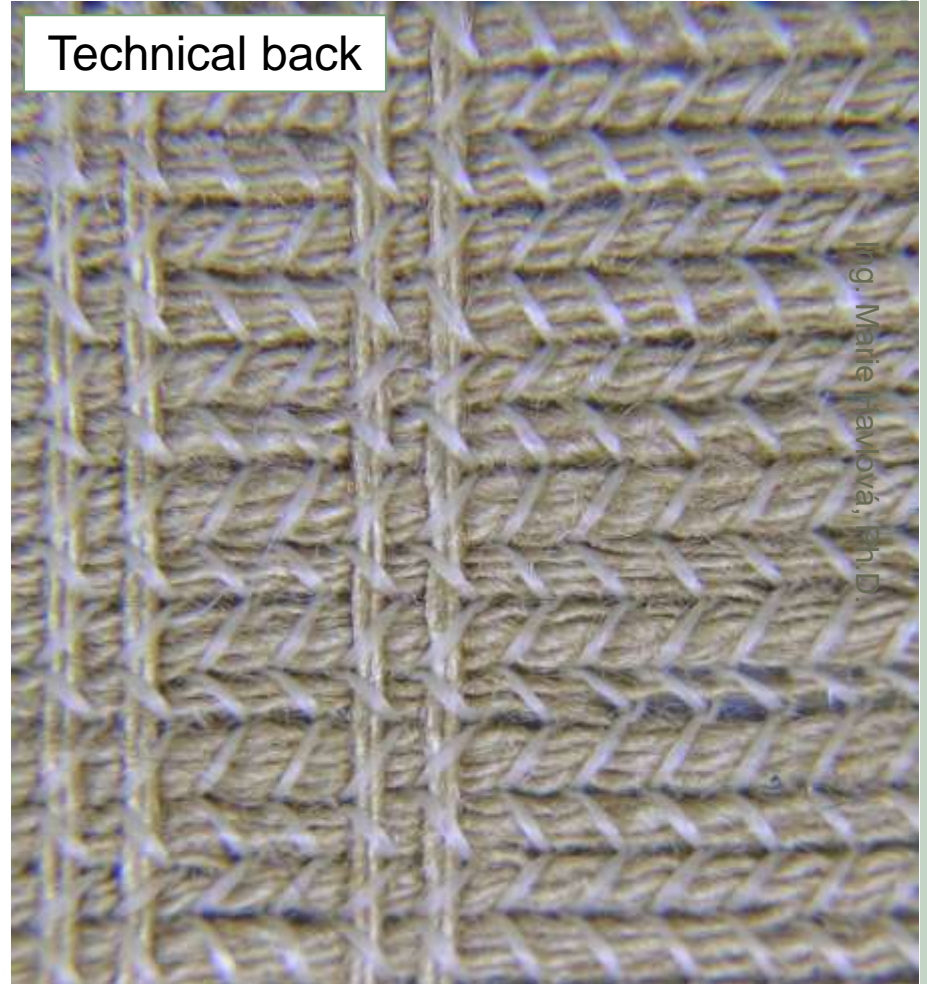
Yarn path notation –
open or closed stitch



Technical face



Technical back

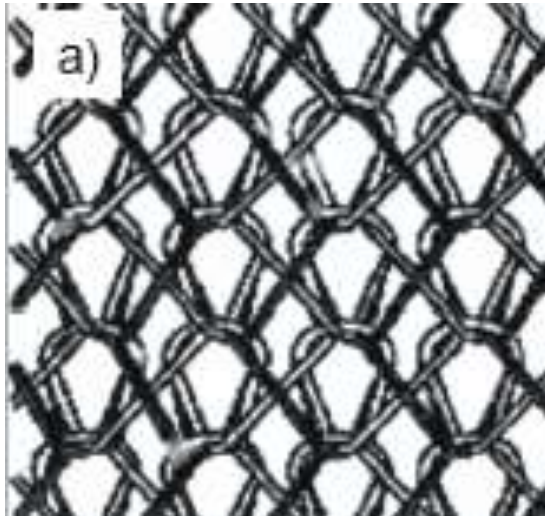


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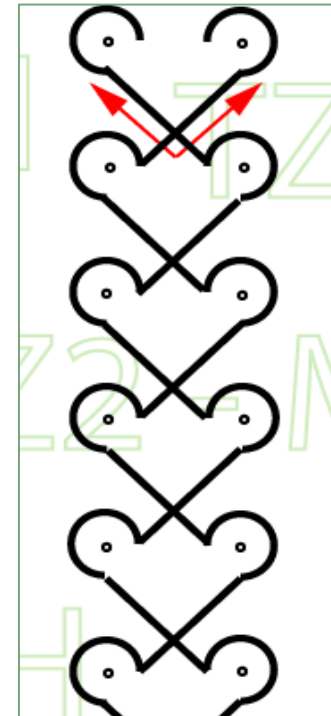
Weft inlay warp-knitted fabric – the ground construction is the tricot stitch

FULL TRICOT

- Warp-knitted jersey-based fabric that consists of two systems of tricot stitches.
- The fabric is made by tricot laps of **two full sets of warp threads** lapping **in opposite directions** on one set of needles.



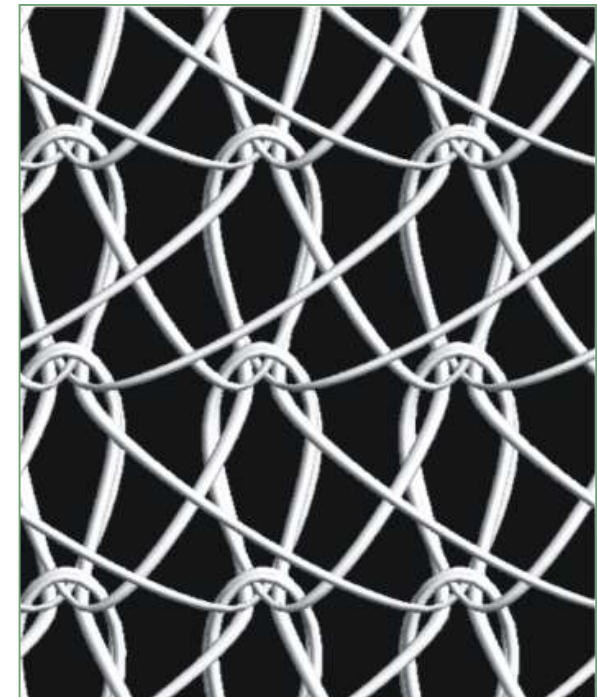
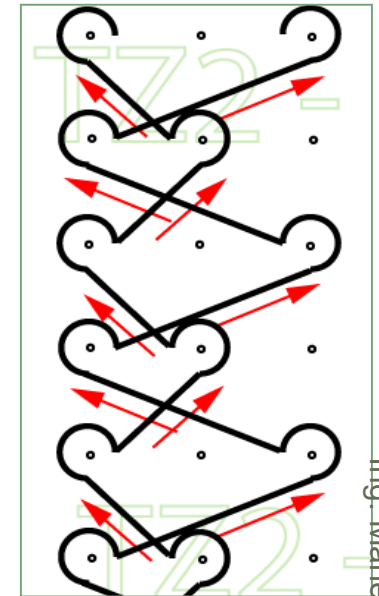
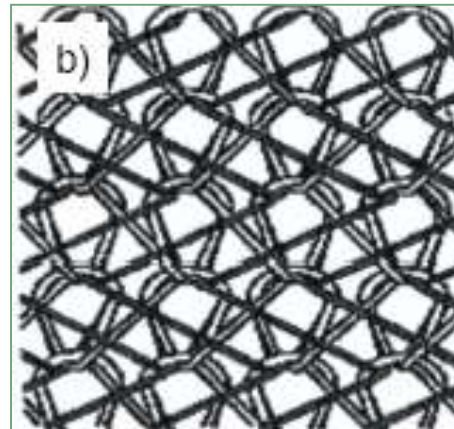
Lapping in opposition – lateral movement of two guide bars in opposite directions.

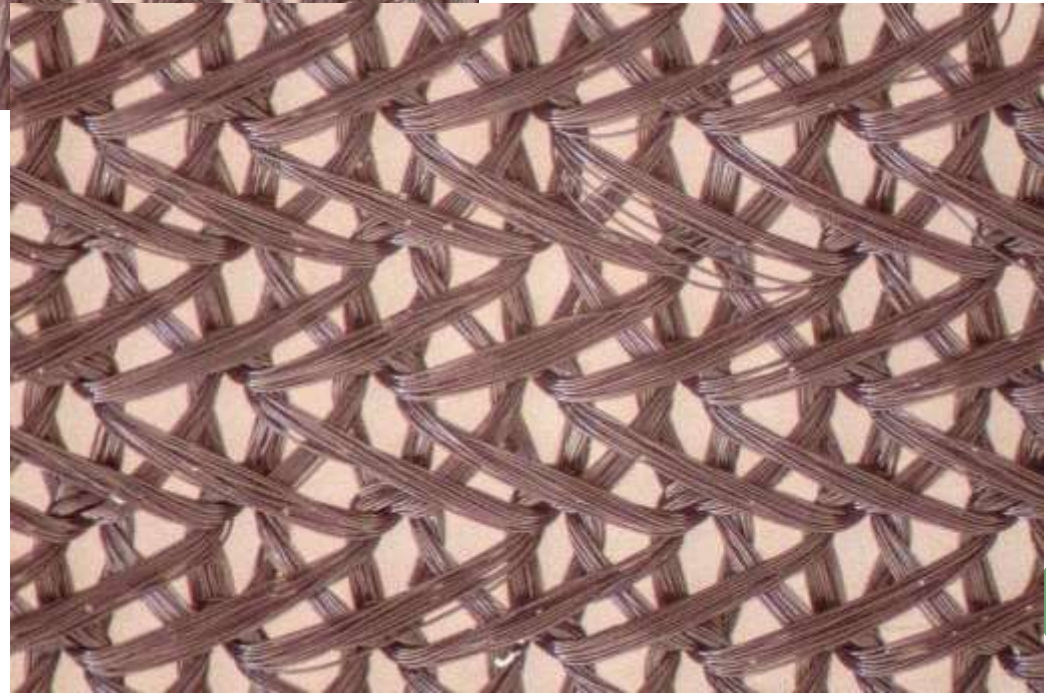
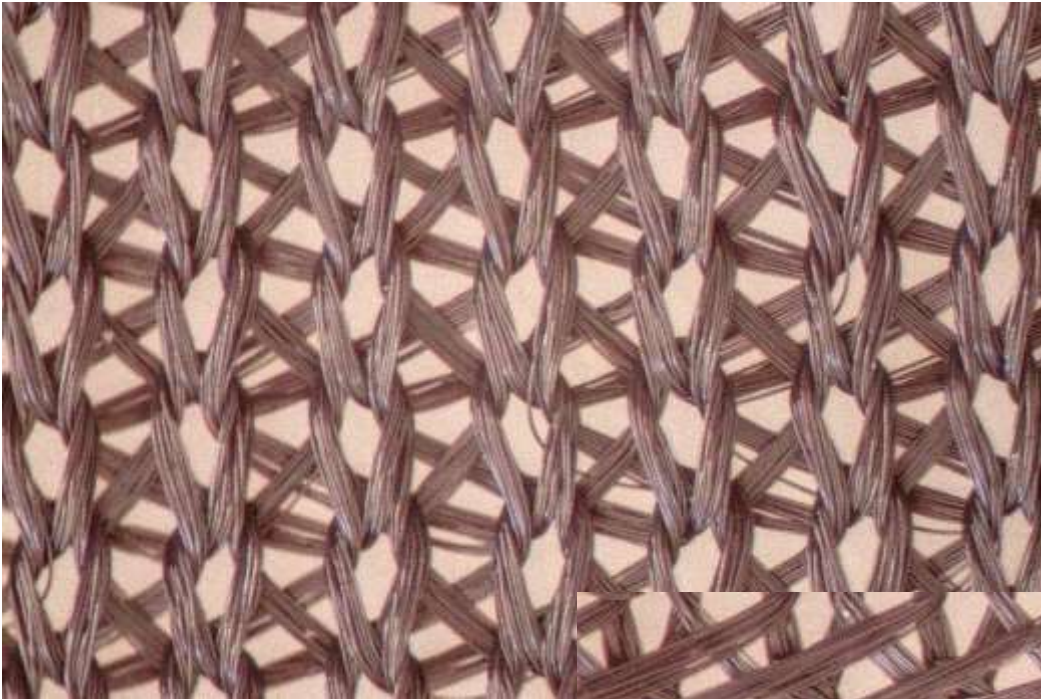


CORD-TRICOT

LOCKNIT

- Warp-knitted jersey-based fabric in which the technical back is formed by cord stitches lying uppermost and covering tricot stitches lapped **in the opposite direction**.
- Both guide bars are fully threaded and the face stitches are formed by both systems of threads.
- The structure named first refers to the lapping movement of the front guide bar the threads of which lie uppermost on the technical back of the fabric.





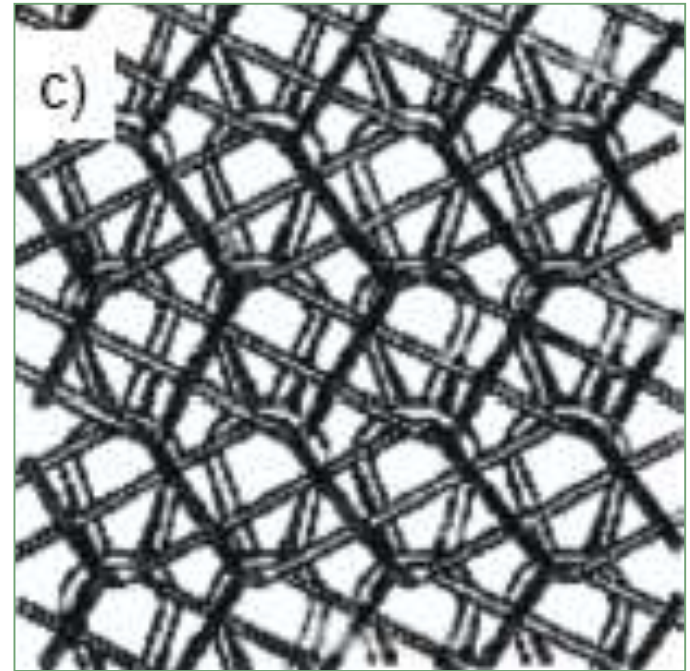
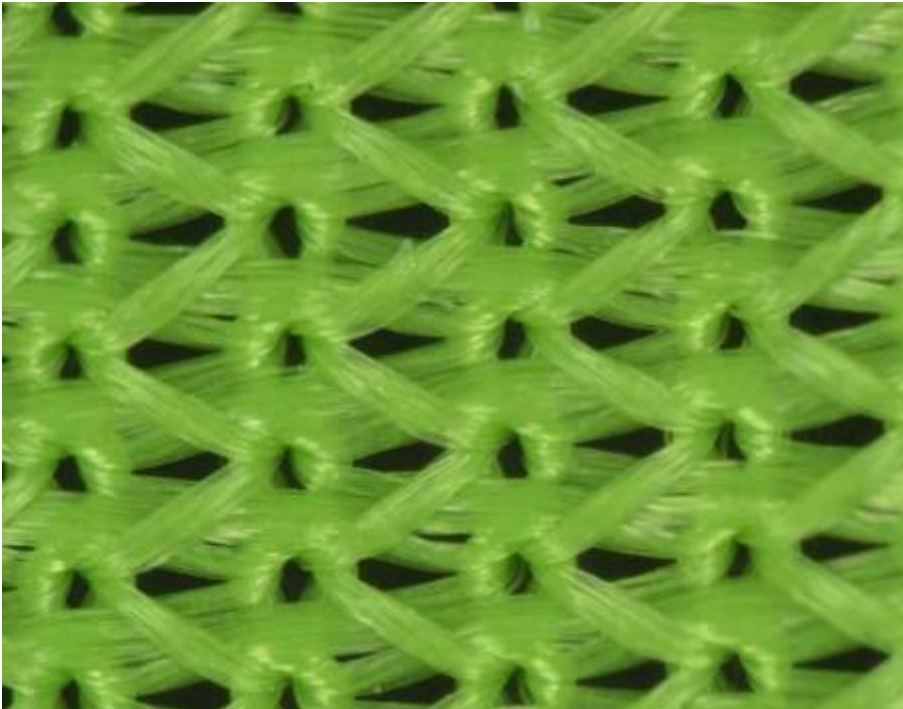
Reflective vest



TRICOT-CORD

REVERSE LOCKNIT

- Warp-knitted jersey-based fabric in which the technical back is formed by tricot stitches lying uppermost and covering cord stitches lapped **in the same or in the opposite direction**.

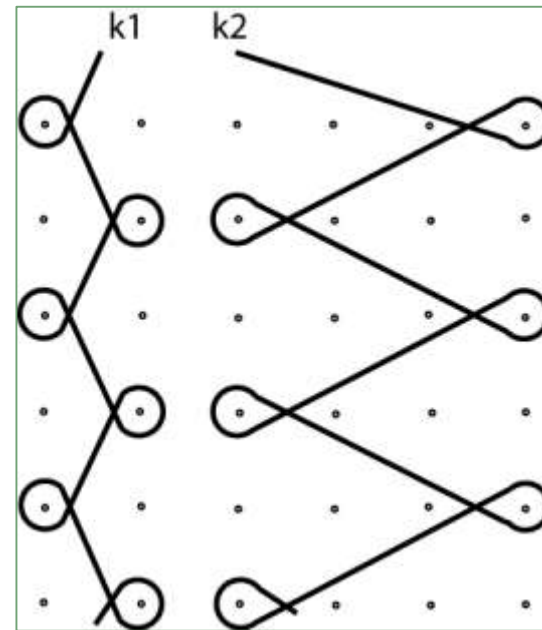


SATIN-TRICOT

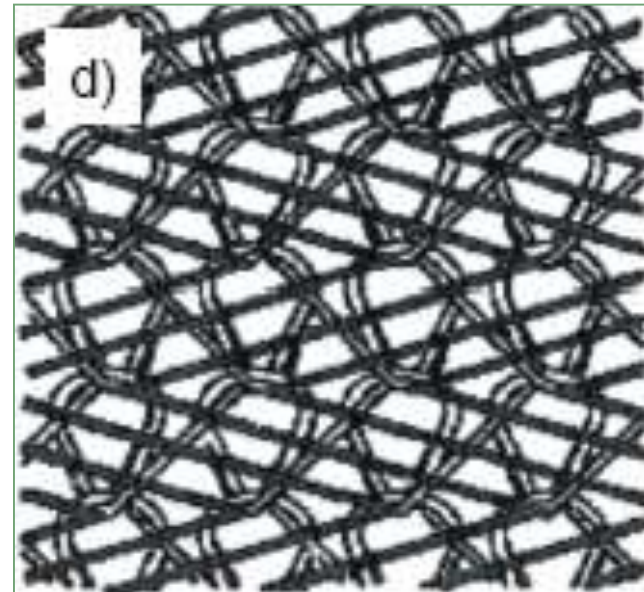
WARP-KNITTED SATIN

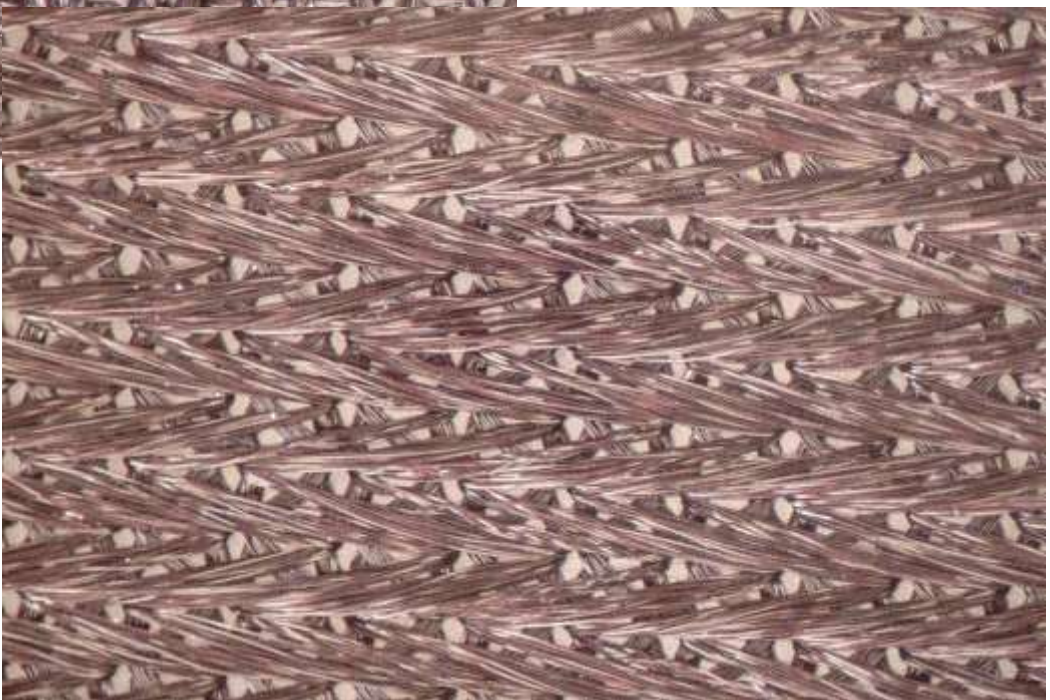
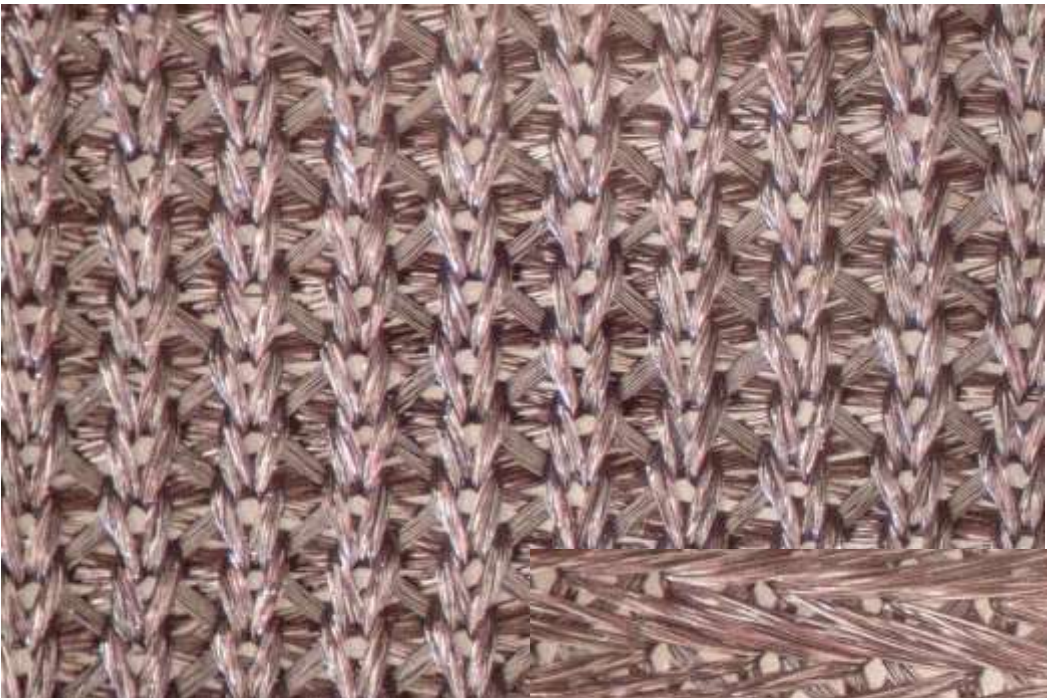
- Warp-knitted jersey-based fabric in which the technical back is formed by satin stitches lying uppermost and covering tricot stitches lapped **in the same or in the opposite direction**.
- A loop-raised fabric is obtained from satin-tricot by brushing or napping so that the loop components are broken up and raised into pile form.

Satin stitch – is an arrangement of two warp-knitted stitches in which the second in relation to the first is knitted three wales away in the following course.



Yarn path notation

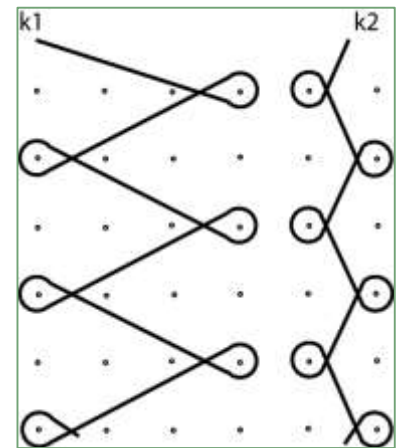




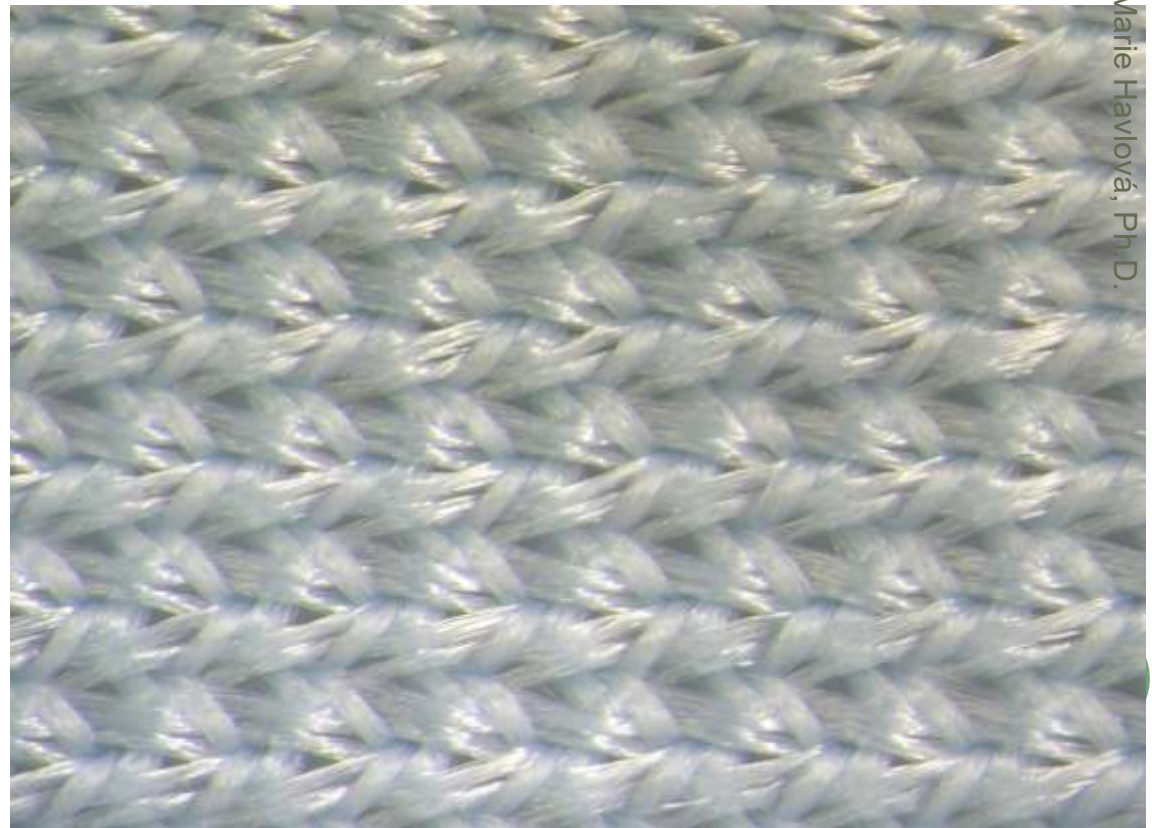
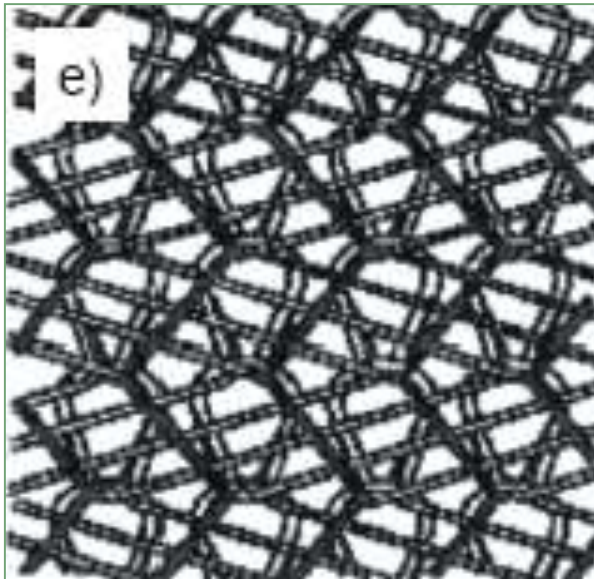
TRICOT-SATIN

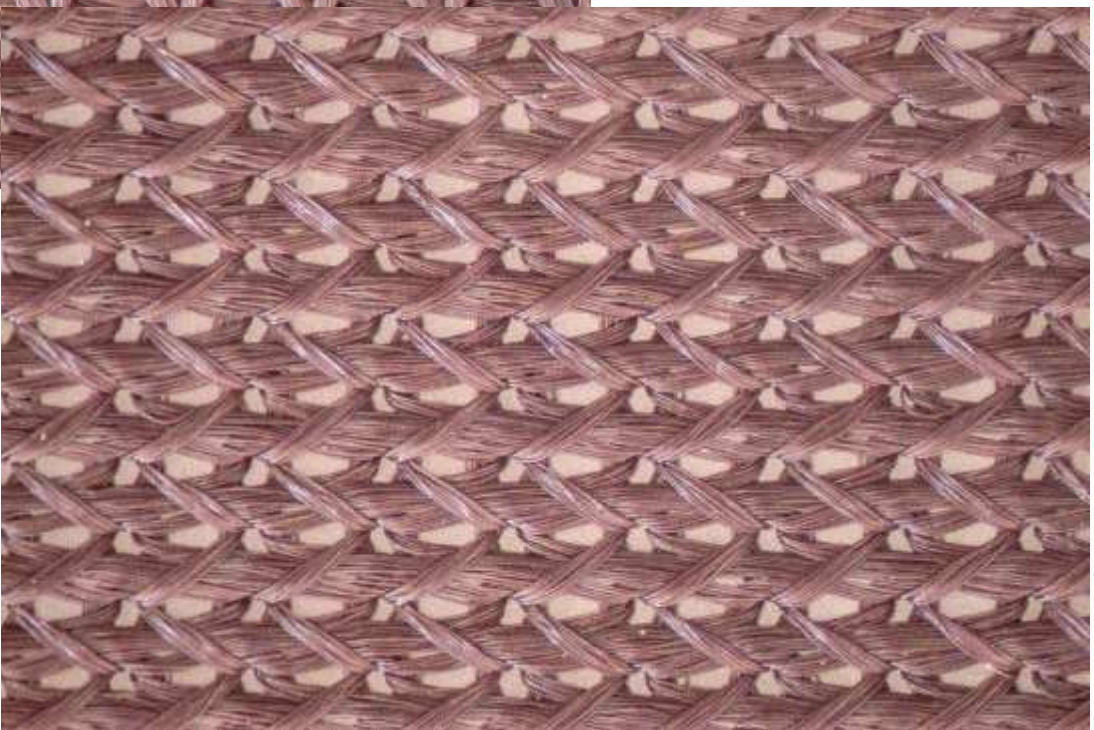
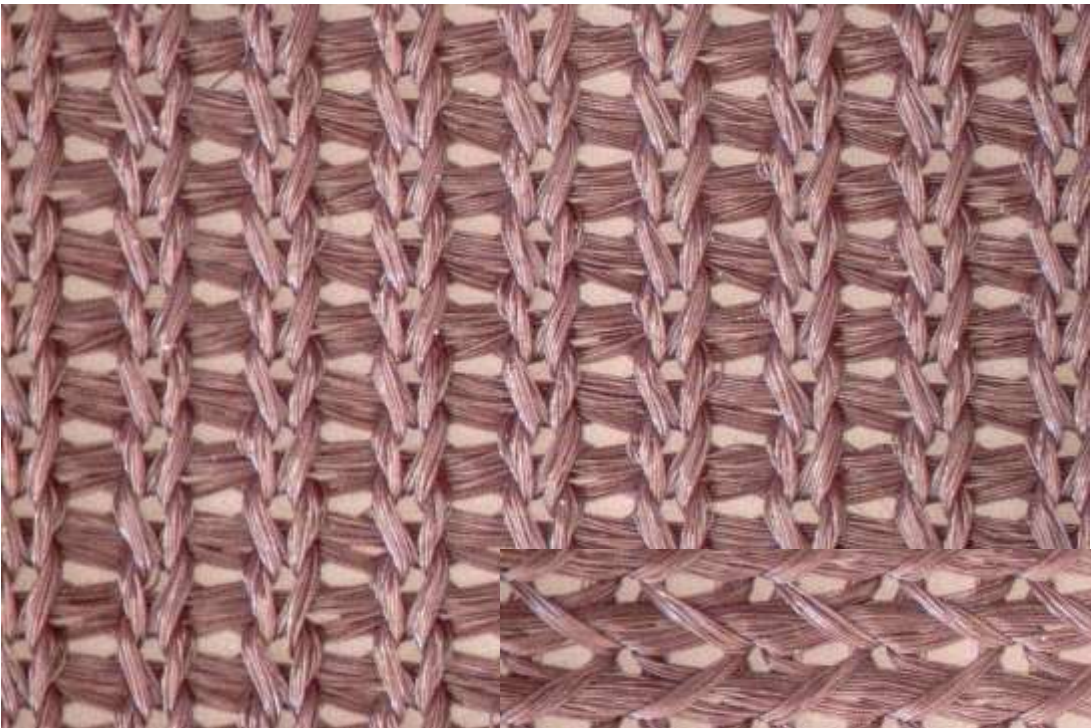
SHARKSKIN

- Warp-knitted jersey-based fabric in which the technical back is formed by tricot stitches lying uppermost and covering satin stitches lapped in the same or in the opposite direction.



Yarn path notation

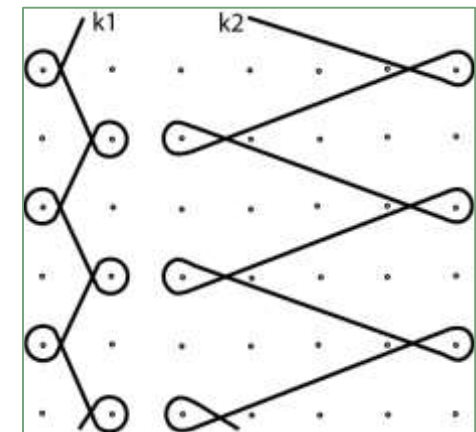




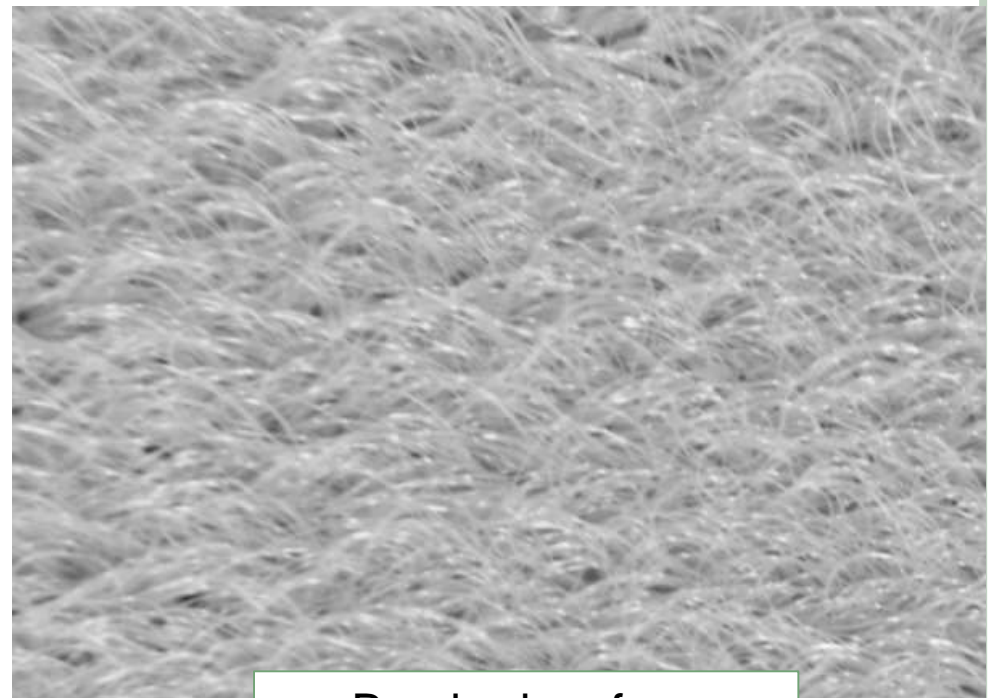
VELVET-TRICOT

WARP-KNITTED VELVET

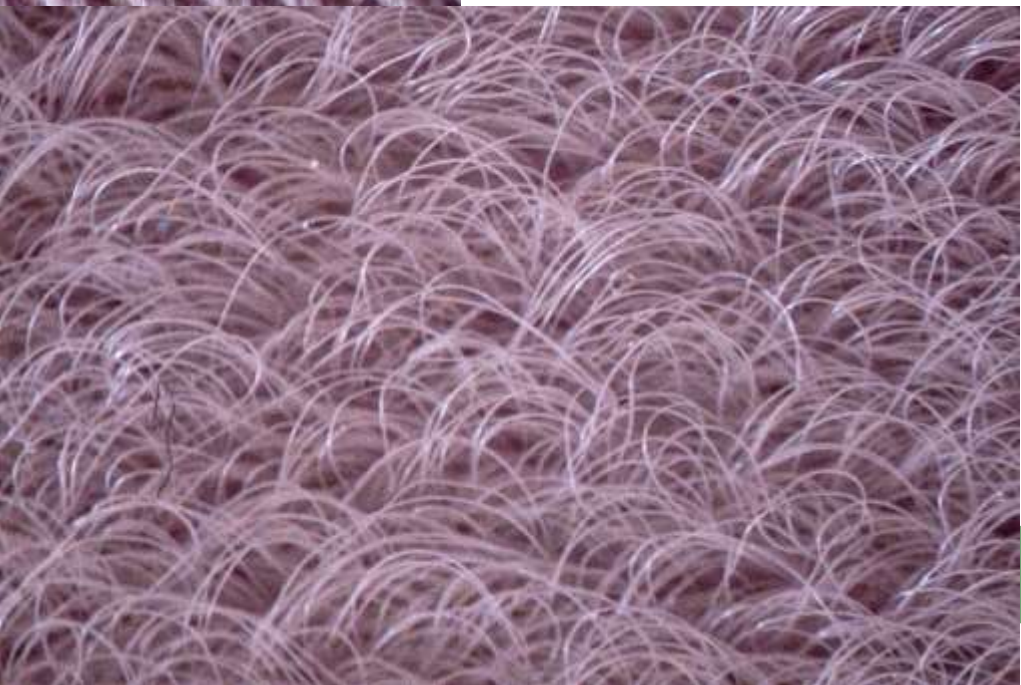
- Warp-knitted jersey-based fabric in which the technical back is formed by velvet stitches lying uppermost and covering tricot stitches lapped in the same or in the opposite direction.
- A loop-raised fabric known as warp-knitted velours fabric is obtained from velvet-tricot by brushing or napping so that the loop components are broken up and raised into pile form.



Yarn path notation

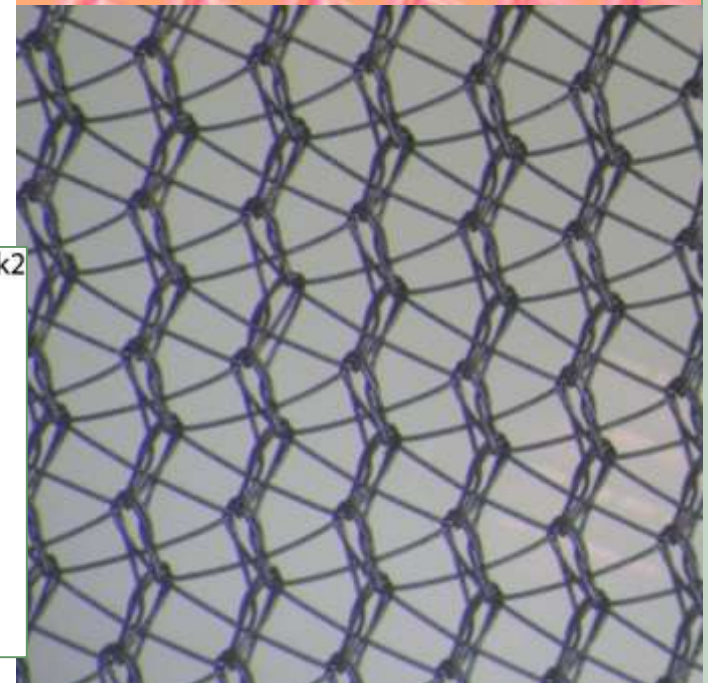
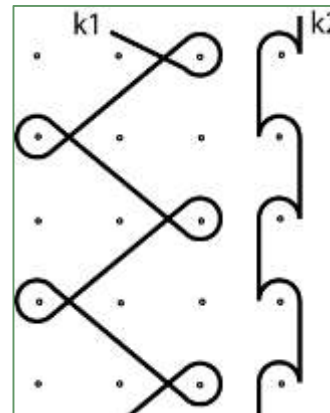
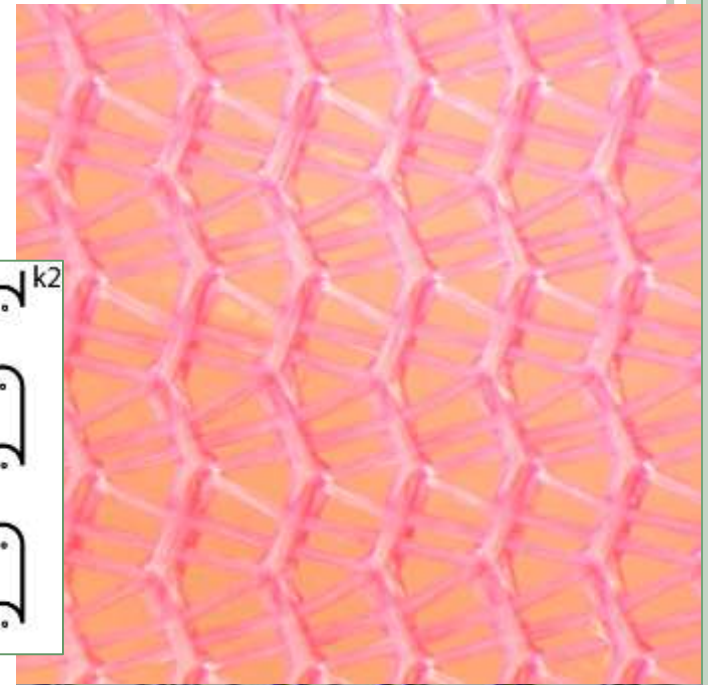
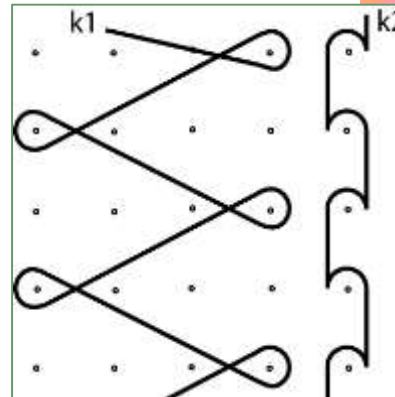


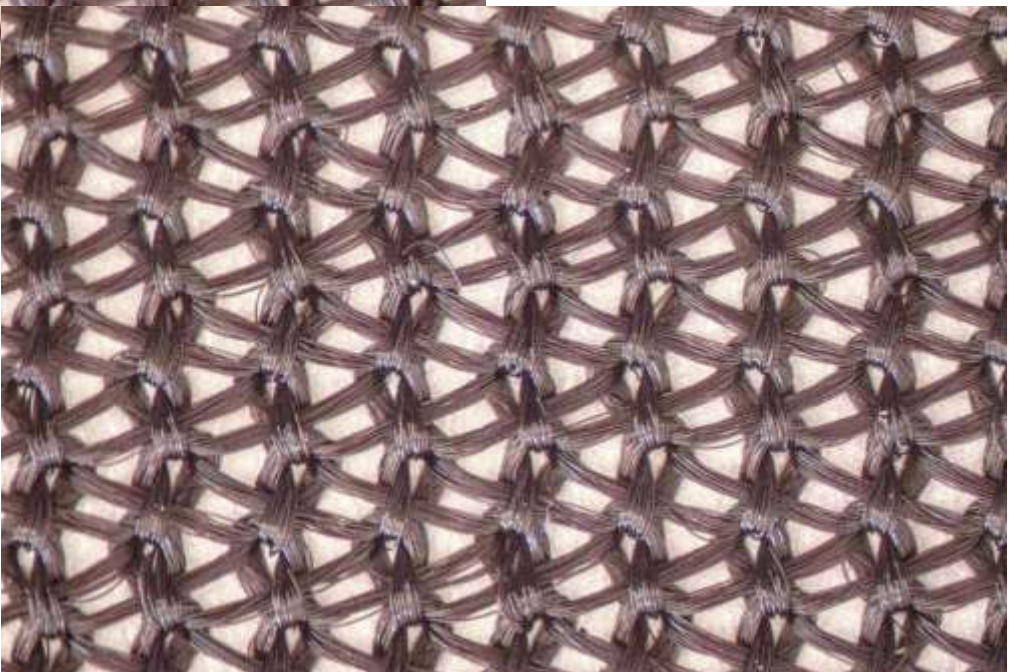
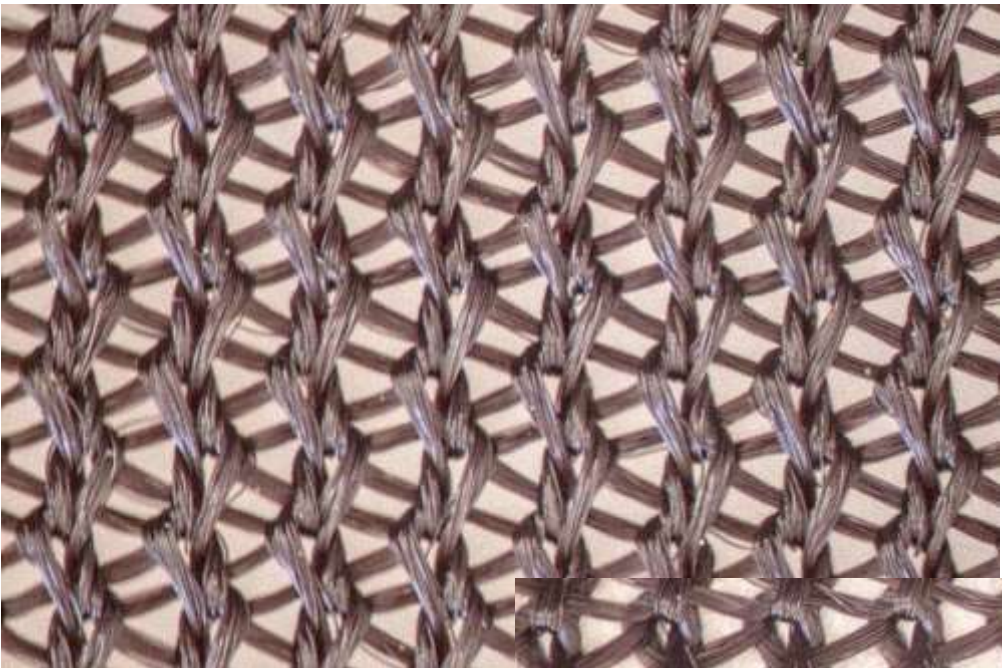
Brushed surface

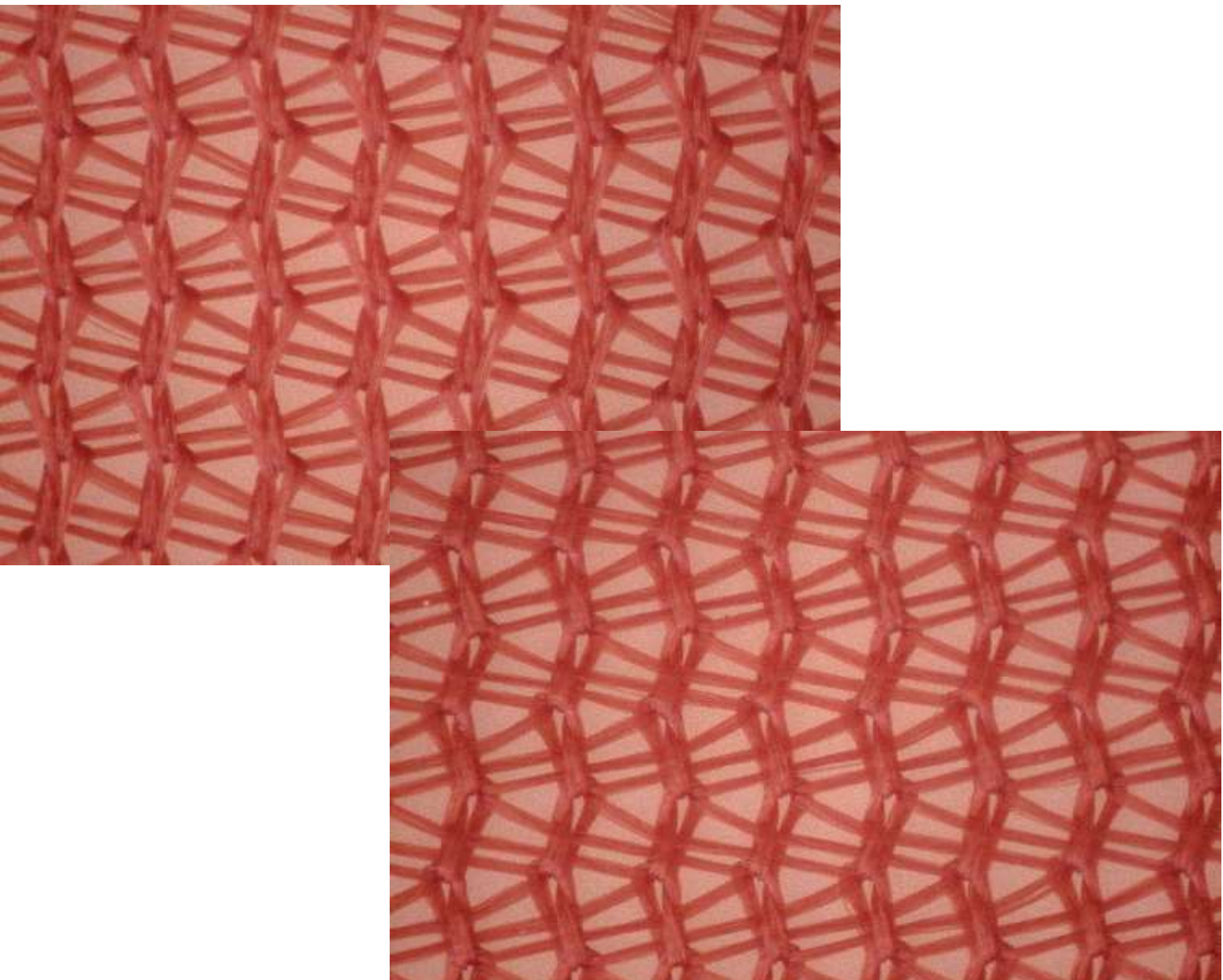


QUEEN'S CORD FABRICS

- ~ Pillar-cord or pillar-satin or pillar-velvet
- Generic name applied to warp-knitted jersey-based fabrics in which the technical back is formed by open pillar stitches lying uppermost and covering (*usually closed*) cord or satin or velvet stitches lapped in the opposite direction.



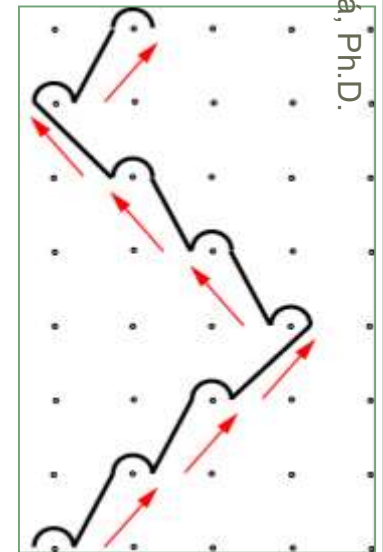
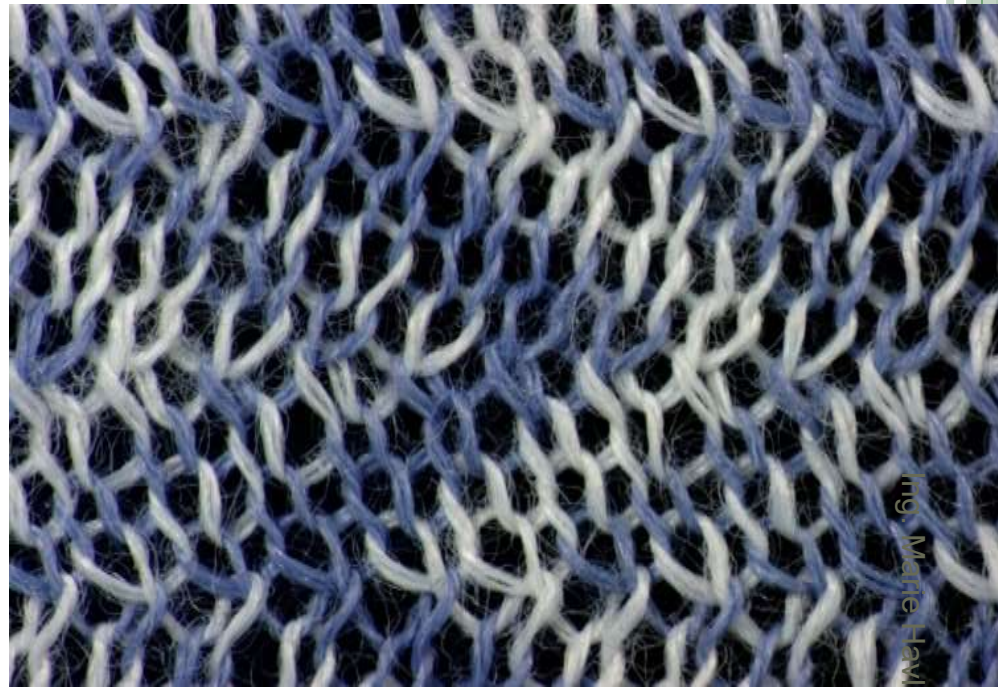




SINGLE ATLAS

SHADOW STRIPE FABRIC

- Warp-knitted jersey-based fabric that consists of one system of atlas stitches.
- To produce this fabric, one full set of **warp threads traverses progressively by one needle space in a diagonal direction** for a number of courses and then returns, in similar manner, to the starting position.



Yarn path notation

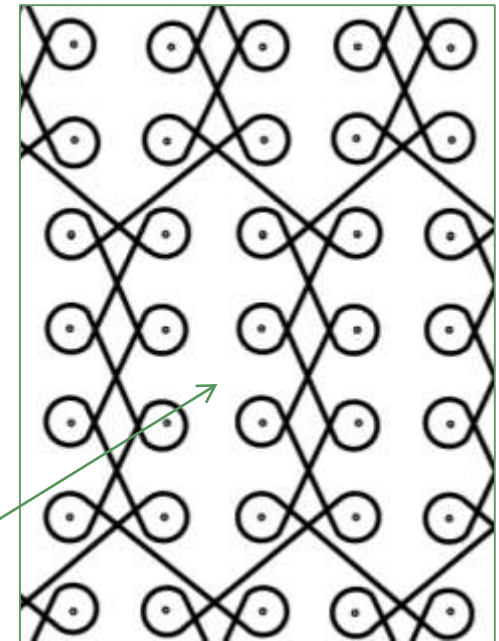
Atlas stitch – is an arrangement of four or more stitches knitted in four or more consecutive courses whereby the first half of the unit of stitches is knitted in consecutive adjacent wales and the second half of the unit of stitches is knitted consecutively in the reverse order on the same wales.

MESH FABRICS

OPENWORK FABRIC

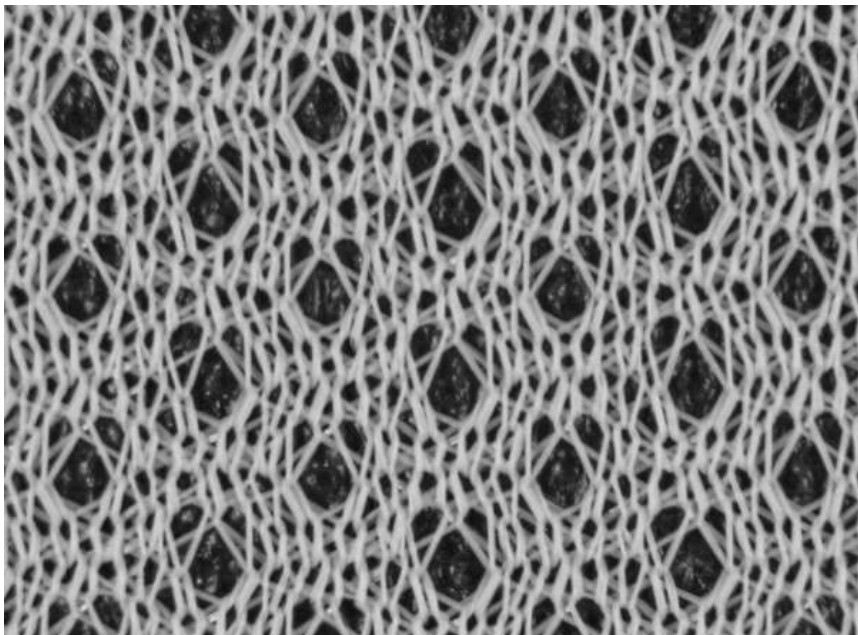
POINTELLE

- Warp-knitted jersey-based fabrics that contain filet openings or covered openings.
- The openings occur **at points where there is no side connection between adjacent wales.**



Filet opening

Yarn path notation





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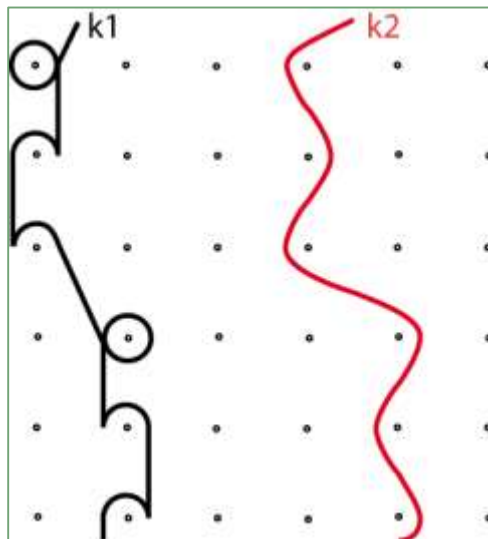


TULLE

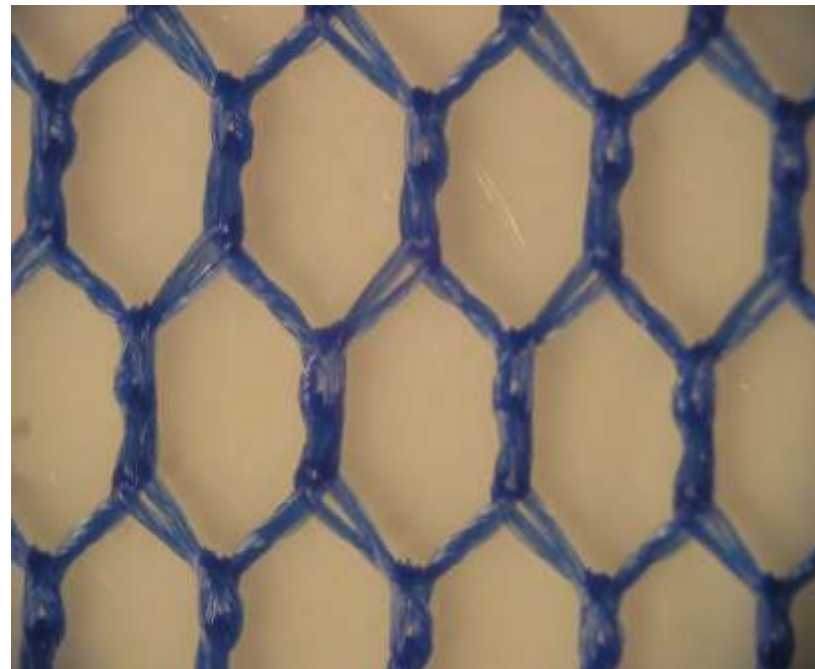
TULLE GROUND NET

FULL-SET TULLE

- Warp-knitted jersey-based fabric that exhibits **hexagonal openings** obtained by pillar stitches alternating with tricot stitches and both being reinforced by inlay threads.
- When the inlays are elastomeric threads, the fabric is known as elastic tulle net.



Yarn path notation





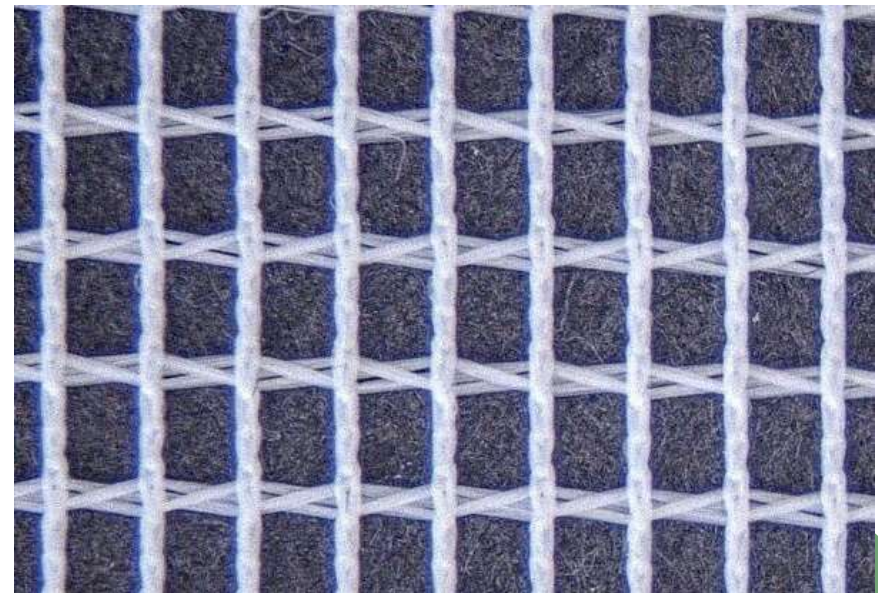
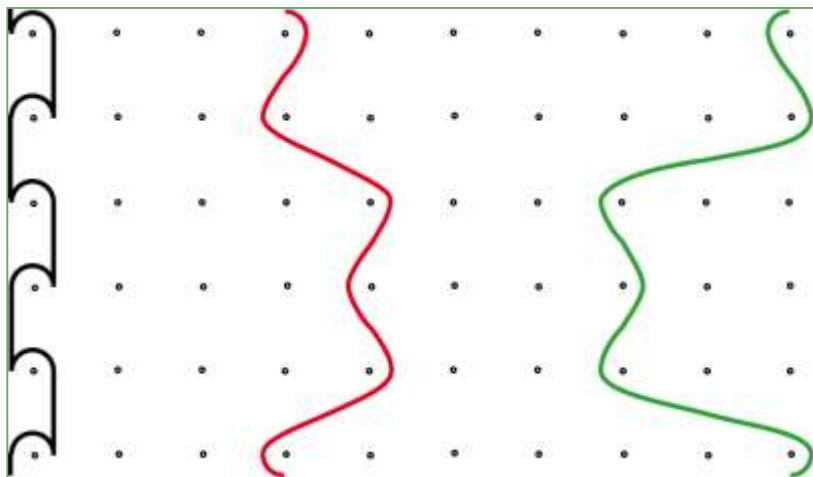
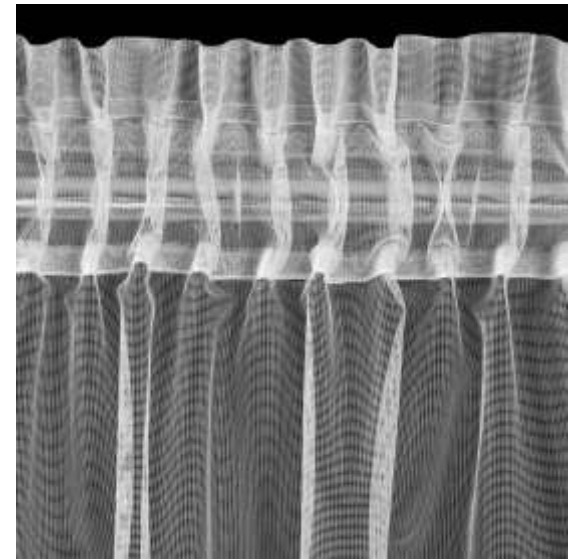
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MARQUISETTE

CURTAIN NET

FILET NET

- Warp-knitted jersey-based fabric that exhibits square openings obtained by pillar stitches that are reinforced by two sets of inlay threads lapped in opposition.



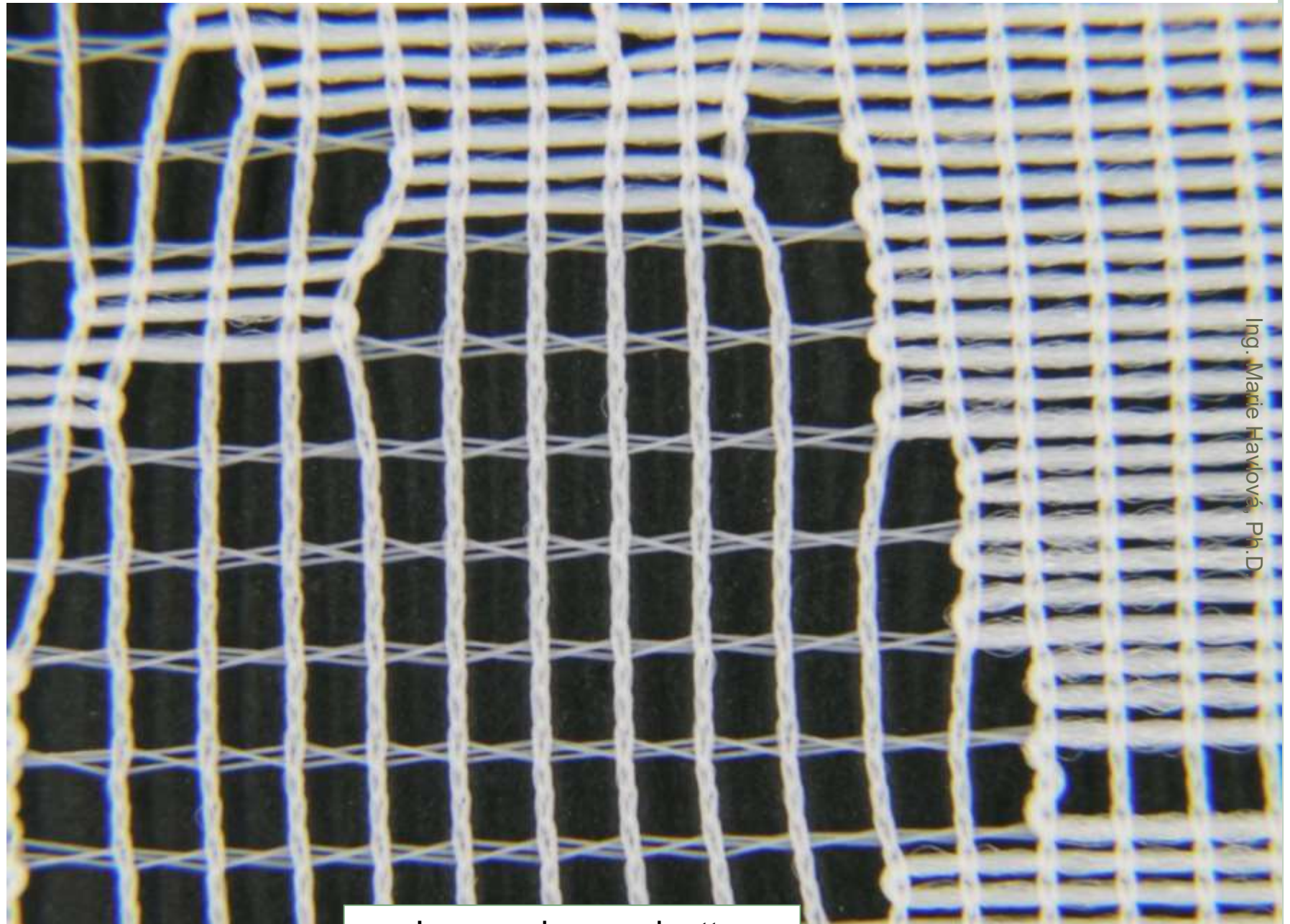
Yarn path notation

JACQUARD MARQUISSETTE

JACQUARD CURTAIN NET

- Warp-knitted jersey-based fabric that shows solid and semi-open design effects on marquisette ground.
- To produce this fabric, the front guide bar makes open pillar laps as in ordinary marquisette while the second and third guide bar have their inlays under one needle space extended to two and three needle spaces thus producing semi-open and solid design effects respectively.
- The horizontal connections made by the second and third guide bar are the same as in ordinary marquisette.





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Jacquard marquisette

LACE FABRIC

- Generic name applied to warp-knitted jersey-based fabrics in which decorative threads are superimposed on a mesh-like ground structure.
- The ground structure can be locknit, pillar inlay, tulle, marquisette, or can be achieved by means of a jacquard attachment.
- The decorative threads forming the design motif can be knitted-in, tucked-in by means of a fall-plate, or laid-in using multiple guide bars.



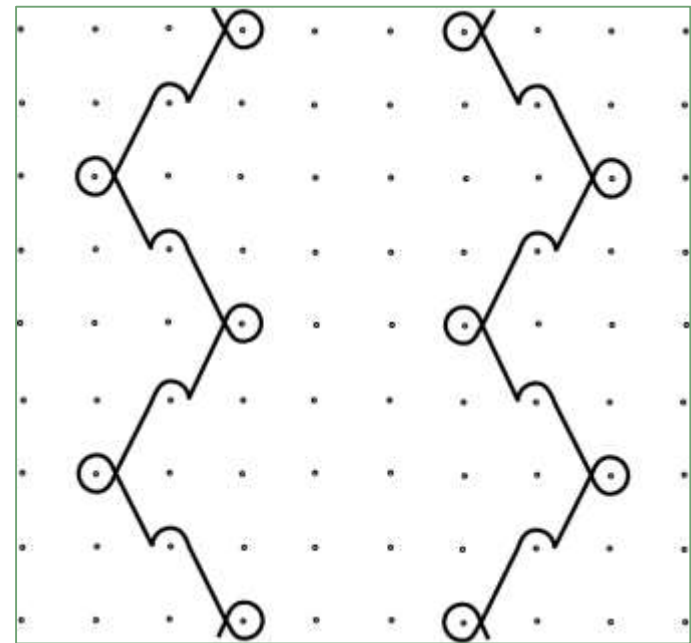


Lace fabric

TRAVERSE NET

MOSQUITO NETTING

- Warp-knitted jersey-based mesh fabric that shows diamond-shaped openings and in which **each stitch** in the fabric **consists of only one thread**.
- The fabric is produced with **two half sets of warps**, each set carrying out a **two-course atlas lapping** movement but in opposite directions.



Yarn path notation



AGROKROJEM
JÍDLO

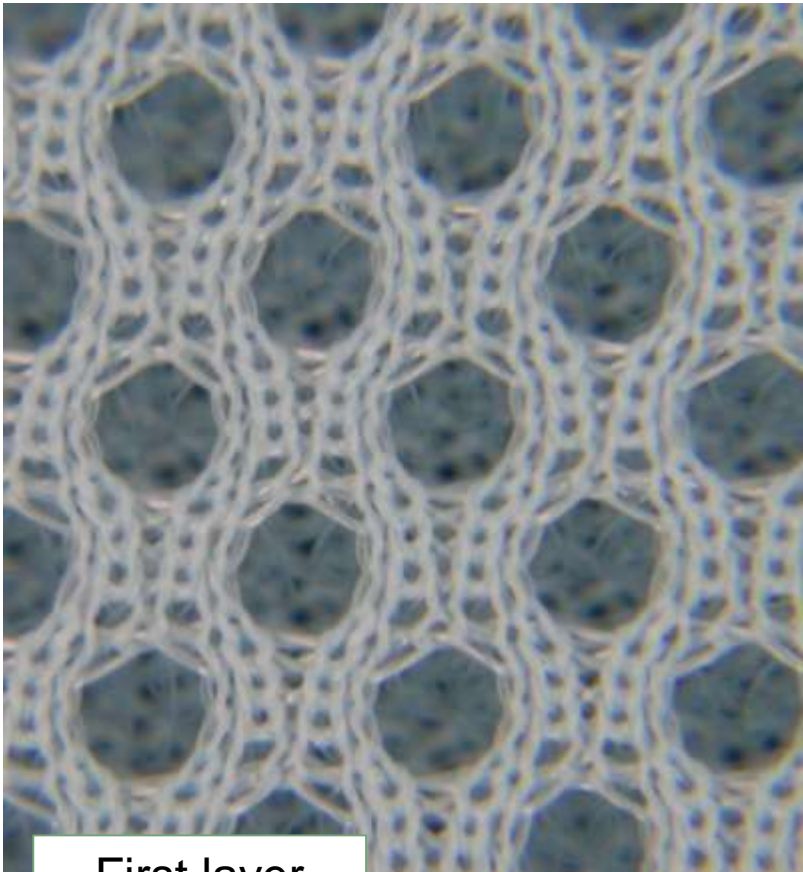


SPACED DOUBLE-LAYER FABRICS

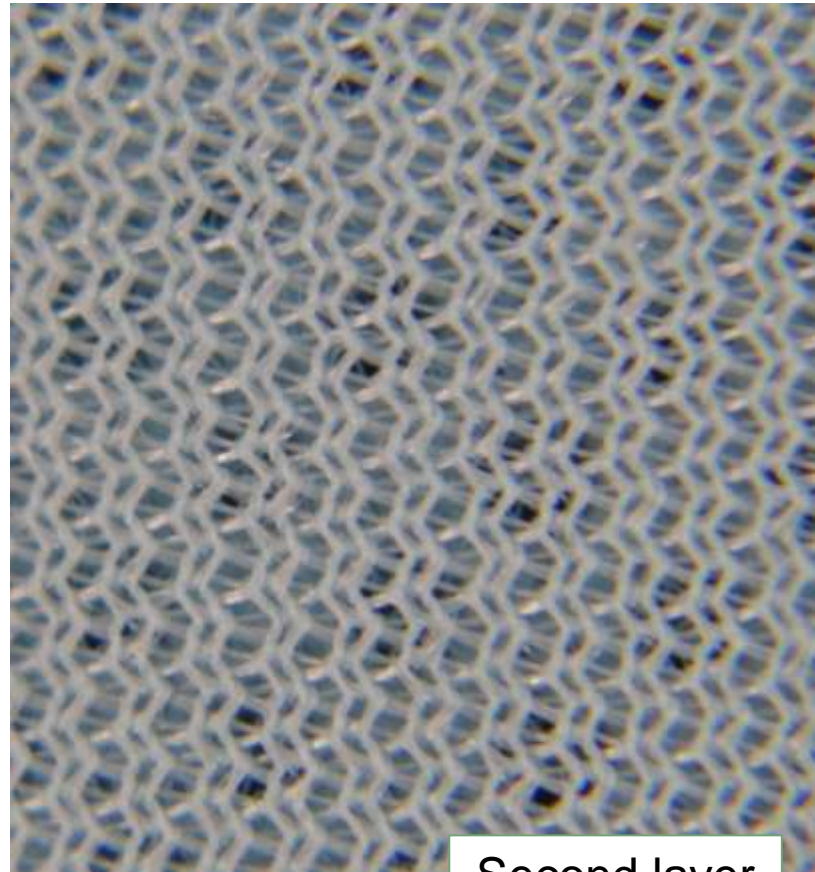


- Generic name applied to a range of double-layer jersey-based warp-knitted fabrics in which **one layer can be entirely different from the other** as concerns the knitted structure and the type of fibres used and in which the multiple **connecting threads** between the two layers can be varied as to their length, frequency and physical characteristics.
- The distance between the trick plates can be adjusted up to a maximum of 60 mm.

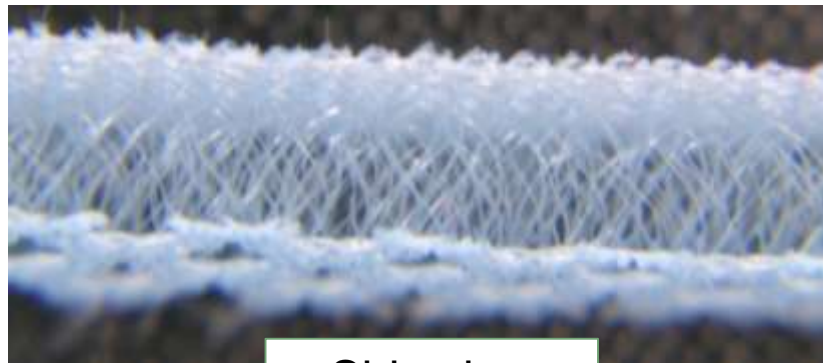




First layer

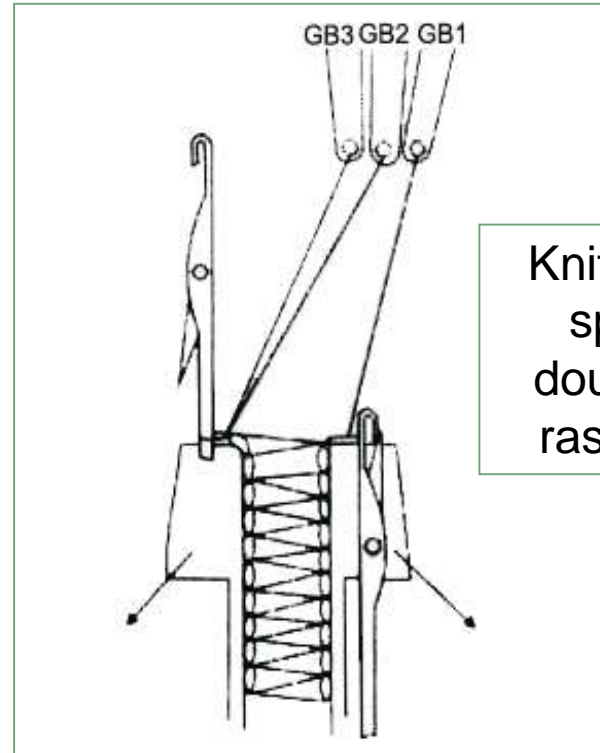
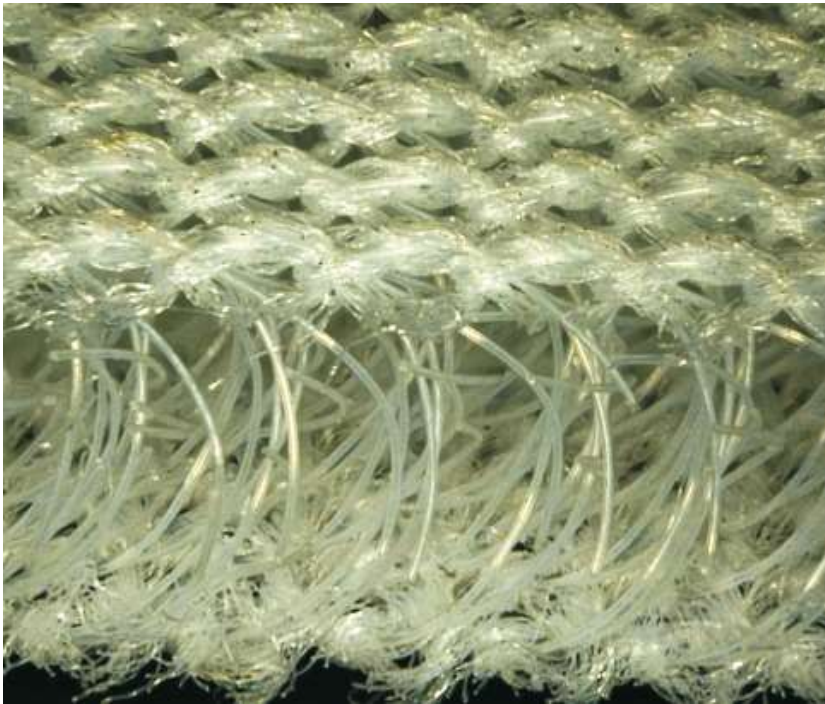


Second layer

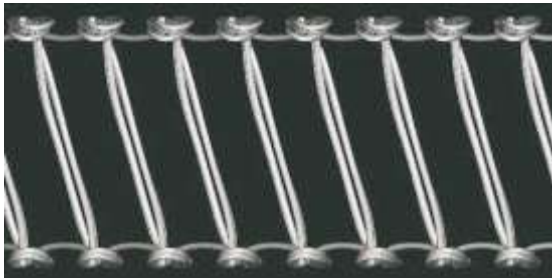


Side view

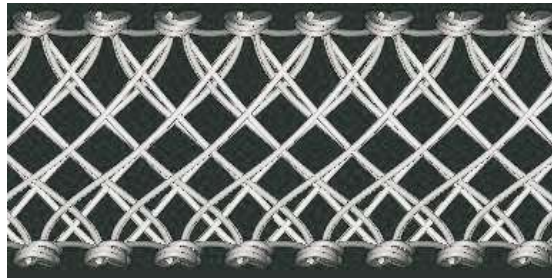




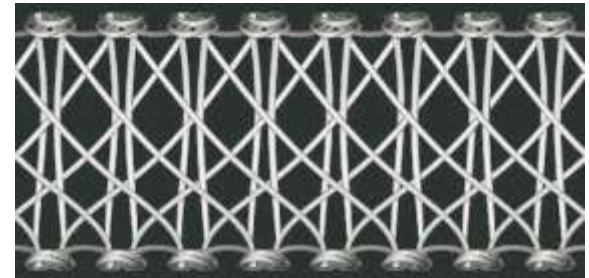
Knitting process of spacer fabrics:
double needle bar raschel machines



Parallel type



Crossed layer

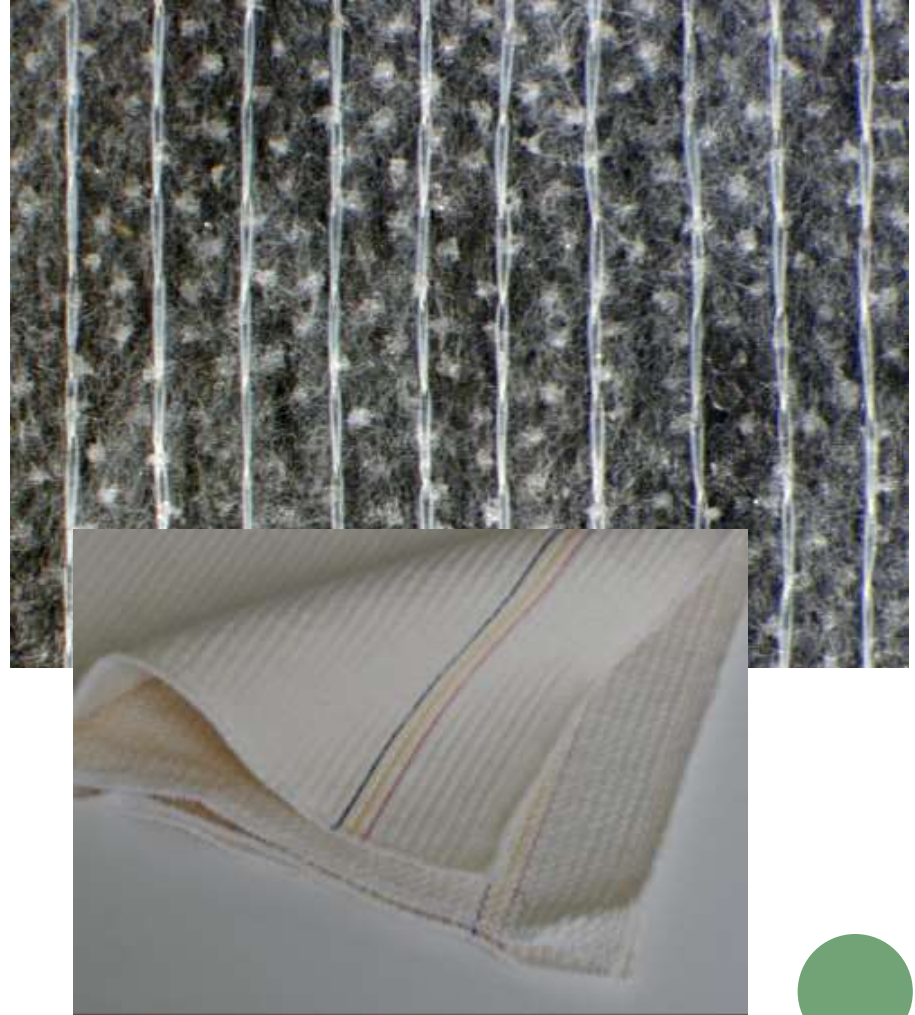


Combined type

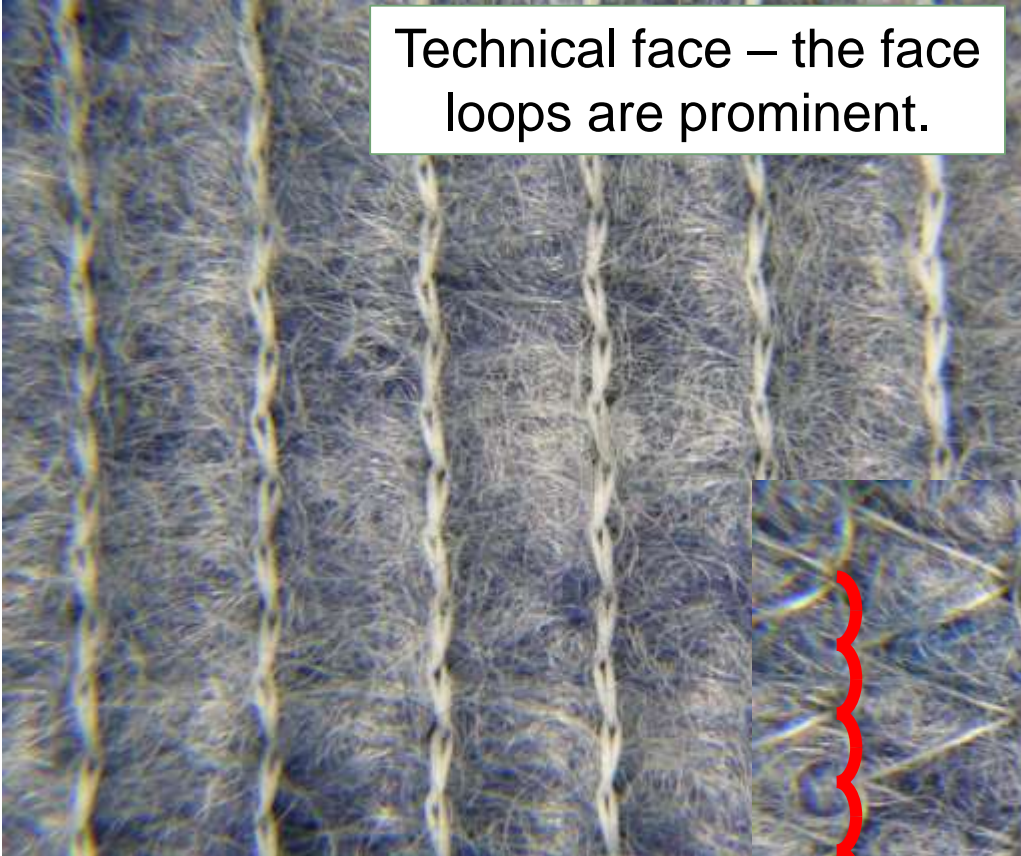
Common effects of the cross section of warp-knitted spacer fabrics

STITCH-BONDED FABRIC

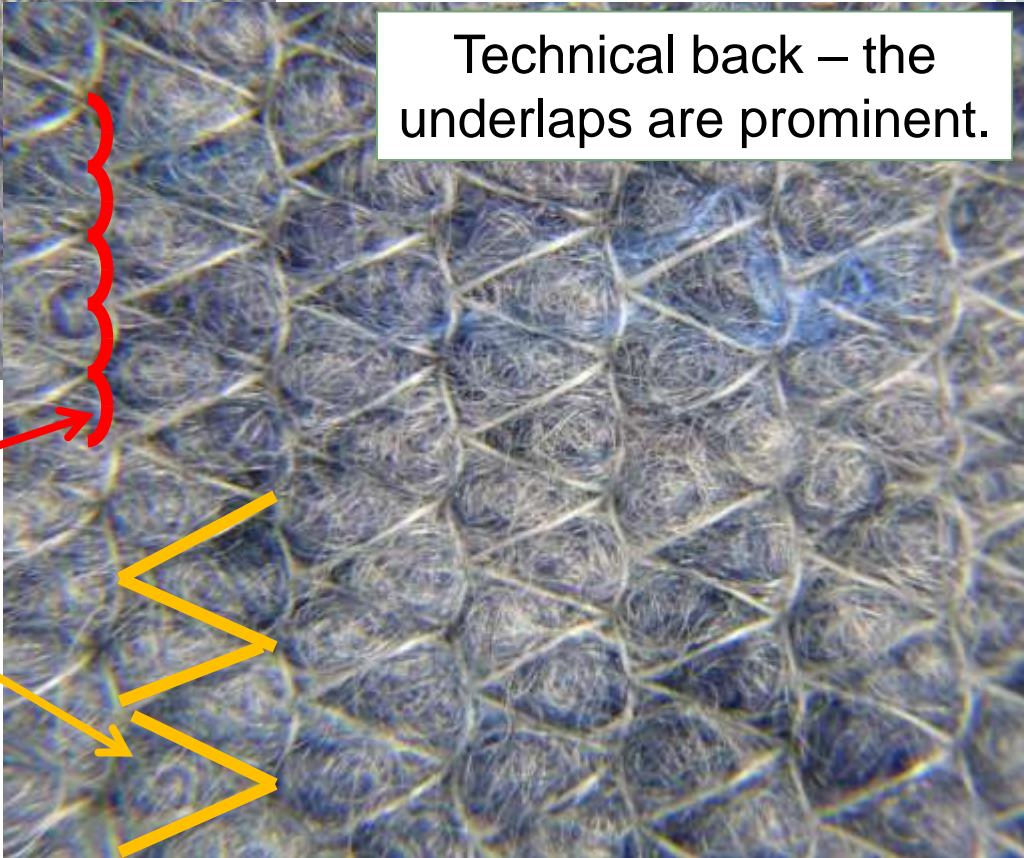
- It is the mechanical bonding of nonwoven fabrics.
- A fibre layer is reinforced by knitted stitches.
- It is necessary to look at the fabric from both sides for proper identification of warp-knitted structure:
 - Technical face – only the face loops are prominent.
 - Technical back – underlaps are prominent.



Technical face – the face loops are prominent.



Technical back – the underlaps are prominent.



Tricot stitch

Pillar stitch