

The present invention is directed to a process of producing a yarn, especially a sewing yarn, with the features of the preamble of patent claim 1 as well as to a yarn produced according to this process.

5 A number of processes to produce yarns by intermingling two yarn components is known.

So, for example, US patent 4 080 777 describes such an intermingling process of producing yarns which have a different titre along their yarn length on account of the alternate presence of thick and thin locations.
10 The known process uses as starting materials draw-textured yarns or such yarns which are drawn immediately before the intermingling by means of corresponding pairs of galets.

15 US patent 4 615 167 describes a process of producing a sewing yarn according to which a first yarn component serving as core is intermingled with a second yarn component serving as effect material in a nozzle by means of a fluid stream. Here, a pre-oriented yarn (POY yarn) is used as first yarn component which is pre-drawn by means of a
20 heated pin prior to the intermingling with the second yarn component. In order to obtain a uniform dyeing affinity of the two yarn components, US patent 4 615 167 suggests to also pre-draw the second yarn component used as effect material by means of a corresponding heated pin.

EP-A-00 57 583 or the corresponding US patent 4 497 099 describe also a process of producing an intermingled yarn. In contrast to US patent 4 615 167, EP-A-00 57 583 suggests at least one pre-drawing step of the first yarn component with a drawing ratio which is higher than the drawing ratio recommended for the respective material. By this, it is to be attained that the self-crossing loops forming during intermingling are drawn together in a subsequent thermal aftertreatment so that a non-crimped compact yarn is formed.

A process including the features of the preamble of patent claim 1 is described in the prefiled but postpublished EP-A-02 95 601 which is based on the same applicant as the present invention. This European patent application discloses a process of producing a sewing yarn with high strength, wherein this sewing yarn has a first yarn component as core material and a second yarn component intermingled therewith as effect material. The above-cited European patent application suggests as material for the first yarn component the use of a pre-oriented yarn (POY yarn), wherein the specific strength or tenacity of the core material is increased by the use of a special pre-drawing process. Furthermore, in this European patent application specific strength dates of core materials are cited for the first time which are pre-drawn according to the known processes, for example according to processes of the above-cited US patent 4 615 167 or EP-A-00 57 583. The specific strengths or tenacities of these conventionally pre-drawn core materials are between about 30 cN/tex and about 40 cN/tex.

The process known from EP-A-02 95 601 makes necessary an exact adjustment of the parameters influencing the yarn yield at the drawing device and a control of the same. These provisions, i. e. the special

drawing device and its adjustment and control, are not automatically present everywhere.

5 The present invention is based on the problem to provide a process of the cited kind by means of which yarns, especially sewing yarns, with a high strength or tenacity can be produced in an especially simple manner.

10 According to the invention this problem is solved by a process with the characterizing features of patent claim 1.

15 The inventive process is based on the fundamental idea to use at least one multifilament yarn having as starting material a high strength per se as first yarn component for the production of the yarn, especially the sewing yarn. Accordingly, the inventive process suggests to use at least one multifilament yarn as starting material for the first yarn component the specific strength or tenacity of which is between 60 cN/tex and 75 cN/tex, and to not pre-draw this multifilament yarn prior to the intermingling with the second yarn component.

20 The inventive process has a number of advantages. So, it is for example possible to produce a yarn, especially a sewing yarn, which has excellent characteristics with a very low expenditure of machines. Dependent on the respective starting material, i. e. primarily on the starting material of the first yarn component, the sewing yarn produced
25 in such a manner has absolute strengths or tenacities between about 1300 cN and about 5500 cN, wherein the corresponding specific strengths or tenacities vary between about 40 cN/tex and about 60 cN/tex. Here, the specific strength or tenacity is defined as force per titre (cN/tex).
30 The above-cited strengths have the result that the yarn during further

processing, especially a sewing yarn produced according to the inventive process during sewing, does not show any yarn fractures or capillary fractures. Furthermore, the yarn produced according to the inventive process has excellent residual shrinking values, wherein for example the free thermal shrinkage at 160° of a dyed yarn is between about 0.3 % and about 1.5 %, and the boiling water shrinkage of the same yarn is smaller than about 1.0 %.

Normally, according to the inventive process the first yarn component is fed to the intermingling with an overfeeding. By this measure it is assured that the generated yarn has a certain volume or a certain bulk whereby further advantages are obtained. So, it could be observed that a yarn having a certain volume encloses a certain amount of air in the yarn interspaces located between the individual filaments. This amount of air is pressed out during the deflection of the yarn, for example at deflecting members or with a sewing yarn in the range of the sewing needle, whereby cooling of the deflecting members of the sewing needle is obtained. This improves the processing characteristics. Normally, the first yarn component is fed to the intermingling step with an overfeeding of between 1 % and 9 %, preferably of between 2 % and 5 %. In the simplest case this can be obtained by feeding the first yarn component to the intermingling step by means of corresponding feeding units, wherein the speed of the feeding units relative to the speed of the take-off units transporting the intermingled yarn is between 1 % and 9 %, preferably between 2 % and 5 % higher.

In order to achieve an especially intensive intermingling of the two yarn components, according to a further embodiment of the inventive process the first yarn component is wetted with a liquid prior to the intermingling. If additionally particles are added to this liquid, as

this is described in the German patent application DE-A-38 16 318 of the same applicant, the intermingling can even be intensified. This has the result that the formed yarn compound is especially stable.

5 Normally, according to the inventive process also the second yarn component is fed to the intermingling step with an overfeeding. Dependent on the selected overfeeding of the second yarn component in relation to the selected overfeeding of the first yarn component the volume and the number of the formed loops or slings of the produced intermingled yarn can be varied hereby, which especially has a decisive
10 influence on the above-described air storing ability of the intermingled yarn and thus also on the processing characteristics. Normally, the second yarn component is fed to the intermingling step with an overfeeding of between 14 % and 35 %, preferably of between 20 % and
15 30 %. Especially good results with industrially carried out sewing tests had a sewing yarn according to which the first yarn component was fed to the intermingling step with an overfeeding of between 3 % and 4 % and the second yarn component was fed to the intermingling step with an overfeeding of between 24 % and 26 %. Even at extreme stresses, i. e. a
20 stitch density of 7000 stitches per minute, this sewing yarn did not show any yarn fractures or capillary fractures even during longtime use.

On principle, according to the inventive process every starting material can be used as second yarn component. Preferably, one multifilament yarn or a plurality of multifilament yarns, especially one to four
25 multifilament yarns, are used. These multifilament yarns are usual textile standard yarns. Good results with regard to the characteristics of the yarns produced according to the inventive process are obtained if pre-oriented yarns (POY yarns) are used as second yarn component, and
30 these pre-oriented yarns are pre-drawn prior to the intermingling step.

This pre-drawing can be carried out for example by means of a heated pin in the known manner. Pin temperatures which vary between 110°C and 150°C, preferably between 120°C and 140°C, have shown especially good results.

5 With respect to mechanical stresses especially stable yarns are obtained if a POY yarn is selected as second yarn component and this is drawn by means of a non-heated pin and subsequently subjected to a thermal treatment, as this is described in EP-A-02 95 601 which is based on the
10 same applicant.

With regard to the pre-drawing ratio of the second yarn component it has to be stated that the second yarn component is preferably drawn in a ratio which is 2 % to 40 %, preferably 10 % to 25 %, below the value
15 according to which yarn fractures or capillary fractures occur with the respective yarn.

If the production of a yarn with very high strengths, i. e. specific strengths which are higher than about 45 cN/tex, is desired, preferably
20 a high-strength multifilament yarn having a specific strength of between 60 cN/tex and 75 cN/tex is used as starting material for the first yarn component and the second yarn component. In addition to the above-cited extremely high strengths such a yarn has also excellent processing characteristics, for example during sewing, since the occurrence of yarn
25 fractures and capillary fractures is excluded due to the good strength of the monocapillaries and the air inclusions already described above, which was observed by means of extensive industrial sewing tests.

Furthermore, such a yarn has not only thermal shrink values at 160°C but also boiling shrink values which are below about 0.8 %. This has the
30 result that the yarn in its processed condition does no more shrink so

that bulging seams can no more occur.

5 Furthermore, such a process which uses as starting material for the two yarn components the above-cited high-strength multifilament yarns can be carried out very simply since no pre-drawing means is necessary for these process variants and thus extensive adjustment measures of the same and controlling measures of the adjusted parameters are superfluous.

10 Furthermore, still a further problem occurs with the above-described intermingled yarns, especially sewing yarns. The reason for this problem can be seen in the fact that the intermingled yarns are often dyed differently which can be expressed in a shifting of the tonality and depth of colour.

15 An especially suited process variant which takes into account the above-described problem of different dyeing of the first yarn component relative to the second yarn component in a special manner and which enables nevertheless the production of high-strength yarns provides that
20 the individual titres of the filaments of the first yarn component and the individual titres of the filaments of the second yarn components are adjusted with regard to one another. So, it could be observed that with intermingled yarns the first and second yarn component are dyed uniformly with regard to the tonality and depth of colour if filaments
25 with an individual titre of between 2 dtex and 5 dtex, preferably of between 2.5 dtex and 4 dtex, are selected for the first yarn component and filaments with a monotitre of between 0.8 dtex and 5 dtex, preferably of between 1 dtex and 4 dtex, are selected for the second yarn component. Surprisingly, the intermingled yarns are dyed uniformly
30 independent of the material worked in as first and second yarn

component, wherein these materials, of course, were always the same fiber substrate, i. e. for example polyester fibers, propylene fibers or polyamide fibers. With extensive dyeing tests, even with very critical dyestuff combinations, no differences in the tonality and in the depth of colour between the two yarn components could be observed. So, for example intermingled yarns having as first component multifilament yarns with strengths of between 60 cN/tex and 75 cN/tex alone or in connection with usual textile standard yarns and/or POY yarns pre-drawn prior to the intermingling step and having as second yarn component textile standard yarns, POY yarns pre-drawn prior to the intermingling step and/or high-strength yarns with the above-cited strengths are always dyed uniformly if one takes into account the above-cited adjustment of the individual titres of the filaments in both yarn components.

According to a further variant of the inventive process a non-delustered multifilament yarn or a plurality of non-delustered multifilament yarns are used especially as second yarn component. Surprisingly, it could be observed that with the use of such a yarn as sewing yarn the sewing characteristics are still further improved compared with a yarn having as second yarn component a delustered multifilament yarn or delustered multifilament yarns, which is expressed for example in a lower heating of the sewing needle. Furthermore, such a yarn having as second yarn component non-delustered filaments can be produced with a higher speed according to the inventive process.

According to the inventive process the mass ratio of the first yarn component relative to the second yarn component is adjusted dependent on the desired characteristics of the intermingled yarn, i. e. especially the dyeability, strength, end titre and/or shrink values. Usually, this mass ratio of the first yarn component relative to the second yarn

component can be varied between 90 % : 10 % and 50 % : 50 %, preferably between 85 % : 15 % and 70 % : 30 %. With these above-cited mass ratios very good yarns, especially sewing yarns, can be produced.

5 As already mentioned above several times, according to the inventive process at least one multifilament yarn the strength of which varies between 60 cN/tex and 75 cN/tex is selected for the first yarn component. Usually, these yarns are also yarn materials designated high-strength multifilament yarns or technical multifilament yarns which
10 have normally a viscosimetrically determined molecular weight which, compared with the viscosimetrically determined molecular weight of a textile standard fiber chemically identical in other aspects, is higher for about 5 % to 50 %, preferably about 10 % to 25 %. The viscosimetrically determined molecular weight is measured for polyester
15 fibers according to SNV 19 55 91 or for polyamide fibers according to SNV 95 590 or DIN 53 728. Of course, also other high-strength multifilament yarns can be used with the inventive process if they have the above-cited specific strengths.

20 The selection of the first yarn component is dependent on the desired final titre of the intermingled yarn and on the desired characteristics of the same. Normally, a multifile material is used the entire titre of which varies between 100 dtex and 1000 dtex, preferably between 100 dtex and 600 dtex.

25 Just as the entire titre the selection of the elementary thread number depends on the desired characteristics according to the inventive process. So, in the field of sewing yarns it could be observed that excellent yarns can be produced with the inventive process if a yarn
30 material having an elementary filament number between 16 and 300,

preferably between 24 and 96, is used as first yarn component.

According to the inventive process the intermingling step can be joined by a number of further processes. In the simplest case, the intermingled yarn is wound up under low tension and is then ready as finished yarn for further processing. It is also possible to dye the intermingled yarn after the intermingling step, wherein with such a process variant the intermingled yarn is preferably wound up directly on corresponding dyeing sleeves (cheese centers) immediately after the intermingling step. During the subsequent dyeing step, especially during a high temperature dyeing at about 130°C, the yarn shrinks for about 2 to 3 % which results in a reduction of the diameters of the self-crossing loops or slings without drawing together the same as knots.

According to another embodiment of the inventive process the produced yarn is subjected to a tension treatment after the intermingling step and prior to winding up the same. By this, the diameters of the self-crossing loops and slings formed during intermingling are preferably reduced in such a manner that they are reduced for 20 % to 95 % related to their original diameter. However, it has to be expressively emphasized that by this measure it is to be prevented that the loops and slings draw together so that knots are formed since otherwise the later processing characteristics of such a yarn, especially a sewing yarn, are deteriorated. So, it could be observed that the loops or slings reduced in their diameters cause a very good yarn cohesion, which is desired especially on account of the high stress of a sewing yarn during the processing of the same. Furthermore, as already described above, such a sewing yarn has still a certain volume so that air is enclosed within the yarn which is pressed out with a sewing yarn, especially during the deflection of the yarn at thread

deflecting members or the needle. This results in a cooling of the deflecting members or of the needle so that no thread fractures occur with such a yarn, which is not the case with a comparison yarn according to which the loops are drawn together in a knot-like manner.

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In order to carry out the above-cited stress treatment, after the intermingling the yarn is fed to the stress treatment with a speed which is between 0.1 % and 5 %, especially between 0.1 % and 2.5 %, lower than the speed with which the yarn is drawn off the stress treatment. The above-cited speed differences depend on the one side on the desired reduction of the diameters of the self-crossing loops and slings and on the other side on the selected overfeeding of the first and second yarn component.

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According to another embodiment of the inventive process a thermal treatment is carried out prior to winding up the intermingled yarn in addition to the stress treatment or instead of the stress treatment. The temperature of the thermal treatment is varied between 100°C and 250°C, especially between 180°C and 230°C. Similar to the above-described stress treatment carried out at room temperature a reduction of the diameters of the self-crossing loops and slings is achieved by such a thermal treatment, which results in the advantages which were already cited above, especially with a sewing yarn. Furthermore, the thermal shrink values of the intermingled yarn are reduced by a thermal treatment which is positively expressed during the later use of the yarn in the processed condition. Normally, this thermal treatment is carried out at dwell times between 0.01 s and 10 s, preferably between 0.05 s and 1 s. As regards the stress during the thermal treatment, it has to be stated that the same is carried out in a stress-free manner or preferably with a certain overfeeding so that the intermingled yarn

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treated in such a manner can shrink. Particularly, the yarn is fed to the thermal treatment with speeds which are for 0.1 % to 10 %, especially for 2 % to 4 %, higher than the draw-off speeds. By this, it is prevented that undesired stresses are preserved in the yarn which are perceivable during later use in a disadvantageous manner, for example by bulging of the seams with a sewing yarn.

In order to generate an especially good and stable yarn compound, another embodiment of the inventive process provides that the intermingled yarn is twisted. The yarn can be provided with a twist of between 10 twists/m (turns/m) and 800 twists/m (turns/m), preferably between 100 twists/m (turns/m) and 600 twists/m (turns/m). Such a twisting of the yarn can be carried out as integrated step in one of the above-described processes prior to winding up the yarn. However, in many cases it is better to twist the yarn in a separate processing step after winding up since otherwise the production speed will have to be predetermined by the relative slow twisting.

According to an embodiment of the inventive process which is especially suited and which is especially used for the production of sewing yarns, a single multifilament yarn is used for the first yarn component which has the above-described individual titre range, filament number range and a specific strength of between 60 cN/tex and 75 cN/tex. This multifilament yarn is intermingled with a second multifilament yarn as second yarn component with the above-cited overfeedings, wherein the second yarn component has the monotitre range already cited above and is fed to the intermingling step with the overfeeding already cited above. Subsequently, the yarn produced and intermingled in such a manner is drawn under the above-cited conditions at room temperature and is thereafter transferred to a thermal treatment, wherein the above-cited

temperatures, stresses and dwell times are used. Hereafter, the sewing yarn produced in such a manner is wound up and thereafter twisted, dyed and/or avived.

5 In the following the inventive process is described in detail by means of examples and the yarn produced according to such a process is described in detail by means of a microscopic photo of the yarn.

10 A yarn designated on the whole with 1 in the scanning electron microscopic photo, which is a sewing yarn, comprises a core material 2 as first yarn component which is a multifilament yarn. The core material 2 is intermingled with a second yarn component 3 which is usually designated effect yarn component or effect yarn, too. Just as the core material 2 the effect yarn component 3 consists of a multifilament yarn. As one can see in the enclosed photo, the effect yarn component 3 is 15 predominantly located in the outer range of the yarn 1 and forms there self-crossing loops 4 or slings 5 with regard to the core material 2 which extends predominantly straightly in the axial direction. As shown in the photo, the self-crossing loops 4 have different loop diameters, however, are not drawn together in a knot-like manner. 20

The shown yarn has as core material 2 a multifilament yarn having a specific strength of 70 cN/tex, an elementary thread number of 64 and a monotitre of about 3.6 dtex. Of the shown yarn 1 the effect material 3 25 consists of a pre-oriented multifilament yarn (POY yarn) which was drawn by means of a pin heated to 31°C and having a diameter of 70 mm at a pre-draw ratio of 1 : 1.7 and which had an individual filament number of 24, wherein the individual filament titre was about 3.4 dtex. The entire titre of the yarn 1 after intermingling was about 300 dtex. The absolute 30 strength of the yarn 1 was 1300 cN.

The loops 4 or slings 5 projecting from the shown yarn were measured. For this, the yarn was transported perpendicularly to a convergent light beam which was generated by a corresponding light source. The light source was located in a plane opposite to a photocell so that the interruption of the light beam caused by a loop 4 or sling 5 was determined by the photocell and correspondingly added. This measurement was carried out with a distance of the light beam from the yarn of 0.5 mm and 1 mm. With a distance of the light beam of 0.5 mm above the yarn 160 interruptions per m and with a distance of 1 mm 18 interruptions per m could be measured. From this one can conclude that relative few loops or slings project from the yarn compound with a distance larger than 1 mm. Furthermore, the above-described yarn was subjected to industrial sewing tests. Compared with a conventionally twisted yarn and a yarn which had loops which were drawn together in a knot-like manner according to EP-A-00 57 583, it was observed that the above-described yarn did not have any thread fractures or capillary fractures or capillary enlargements even at high sewing speeds of about 6000 to 7000 stitches per m, while the sewing process had to be frequently interrupted on account of thread fractures and capillary enlargements not only with the conventionally threaded yarn but also with the yarn the loops of which were drawn together in a knot-like manner, although all the yarns were manufactured from the same starting materials.

In order to examine the dyeing affinity of the yarn, a number of dyeing tests with different dyestuff combinations and different yarns were carried out. Since all the yarns consisted of polyester, the same were dyed with an end temperature of 130°C. For the dyeings the following temperature gradient was selected:

Starting temperature: 70°C

Upward speed to 130°C with 2°C/min

Dwell time at 130°C: 45 min

Cooling to 80°C with 2°C/min

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After dyeing the yarns were twice rinsed cold and hot and subsequently dried conventionally. The dye baths were adjusted to a pH of 4.5 by the addition of acetic acid and sodium acetate, respectively. Furthermore, all the baths had 0.5 g/l of a dispersing/levelling agent (Lewegal HTN, Bayer). The following dyestuff combinations were used:

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Dyestuff combination I:

0.5 % resolin yellow brown 3 GL, 200 %
(C. I. Disperse orange 29)

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0.25 % resolin red FB, 200 %
(C. I. Disperse red 60)

1 % resolin marine blue 2 GLS, 200 %
(C. I. Disperse blue 79)

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Dyestuff combination II:

3 % resolin marine blue 2 GLS, 200 %
(C. I. Disperse blue 79)

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0.15 % resolin yellow 5 GL, 200 %

0.8 % resolin red BBL, 200 %

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Dyestuff combination III:

- 0.5 % resolin blue BBLS, 200 %
 (C. I. Disperse blue 165)
- 5 1.5 % resolin yellow brown 3 GL, 200 %
 (C. I. Disperse orange 29)
- 0.5 % resolin red FB, 200 %
 (C. I. Disperse red 60)

10 Dyestuff combination IV:

- 0.1215 % resolin orange K-3GLS
- 0.0265 % resolin red K-2BLS
- 0.0275 % palanil brilliant blue BGF
- 15 0.024 % resolin blue K-RLS

For the dyeing tests the following yarns were used:

Yarn 1:

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First yarn component: A multifilament yarn having a specific strength of 65 cN/tex and an individual filament titre of about 4.8 dtex.

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Second yarn component: A multifilament yarn of a textile standard type with an individual filament titre of about 3 dtex.

Yarn 2:

First yarn component: As yarn 1.

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Second yarn component: A multifilament yarn of a pre-oriented (POY) fiber which was pre-drawn with a pre-drawing ratio of 1 : 1.7 by means of a 130°C hot pin with a diameter of 70 mm, individual filament titre 3 dtex.

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Yarn 3:

First yarn component: As yarns 1 and 2.

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Second yarn component: A multifilament yarn as yarn 2 pre-drawn, however, with an individual filament titre of about 1.5 dtex.

Yarn 4:

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First yarn component: A multifilament yarn having a specific strength of 70 cN/tex and an individual filament titre of about 2.8 dtex.

Second yarn component: A multifilament yarn of a textile standard material with an individual filament titre of about 1.2 dtex.

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Yarn 5:

First yarn component: As yarn 4.

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Second yarn component: As yarn 3.

Yarn 6:

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First and second yarn component: A multifilament yarn having a specific strength of 68 cN/tex, respectively,

individual filament titre of the first yarn component: 5 dtex,
individual filament titre of the second yarn component: 1.2 dtex.

Yarn 7:

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First yarn component: A multifilament yarn having a specific strength of 62 cN/tex and an individual filament titre of about 5.5 dtex.

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Second yarn component: A textile standard multifilament yarn with an individual filament titre of about 5.5 dtex.

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The dyeing tests of the yarns showed that all the yarns 1 to 5 with the above-described dyestuff combinations I to IV were uniformly dyed as regards the tonality and the depth of colour, i. e. the first yarn component was not dyed differently as the second yarn component. With the yarn 6 small visual differences with regard to tonality and depth of colour were observed which can be accepted.

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Yarn 7 showed significant differences with regard to tonality and depth of colour so that this yarn is not suited due to the existing colour differences although the yarn has the same individual filament titres.

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Patent claims

1. A process of producing a yarn, especially a sewing yarn, by intermingling a first yarn component as core material, which consists of at least one multifilament yarn, with a second yarn component as effect material by means of a fluid stream so that a yarn is formed which has self-crossing loops and slings, and by optionally drawing, thermally treating, twisting, aviving and/or dyeing the yarn produced in such a manner prior to and/or after winding up the same, characterized by carrying out the intermingling step directly without any pre-drawing with the at least one multifilament yarn of the first yarn component which has a specific strength of between 60 cN/tex and 75 cN/tex.
2. The process according to claim 1, characterized by intermingling the first yarn component with an overfeeding of between 1 % to 9 %, preferably of between 2 % and 5 %.
3. The process according to claim 1 or 2, characterized by wetting the first yarn component with a liquid prior to intermingling.
4. The process according to one of the preceding claims, characterized by feeding the second yarn component with an overfeeding of between 14 % and



35 %, preferably of between 20 % and 30 %, to the intermingling step.

5 5. The process according to one of the preceding claims, characterized by selecting a pre-oriented multifilament yarn (POY yarn) as second yarn component.

10 6. The process according to claim 5, characterized by pre-drawing the pre-oriented multifilament yarn by means of a pin, preferably a heated pin, and thereafter intermingling.

15 7. The process according to claim 5 or 6, characterized by carrying out the pre-drawing of the pre-oriented multifilament yarn at a pin temperature of between 110° C and 150° C, preferably of between 120° C and 140° C.

20 8. The process according to one of the claims 5 to 7, characterized by pre-drawing the pre-oriented multifilament yarn with a ratio which is 2 % to 40 %, preferably 10 % to 25 %, lower than the value at which a break of the multifilament yarn occurs.

25 9. The process according to one of the preceding claims, characterized by selecting as second yarn component a multifilament yarn with a specific strength of between 20 cN/tex and 75 cN/tex, preferably of between 30 cN/tex and 45 cN/tex or 60 cN/tex and 75 cN/tex.

30 10. The process according to one of the preceding claims according to which the yarn produced in such a manner is dyed, characterized by adjusting the monofilament titre of the multifilament yarn of the first yarn component and the monofilament titre of the yarn material of the second yarn component with respect to one another in such a manner that



filaments with a monofilament titre of between 2 dtex and 5 dtex, preferably of between 2.5 dtex and 4 dtex, are used for the first yarn component and a yarn material with a monofilament titre of between 0.8 dtex and 5 dtex, preferably of between 1 dtex and 4 dtex, is used for the second yarn component.

11. The process according to one of the preceding claims, characterized by selecting as second yarn component a multifilament yarn which is not delustered.

12. The process according to one of the preceding claims, characterized by selecting a mass ratio of the first yarn component relative to the second yarn component of between 90 : 10 to 50 : 50, preferably of between 85 : 15 to 70 : 30.

13. The process according to one of the preceding claims, characterized by selecting for the first yarn component yarn materials having a viscosimetrically determined molecular weight which is 5 % to 50 %, preferably 10 % to 25 %, higher than the viscosimetrically determined molecular weight of a textile standard fiber which is chemically identical in other respects.

14. The process according to one of the preceding claims, characterized by selecting a yarn material with an entire titre of between 100 dtex and 1000 dtex, preferably of between 100 dtex and 600 dtex, for the first yarn component.

15. The process according to one of the preceding claims, characterized by using a yarn material with an elementary thread number of between 16 and 300, preferably of between 24 and 96, for the first yarn component.



16. The process according to one of the preceding claims, characterized by subjecting the intermingled yarn to a tension treatment prior to winding up in such a manner that the self-crossing slings or loops formed during intermingling are decreased in such a manner that their diameter is reduced for 20 % to 95 %, related to their original diameter.
17. The process according to claim 16, characterized by feeding the intermingled yarn to the tension treatment with a speed which is between 0.1 % and 5 %, preferably between 0.1 % and 2.5 %, lower than the speed with which the yarn is drawn-off from the tension treatment.
18. The process according to one of the preceding claims, characterized by subjecting the intermingled yarn prior to winding up to a thermal treatment at a temperature of between 100° C and 250° C, preferably of between 180 C and 240° C.
19. The process according to claim 18, characterized by carrying out the thermal treatment in a hot stream of air.
20. The process according to one of the claims 18 or 19, characterized by carrying out the thermal treatment for between 0.01 s and 10 s, preferably for between 0.05 s and 1 s.
21. The process according to one of the claims 18 to 20, characterized by feeding the intermingled yarn to the thermal treatment with a speed which is the same as or higher than the speed with which the yarn is drawn-off from the thermal treatment.
22. The process according to claim 21, characterized by using a feeding



speed which is 0.1 % to 10 %, preferably 2 % to 4 %, higher than the speed with which it is drawn-off.

5 23. The process according to one of the preceding claims, characterized by providing the intermingled yarn with a twist of between 10 twists/m and 800 twists/m, preferably of between 100 twists/m and 600 twists/m.

10 24. The process according to one of the preceding claims, characterized by winding up the intermingled yarn with an overfeeding of between 0 % and 10 % and subsequently dyeing and/or aviving the same.

15 25. The process according to one of the preceding claims, characterized by using as first yarn component only one multifilament yarn and as second yarn component also only one multifilament yarn.