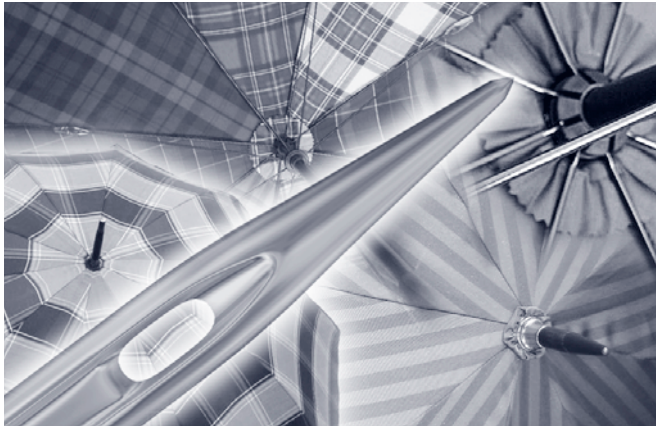


SEWING FOCUS

TECHNICAL SEWING INFORMATION

SERVICEHOUSE



Umbrellas

Checklist for Sewing Umbrellas

Sewing Parameters: SCHMETZ Tip:

Needle size	NM	SIZE
	70 – 110	10 – 18
	Depending on the thickness of the material.	
	We recommend the use of the SCHMETZ SERV 7 needle.	

Needle point In the production of umbrellas, mostly round points of the type “R” and “SPI” are used.

Sewing thread In the production of umbrellas, mostly core spun threads made from cotton or polyester are used. They have a core multi filament made from polyester and thus have greater strength. These threads are also available with hydrophobic finishing.

Machine Many processes are carried out using industrial high-speed sewing machines with stitch types 301 (double lockstitch) and types of overedge chain stitches (class 500). Several types of automats are also used.

Other factors:

Thread tension The required thread tension depends on fabric, sewing thread and sewing machine. It should however be kept as low as possible in order to avoid seam puckering.

Stitch type Double lockstitch (stitch type 301), single thread chain stitch (stitch type 101) and types of overedge chain stitch (class 500); all stitch types and classes according to DIN 61400.

Stitch density The higher the stitch density the higher the elasticity and strength of the seam. The production of umbrellas requires an extremely high stitch density of 7 stitches/cm for the seam to withstand the high tension.

Quick Reference for Typical Sewing Problems in Umbrella Manufacturing

Symptoms	Effect	Cause
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Skip stitches/Thread breakage

No interlocking/interlooping of needle and bobbin/looper thread	Reduced seam strength	Incorrect thread tension
Needle thread breaks	Sub-standard, defective seam appearance	Incorrect needle system
Ravelling of the needle thread	Thread breakage after skip stitch	Needle incorrectly fitted
	Jamming of the sewing thread due to stitch holes which are stuck together	Adhesion of melted residues, clogging of the needle eye and needle groove
	Partly or whole melting through of the needle thread	Use of an oversized sewing thread in relation to the needle size
		Wrong sized aperture of throat plate, material is pulled into it or jammed and prevents the loop formation
		Overheating of sewing machine needle
		Mechanical damage to needle, throat plate, feed etc.
		Arching up of the material due to insufficient presser foot pressure
		Jamming of the sewing thread between needle and fabric
		Incorrect thread guidance

Fabric damage

Material damage	Reduced tensile strength of the material	Use of excessively thick needles and/or the wrong point style
Stitch holes with melted residue of fabric threads	Sub-standard, defective seam appearance	Sewing speed too high
	Reduced seam strength	Damaged/used needles
		Unsuitable finish
		Damaged sewing accessories such as throat plate, feed etc.
		Use of wrong feed

Solution

NM SIZE



Point style



Thread



Machine



Use the SCHMETZ SERV 7 needle

Adjust needle size to the material and amount of layers

Regular changing of the needle (after every shift or in a shorter interval depending on the stress)

Check needle eye and groove for damage, if in doubt: change needle

Check point for damage

Coordination of the sewing thread in relation to the needle size

Optimize thread tension

Optimize the hook/lopper setting

Examine the thread guiding elements

Adjust the sewing accessories such as throat plate aperture, feed etc. to the material thickness and sewing thread/needle

Change worn out or defective sewing accessories such as thread guiding elements, hook/lopper, throat plate etc.

Correct thread guidance

Use the right presser foot and the right adjustment of the presser foot pressure

Check throat plate for damage

Use the SCHMETZ SERV 7 needle

Adjust needle size to the material and amount of fabric layers

R
Normal round point

SPI
Acute round point

CAUTION: After every change of shifts or in short intervals according to the needle stress we recommend to change the needle

Adjust the right sewing thread size according to the needle size

Adjust the sewing accessories such as throat plate aperture, feed-dog etc. to the material thickness and sewing thread/needle

Check and adjust the material transport

Quick Reference for Typical Sewing Problems in Umbrella Manufacturing



Symptoms	Effect	Cause
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Seam puckering

Formation of undesirable waves along the seam	<p>Shifting of material layers</p> <p>Fit is not precise</p>	<p>Incorrect adjustment of the sewing accessories such as hook/looper, feed etc.</p> <p>Incorrect balance of thread guidance</p> <p>Incorrect thread guidance</p> <p>Wrong sewing accessories: too rough toothed feed, oversized aperture of the throat plate etc.</p> <p>Oversized needle</p> <p>Stitch density too high</p> <p>Use of an oversized sewing thread and/or wrong sewing thread</p> <p>Selection of unsuitable stitch type</p> <p>Presser foot pressure too high</p>
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Thermal damage

	<p>Melted particles cling to the fabric</p> <p>Needle thread breaks</p> <p>Needle eye is clogged</p> <p>Needle groove is clogged</p>	<p>Excessive needle temperature due to friction especially when sewing densely woven fabrics</p> <p>Sewing speed too high</p> <p>Needle smeared or needle eye clogged with melted residue</p> <p>Melting of the thread surface and as a result mechanical breakage of the weakened thread</p>
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Solution			
NM SIZE	Point style	Thread	Machine
			

<p>Use of thinner needles</p> <p>Adjust needle size to the material and amount of layers</p>	<p>SPI Acute round point</p>	<p>Choose the right sewing thread size according to the needle size and the fabric</p> <p>Optimize thread tension</p> <p>Optimize stitch density</p> <p>Use core-spun threads</p>	<p>Use of special feed (roller or teflon foot)</p> <p>Use of special sewing accessories</p> <p>Correct thread guidance</p> <p>Adjust the sewing accessories such as throat plate, feed etc. depending on material thickness and sewing thread/needle</p> <p>Adjust presser foot pressure</p> <p>Verify stitch type and stitch density</p> <p>Examine the thread guidance elements</p>
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<p>BLUKOLD needle with Teflon coating. This needle coating prevents or greatly reduces the adhesion of melted residues</p> <p>CAUTION: The use of the BLUKOLD needle does not reduce the needle temperature which is caused by excessive sewing speeds</p>	<p>R Normal round point</p> <p>SPI Acute round point</p> <p>are available in BLUKOLD</p>	<p>Select a well finished sewing thread</p> <p>Alternatively use an extra thread lubricant (e. g. silicone oil)</p>	<p>Reduce sewing speed</p> <p>Needle cooling through compressed air</p>
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Selection of Point Style and Needle Size

Material	Number of layers	Needle size NM / SIZE	Point style
Light fabrics Nylon Polyester (tie fabrics)	2 – 4	65 – 70 / 9 – 10	R normal round point SPI acute round point
Tightly woven fabrics Satin (Baygard) finishing Umbrella silk	2 – 4	60 – 70 / 8 – 10	SPI acute round point
Medium fabrics Cotton Polyester/cotton (tartan) Cotton/polyester/acryl (tartan)	2 – 4	70 – 80 / 10 – 12	R normal round point
Brass/metal/steel combined with fabric (connect tip of the umbrella and the spoke ends with the cover of the umbrella)		100 – 110 / 16 – 18	R normal round point

General recommendation in manufacturing umbrellas:

Use of the SERV 7 needle version with the appropriate point style



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1. Manufacturing of umbrellas
 - 1.1 Typical sewing problems
 - 1.2 Quality seams with the right sewing parameters
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 - 2.2 Point style
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 - 2.4 BLUKOLD needle
 - 2.5 Changing of the needle
3. Selection of sewing threads and stitch parameters
 - 3.1 Composition and size of the sewing thread
 - 3.2 Stitch type
 - 3.3 Stitch density
 - 3.4 Thread tension
4. Sewing machines for the manufacturing of umbrellas
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5. Our advice
6. SERVICEHOUSE – An overview of our services

1. Manufacturing of umbrellas

It had to be an eccentric inventor from rainy Great Britain: The Englishman Jonas Hanway (1712 – 1786) popularized the umbrella as we know it today. In fact, the English word “umbrella” reveals the origin of this portable weather protection device. For, long before people in England and in other countries used umbrellas to protect themselves from the rain, this mobile roof fulfilled its purpose as a provider of shade (from Lat. “umbra” – shadow; “umbrella” – “little” shadow). Originally, the umbrella was an exclusively female accessory. Until the London merchant Hanway put an end to this and made the umbrella socially acceptable for the British gentleman.

Around 1800, the umbrella still weighed about ten pounds, its frame was made from wooden rods and whalebone. Another Englishman, Samuel Fox from Sheffield, invented the slimmer and lighter steel frame, thus freeing umbrellas of their cumbersome weight.

As early as 1715, the Parisian manufacturer Marius advertised a pocket umbrella and during the course of the 19th century, several attempts were made to make the umbrella more portable. In 1852 in Paris, John Gedge announced a self-opening umbrella.

The real breakthrough, however, was achieved by Hans Haupt during the Golden Twenties in Berlin. He designed the first telescopic umbrella (up until then, all small umbrellas were collapsed) and founded the Knirps GmbH in Berlin. In Germany in 1936, the first automatic umbrella was on the market. At the beginning of the 1950s, the popularity of the pocket umbrella began to rise; the umbrella as fashion



Source: Schirm Oertel

accessory now took second place to practicality as well as to the wishes of a travelling and increasingly mobile society. The little miraculous umbrella, or “Knirps”, as it is called in German, was truly booming at that time. Due to the introduction of nyltest fabrics, which could be manufactured in unbelievable colors and patterns, this trend developed even further. The umbrella became slimmer, lighter, flatter and much more durable.

Due to less expensive imports from the Far East, the umbrella lost its upmarket character. However, during the last few years of the 20th century, its status was once again enhanced through the introduction of new materials and functions. The light-weight umbrella made from aluminium or fibre glass, new frames with a double automatic function for opening and closing it, new fabrics and new coatings (such as Teflon®) change as well as enrich the market. However, traditional models such as the walking-stick umbrella for both ladies and gentlemen continue to be valued types of umbrellas.

1.1 Typical sewing problems

In the production of umbrellas, mostly fine fabrics are used. In order to make them weatherproof, they usually receive a Teflon® or Baygard® finishing. When very densely woven materials are used, there is a great danger that the seam will pucker due to displacement. It is therefore important that both thread and needle are as thin as possible. Nowadays, the materials for the roof of the umbrella are usually made from synthetic fibres such as nylon, polyester, satin and mixed fibres. As a result, when sewing speed is high, there is a danger that there will be melted residue on the needle. This can be prevented using special needles. In addition, sewing speed should be reduced and needles with a special finishing should be used. Air humidity is another aspect that plays an important role when producing umbrellas. The fabric roof of the umbrella must always be taut across the umbrella frame, no matter what the air humidity. If umbrellas are manufactured under different climatic conditions from those that predominate in the area where they will later be sold, then care must be taken that the average air humidity in that area is taken account of. The umbrella must open easily even when air humidity is different.

Further typical sewing problems are:

- Fabric damage
- Skip stitches/Thread breakage
- Seam puckering
- Thermal damage

1.2 Quality seams with the right sewing parameters

All sewing parameters which influence production must be carefully coordinated: material, needle, thread and machine settings. In the production of sensitive materials especially (typical for umbrella manufacturing), it must be noted that material, thread and needle form an “inseparable trio”. If one parameter is changed the others must be checked and if necessary adapted.

Needle

2. Selection of the right needle

Choosing the right needle and point style for the material is extremely important for an undamaged seam and a perfect end product. The material is the main factor when choosing a point style for a particular sewing operation.

In the production of textiles, we generally recommend the use of round points. These needles displace the weave threads and gently push them aside. However, the combination and composition of material and number of layers are also important factors when deciding on the right needle.

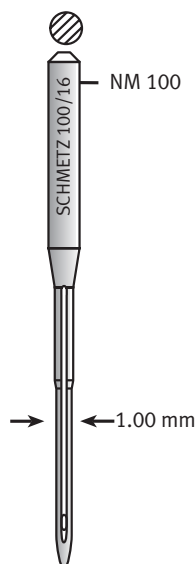
2.1 Needle size

Before deciding on a point style, needle size should be determined. It is important to bring this into line with the thread so that it can pass the needle eye with as little friction as possible. As a rule, the size of the needle eye is around 40 % of the needle size (NM).

The strain put on the sewing thread becomes particularly apparent when considering that the needle thread in the case of a double lockstitch passes the needle eye 25 – 60 times in the same place until it interlaces in the middle of the material with the bobbin thread to create the stitch. The sewing thread is thus put under a lot of strain. There is a simple test that exactly determines which needle size goes with which sewing thread: If the needle is of the right size, it should slide along the thread held at an angle by its own weight without any problems.

The material is of course an important factor when determining the size of the needle. Especially fine fabrics can benefit from the use of needle sizes NM 65 – 70. The right needle mainly prevents material damage and displacement puckering. In this context please note: The thinner the needle's diameter (i.e. NM/SIZE) the less the individual fabric threads are displaced. Minimal displacement prevents the fabric threads from tearing. A thin needle can thus pass the fabric threads more easily without causing damage.

You can find an overview of the recommended needle sizes in the table on page 6.



2.2 Point style

In the production of umbrellas, round points are used exclusively. This is because round points displace the fine woven materials optimally without damaging the fabric threads.

The normal round point “R” with its pointed conical shape counts as the standard point style and has many fields of application. The slightly rounded point style displaces the fabric threads without puncturing them. As a rule, this point style is suitable for most light fabrics.

R normal round point



In the case of particularly tightly woven fabrics such as micro fibers, the “SPI” point enables exact piercing due to its very slim acute point. This point style can easily find its way through the very tight fabric and produces a tidy and straight seam appearance.

SPI acute round point



Point style is at least as important for a smooth production process and optimal end result as is the needle size.

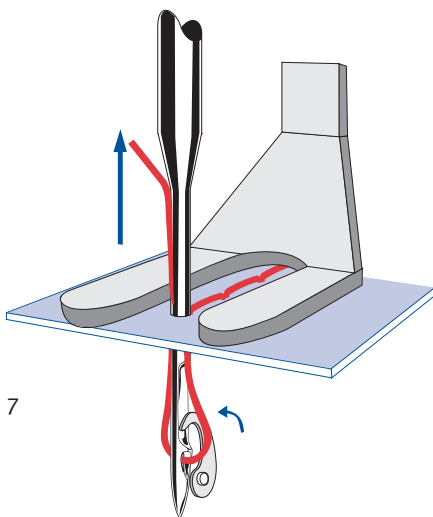
2.3 SERV 7 needle construction

Apart from material damage and seam puckering, skip stitches are also a common problem. Skip stitches occur during stitch formation when the thread loop is not caught by the hook/looper, interrupting the interlacing or interlooping of upper and lower thread. Skip stitches significantly impair the run and the strength of the seam and therefore the quality of the end product.

The SERV 7 needle is a needle for special requirements. This needle version is characterized by an optimized hump scarf and blade reinforcement, both of which help to avoid skip stitches and needle breakage. This type of needle comes with various point styles that meet the demands of different materials.

SCHMETZ Tip:

Benefit 1: SERV 7 hump scarf produces optimum loop formation and prevents skip stitches.



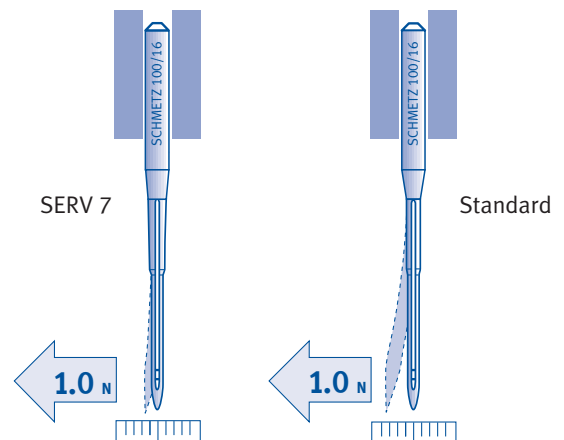
SCHMETZ SERV 7

The SERV 7 needle's blade reinforcement makes the needle more stable. It enables to use a thinner needle and retain the stability of the needle. In order to achieve stitch holes that are as small as possible, SERV 7 in size NM 75 can be reduced to NM 65 – without impairing the stability of the needle.

In addition, the SERV 7 needle's optimized hump scarf avoids skip stitches that can easily arise with elastic materials and higher amounts of layers. The hump scarf guarantees that even in the case of only a small loop or no loop at all that there is enough room between the bottom of the hump scarf and needle thread. The hook or looper can securely pick up the needle thread at any time.

SCHMETZ Tip:

Benefit 2: SERV 7 needle has higher stability which prolongs the needle's operational life.



2.4 BLUKOLD needle

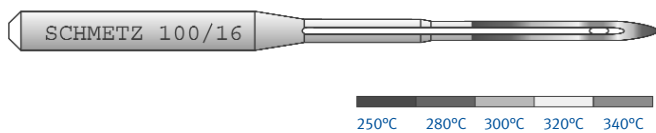
Special sewing problems are associated with synthetic materials or those with a high proportion of synthetic constituents, because they have a very low melting point. Due to the high temperatures that the needle reaches during the sewing process, there can be melting around the stitch hole, which can be transferred to the needle's surface as melted residue.

BLUKOLD special needles have a phosphorated surface and a Teflon coating. This coating either does not permit any melted residue at all or else they appear much later than with a conventional (e. g. chromed) needle. The needle remains "clean" for longer – skip stitches and thread breakage occur significantly less often. This enables a steady sewing process.

During the sewing process, Teflon® coating of the BLUKOLD needle does not reduce the needle temperature, however, as is often wrongly assumed.

In order to avoid damage to the material, the size of BLUKOLD needles, too, must be matched to material and, if necessary, sewing speed must be reduced.

Care must be taken that the needle is definitely “run in” before sewing white or lightly colored materials. This means that the external BLUKOLD layer is chafed off during the needle motion by the fabric over a seam length of approx. 50 cm (20 inches), leaving “green” puncture marks. This “running in” gives the needle a darker appearance, which does not however impair its functionality in any way.



Temperature profile during the sewing process without sewing thread

2.5 Changing of the needle

Even minimal damage at the needle point causes material damage and reduces the quality of the end product. Only a flawless point can ensure that the needle can penetrate the material layers without damaging them. Therefore, the needle should be changed often and at regular intervals.

SCHMETZ Tip:

Check the point of the needle regularly or change the needle at regular intervals.

Sewing thread

3. Selection of sewing threads and stitch parameters

The choice of the various materials for the cover when producing umbrellas is more varied than people are generally aware of. Mostly synthetic fabrics are used due to their water-repellent properties. Similarly, mostly synthetic sewing threads made from polyester are used, since those are more durable and more rot-resistant than threads made from natural fibres. The elasticity of the seam is greatly influenced by type of stitch and thread tension.

3.1 Composition and size of the sewing thread

Nowadays, in the manufacture of umbrellas, core spun threads made from polyester and cotton/polyester are used almost exclusively. They are far superior to conventional threads made from cotton with regard to tensile strength, abrasion resistance, decay resistance and other important characteristics. Core spun threads have a core polyester multi filament, which increases the stability of the yarn.

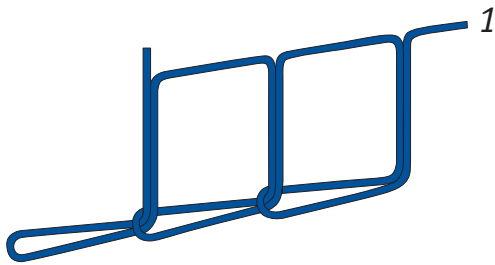
Furthermore, they are more cost-efficient and therefore more economical increasing the possible fields of application: threads with an additional hydrophobic finishing optimize the end-product; semi-transparent threads simplify the manufacture of umbrellas because due to their high color adaptability there is no need to change the color of the threads. Synthetic sewing threads have more tensile strength even when their cross-section is smaller. Thus, thinner needles may be used. It is extremely important to coordinate the strength of the yarn optimally with the material used. In the production of umbrellas, mostly light to medium fabrics are used. We thus recommend the use of threads in the sizes 120/180/240, which are particularly suitable for light fabrics that are prone to puckering.

3.2 Stitch type

In the production of umbrellas, most closing seams are stitched using the overedge chain stitch, so that they can be closed and finished in one step. In order to join the frame of the umbrella with the cover, either the single thread chain stitch or the double lock stitch is used. When choosing stitch type, attention must be paid that there is sufficient amount of thread. If there is not enough thread in the seam, seams can break with only minimal strain.

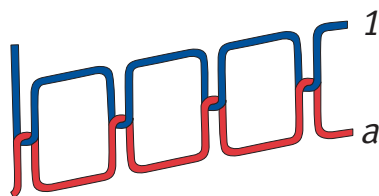
Stitch type 101 – single thread chain stitch

For sewing on the umbrella tips and the hinge protection, for tacking the cover onto the roof of the umbrella



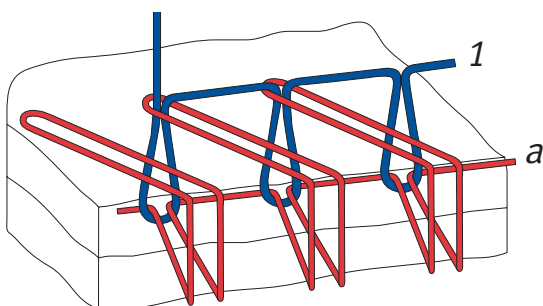
Stitch type 301 – double lockstitch

For closing and attaching seams, also for topstitching seams (e. g. hemming the umbrella, connecting tip of umbrella as well as spoke ends with umbrella roof)



Class 500 – types of overedge chain stitch

For serging seams with high demands as well as joining and serging the fabric edges at the same time (e. g. for sewing together the individual fields with the roof of the umbrella)



3.3 Stitch density

Stitch density should be coordinated with material composition, the number of layers, and the desired strength and elasticity of the seam. At the same time, thread size is a further criterion for optimal stitch density.

The number of stitches per cm (inch) is further said to influence seam strength and elasticity as well as the occurrence of seam puckering. Stitch density has a direct effect on tension as well as displacement puckering. Increasing stitch density leads to a greater amount of thread in the seam, which in turn decreases the risk of tension puckering. If the fabric tends towards displacement puckering, an increase in stitch density displays correspondingly greater seam puckering. This can usually be solved by using thinner needles of NM 70 or thinner together with suitably fine thread.

An increase of stitch density by 30 % (e. g. from 3 to 4 stitches/cm (0.4 inches)) increases the strength of the seam by 30 %. An increase in stitch density thus often enables the use of a finer thread.

In the production of umbrellas, a very high stitch density of 7 stitches/cm will have to be observed because the roof of the umbrella must be able to withstand high tension.

3.4 Thread tension

Thread tension influences the elasticity of the seam, too. Generally, thread tension should be as low as possible in order to produce a smooth and tidy seam appearance and avoid tension puckering in the seam. The exact thread tension depends on fabric, sewing thread, material, stitch type as well as needle.

In the case of the double lockstitch, the tension setting's starting base is the bobbin thread tension, which should first of all be optimized as a precondition for a pucker-free seam. This should be chosen as low as possible. In connection with fine threads, values of up to 20 cN can be realized.

Compared with bobbin thread tension, needle thread tension is approx. 3 times higher. In coordination with the bobbin thread it should be chosen so that stitch interlacing of needle and bobbin thread is situated in the middle of the material.

In the case of particularly sensitive fabrics, it makes sense to loosen thread tension so that the needle thread forms a small loop at the bottom side.

The bobbin's winding tension should be set so that an even winding appearance is achieved and a flawless sewing process is ensured. Depending on the machine, ideal winding tension is between 20 and 30 cN.

Machine

4. Sewing machines for the manufacturing of umbrellas

Apart from needle and sewing thread, machine settings are a decisive factor of the quality of the sewing result, too.

When sewing together the roof of the umbrella, which may be made up of several different kinds of fabrics, safety overlock machines of class 500 with differential transport are used.

In the case of particularly sensitive fabrics such as organza or silk, normal industrial high-speed sewing machines of stitch type 301 are used for stitching. For hemming the roof of the umbrella, industrial high-speed sewing machines of stitch type 301 with needle and roller feed and foot hemmer are used, in order to ensure smooth material feed. In order to sew on the tips and affix the hinge protection, single thread chain stitch automats, button sewing and bartacking machines are used. Those are also used with a slanted sewing head for tacking the cover. The closing loop is sewn on using the double lock stitch, short seam and belt loop machines.



Flatbed Sewing Machine

Closing and attaching seams, hemming



Mono Block Sewing Machine

Closing seams for finishing the sewing edge

Sewing Automats

(see pict. 1)

Pinning the cover, loops, umbrella tip and sewing on hinge protection, fixing closing loop



Pict.1: Bartack automat (9371)

Source: Pfaff AG

4.1 Feed

In order to avoid feed puckering, the feed dog must not be too coarse.

The stitch plate's opening should be adjusted to material and needle size. In the case of thin light fabrics that are very soft, finely toothed feeds have proved to be practical, since coarse toothed feeds encourage puckering.

The height of the feed dog depends on the surface and density of the fabric. In the case of smooth light fabrics, 1/4 to 1/3 of the height of the teeth above the throat plate is sufficient, for fluffy materials feed dog height must be adjusted accordingly in order to ensure material feed.

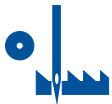
Decreasing the height of the teeth above the throat plate allows the presser foot pressure to be decreased and thus decreases the risk of feed puckering.

Last but not least, as with the needle, it must be considered that even small damages to feed dog, throat plate and hook/looper can lead to material damage.



Drop feed

For sewing fine to medium materials without displacement



Bottom feed, needle and roller top feed

Smooth displacement-free seams



Differential bottom feed and presser foot top feed

For sewing in constant and partial extra width

4.2 Throat plate/Throat plate aperture size

The throat plate aperture size must fit the size of the needle. If the throat plate aperture is too large there is a risk that the material is pushed into the throat plate through the needle; the result are skip stitches and material damage. At needle size of NM 70 – 110 a throat plate of 1.2 – 2.0 mm is the ideal precondition for avoiding seam puckering. A throat plate of more than 2 mm carries the risk that the fabric is pushed through the needle into the throat plate developing a funnel. This results in seam puckering and skip stitches.

Needle size/Throat plate aperture size								
Needle size [NM]	60	65	70	80	90	100	110	120
Throat plate [mm] aperture size	1.00	1.20	1.20	1.40	1.60	1.60	2.00	2.00

Relationship of needle size to throat plate aperture size

4.3 Sewing speed

In the production of umbrellas, the sewing speed of up to 6,000 stitches per minute is much higher than in many other areas of production. Care must be taken, however, that in the case of synthetic (e. g. coated) materials thermal damage in the form of smearing of the needle and material damage may occur if sewing speed is too high. In general, sewing speed must always be coordinated with material, type of stitch and number of layers. A guiding principle is: optimal quality together with high productivity.

5. Our advice

You can achieve damage-free quality seams if all the sewing parameters are precisely coordinated with one another.

Material, needle, thread and machine are the key variables. The **SCHMETZ SERVICEHOUSE** offers various service packages:

From recommending the ideal needle for your fabrics to sending out sample needles and providing assistance with special sewing requirements. In addition the **SCHMETZ SERVICEHOUSE** offers competent on-site advice on your production line and training courses for your employees.

**Challenge us –
let us show you our competence!**

Form to copy and fax: + 49 (0) 24 06 / 85-186

Do you have further questions about sewing umbrellas?
Would you like support in solving your individual sewing problem?
Would you like recommendations on needle selection and sewability of your fabrics in advance of production?
Challenge the SERVICEHOUSE experts and take advantage of our offer.

We will be pleased to send you information on:

Our range of service:

CONSULTING

SAMPLE NEEDLES

Sample needles, tips and information

DOCUMENTED SEWING REPORTS

Sewing reports tailored to match your sewing goods as well as solutions for your complex sewing demands

EXPRESS CONSULTING

Express consulting by phone, fax or e-mail

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INFORMATION

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GUIDE TO SEWING TECHNIQUES

Manual for sewing industry

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TRAINING-ON-SITE

Industry specific training including the latest information on needles, threads, machines and applications

SYMPOSIUM

Interdisciplinary knowledge sharing and exchange of expertise for skilled sewing industry staff

