Fabric Properties

The Fabric Properties define the dimensions, weight and shrinkage of the finished fabric. e.g. Course Density, Wale Density, Area Weight, Yield, Length and Width Shrinkage.

The Reference Dimensions of a particular Fabric Type are determined by the selections for Yarn Type, Wet Process and Depth of Shade together with the Knitting Quality Values for Yarn Count and Stitch Length.

The delivered dimensions for each Knitting Quality on each Knitting Machine are calculated from the Reference Dimensions using the Finishing Quality Target Values that have been entered for the two properties of the Finished Fabric chosen as Finishing Targets.

The Knitting Parameters and the Finished Fabric Properties are calculated and presented in the chosen Units. When a change is made either to the Fabric Manufacturing System, the Working Environment or the individual Quality Values STARFISH recalculates the data and displays the results.

The following topics provide additional information on the options that are available and the limits that apply to the entry and calculation of the finished fabric properties.

- Course Density
- Wale Density
- Stitch Density
- Fabric Weight
- Fabric Width
- Fabric Yield
- Shrinkage

Course Density

Course Density is defined as the number of visible stitches or loops per unit length measured along a wale.

- For Interlock, 1x1 Rib, 2x2 Rib and Plain Jersey constructions Visible Courses are equivalent to the total or "true" number of courses in the fabric.

- For Two thread Fleece fabrics, as defined in STARFISH, there is an inlay course for each face course. Therefore, the total or "true" number of courses in the construction is exactly double the Visible Courses.

- For Crosstuck constructions the total or "true" number of courses in the fabric may be significantly different from those that are actually visible and can be counted easily.

In principle, STARFISH predicts and displays the total or "true" number of Courses per unit length in the fabric.

There are two exceptions

1. **Two thread Fleece fabrics**
   - STARFISH displays the number of Visible Courses per unit length. That is, the inlay courses are not included in the displayed Course Density values since they lie entirely on the technical back of the fabric and are normally not counted.

2. **Crosstuck constructions**
   - When Cells and Wales are the chosen Units, STARFISH displays the number of Cells per unit length.

▷ **Note:**

The STARFISH predictions for Fabric Weight automatically take account of the "true" course and wale densities in the fabric.

Structural Knitted Cell

A Structural Knitted Cell is the smallest repeating pattern of stitches that is required to produce a particular fabric construction. The Cell or pattern may extend over several wales and courses.

All weft-knitted fabrics can be described in terms of the Structural Knitted Cell. e.g. for the simplest construction, plain single jersey, the SKC repeats over one course and one wale, for interlock fabrics the SKC repeats over two courses and two wales. However, the SKC is most useful for describing more complicated constructions where it is very difficult to visually identify and count the individual stitches in the fabric. In STARFISH the SKC is used to provide an alternative method for defining the dimensions of crosstuck fabrics.

In crosstuck (piqué) fabrics it is extremely difficult to count the total or "true" number of Courses per unit length. This is because the combination of knit and tuck loops in each pattern repeat cause some of the courses to "disappear" into the body of the fabric.

For most practical purposes it is therefore more usual to count the number of Structural Knitted Cells (SKC) in the fabric since the repeating pattern creates a diamond-like pattern in the fabric that is usually quite distinct and relatively easy to count.

- For Single Crosstuck and Double Crosstuck fabrics, as defined in STARFISH, the SKC is produced by four courses and two wales.

- For Six-Thread Crosstuck fabric, as defined in STARFISH, the SKC repeats over six courses and two wales.

Each Structural Knitted Cell contains all of the courses required to produce the particular crosstuck construction, whether or not they can actually be seen and counted.

The total or "true" number of courses can be calculated by multiplying the number of Cells by the number of feeders required to produce each pattern repeat. Conversely the number of Cells can be calculated by dividing the "true" courses by the number of feeders. STARFISH makes these calculations automatically depending on the chosen Units.

When Courses and Wales are chosen as the Stitches Unit the total or "true" number of Courses per unit length is calculated and displayed. When Cells and Wales are the chosen Units the number of Cells per unit length are calculated and displayed.

▷ **Note:**

The STARFISH predictions for Fabric Weight automatically take account of the "true" course and wale densities in the fabric regardless of the Units option that has been selected.

Course Density Units

The Units for Course Density and Wale Density are specified together.

The Units provided are:

- Courses and Wales per centimetre
- Courses and Wales per three centimetres
- Courses and Wales per ten centimetres
- Courses and Wales per inch
- Cells and Wales per three centimetres
- Cells and Wales per inch

▷ **Note:**

Cells and Wales can only be selected as the Stitches Unit for Crosstuck fabrics

Active Model

The Active Course Density Unit is chosen from the option list in the Active Stitch Density Units dialog.

▷ **Note:**

> If the Active Stitch Density Unit is changed the Values for Course Density and Wale Density are converted automatically.

Use as Default check box

The Active Stitch Density Unit can also be designated as the Default Stitch Density Unit for the Active Fabric Type by turning ON the Use as Default check box.

To change the Default Stitch Density Unit for any other Fabric Type, use the Default Units dialog.

Default Models

Course Density Units for the Default Models are chosen from the Stitches Tab on the Default Units dialog.

▷ **Note:**

> Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

Course Density Values

Active Model

The values for Course Density in the finished fabric are calculated dynamically according to the selections for the Fabric Manufacturing System, the Working Environment and the entered Quality Values.

When a change is made to the Active Model Environment the values for Course Density are recalculated.

The values are presented in the Prediction Windows in the chosen Units. If the Units are changed then the Values are converted automatically.

The Values for Course Density in the finished delivered fabric can also be changed using the Edit Column data entry boxes adjacent to the Finishing Quality section of the Predictions Tables in the View By Quality and the View By Machine.

New Values can be entered either directly by typing a new value for the Course Density or indirectly by changing one of the other properties that affect the Course Density in the delivered finished fabric. e.g. length shrinkage.

When a new value is entered the Dependent Fabric Properties are recalculated and the Predictions Tables updated.

Default Models

When a Default Model is first opened the values for Course Density are determined by the Default Settings.

Course Density Limits

The actual range of values that can be entered for Course Density depends on the Fabric Type, the specified Fabric Quality and the chosen Units. The range is wide enough to allow room for experimentation and evaluation of qualities outside of normal commercial practice.

This means that within the normal range of practical and commercial limits any value can be entered, so that the effect of changing the delivered Course Density Values on the other Fabric Properties, e.g. weight or length shrinkage, can be evaluated.

Restrictions to data entry are imposed only when the entered Course Density Values are calculated to produce a potential Length Shrinkage in the Finished "As Delivered" Fabric outside the range -5 to 25%.

When a value for the Course Density is entered that exceeds the maximum range allowed a Warning Message is generated. This message provides information on the actual range of Values allowed for the selected Fabric Quality.

STARFISH Model Environment
Fabric Properties

Wale Density

In STARFISH, Wale Density is defined as the number of Visible Wales per unit width counted along a line that is perpendicular to the wale line.

The values for Wale Density displayed by STARFISH are "Visible Wales". That is those wales that are visible and can be counted on the test face of the sample.

For Interlock, Plain Jersey, Two-thread Fleece and Crosstuck constructions the Visible Wales are equal to the "true" wales.

In 1x1 Rib and 2x2 Rib constructions there are an equal number of wales on the reverse side of the fabric that will not be counted. For these fabrics the "true" number of wales in the fabric is exactly double the Visible Wales.

▷ **Note:**

The STARFISH predictions for Fabric Weight automatically take account of the "true" course and wale densities in the fabric regardless of the Units option that has been selected.

Wale Density Units

The Units for Wale Density and Course Density are specified together.

The Units provided are:
- Courses and Wales per centimetre
- Courses and Wales per three centimetres
- Courses and Wales per ten centimetres
- Courses and Wales per inch
- Cells and Wales per three centimetres
- Cells and Wales per inch

▷ **Note:**

Cells and Wales can only be selected as the Stitches Unit for Crosstuck fabrics

Active Model

The Active Wale Density Unit is chosen from the option list in the Active Stitch Density Units dialog.

▷ **Note:**

If the Active Stitch Density Unit is changed the Values for Course Density and Wale Density are converted automatically.

Use as Default check box

The Active Stitch Density Unit can also be designated as the Default Stitch Density Unit for the Active Fabric Type by turning ON the Use as Default check box.

To change the Default Stitch Density Unit for any other Fabric Type, use the Default Units dialog.

Default Models

Course Density Units for the Default Models are chosen from the Stitches Tab on the Default Units dialog.

▷ **Note:**

Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

STARFISH Model Environment
Fabric Properties

Wale Density Values

Active Model

The values for Wale Density in the finished fabric are calculated dynamically according to the selections for the Fabric Manufacturing System, the Working Environment and the entered Quality Values.

When a change is made to the Active Model Environment the values for Wale Density are recalculated.

The values are presented in the Prediction Windows in the chosen Units. If the Units are changed then the Values are converted automatically.

The Values for Wale Density in the finished delivered fabric can also be changed using the Edit Column data entry boxes adjacent to the Finishing Quality section of the Predictions Tables in the View By Quality and the View By Machine.

New Values can be entered either directly by typing a new value for the Wale Density or indirectly by changing one of the other properties that affect the Wale Density in the delivered finished fabric. e.g. fabric width or width shrinkage.

When a new value is entered the Dependent Fabric Properties are recalculated and the Predictions Tables updated.

Default Models

When a Default Model is first opened the values for Wale Density are determined by the Default Settings.

Wale Density Limits

The actual range of values that can be entered for Wale Density depends on the Fabric Type, the specified Fabric Quality and the chosen Units. The range is wide enough to allow room for experimentation and evaluation of qualities outside of normal commercial practice.

This means that within the normal range of practical and commercial limits any value can be entered, so that the effect of changing the delivered Wale Density Values on the other Fabric Properties, e.g. weight or width shrinkage, can be evaluated.

Restrictions to data entry are imposed only when the entered Wale Density Values are calculated to produce a potential Width Shrinkage in the Finished "As Delivered" Fabric outside the range -5 to 25%.

When a value for the Wale Density is entered that exceeds the maximum range allowed a Warning Message is generated. This message provides information on the actual range of Values allowed for the selected Fabric Quality.

Stitch Density

Stitch Density is defined as the number of Visible Stitches per unit area in a fabric. It is calculated by multiplying the number of Visible Courses per unit length by the number of Visible Wales per unit width.

It is important to remember, however, that for certain fabric constructions the "Visible" courses and wales may not be the same as the total or "true" number of courses and wales in the fabric.

Values for Stitch Density are not provided as a direct output from the STARFISH software.

In STARFISH, Stitch Density is the term used to identify the dialogs from which the Units for Course Density and Wale Density are selected.

For the Active Model the Units for Course Density and Wale Density are chosen together from the option list in the Active Stitch Density Units dialog and for the Default Models from the Stitches Tab on the Default Units dialog.

STARFISH Model Environment
Fabric Properties

The Units provided are:

- Courses and Wales per centimetre
- Courses and Wales per three centimetres
- Courses and Wales per ten centimetres
- Courses and Wales per inch
- Cells and Wales per three centimetres
- Cells and Wales per inch

▷ **Notes:**

- ❑ Cells and Wales can only be selected as the Stitches Unit for Crosstuck fabrics.
- ❑ If the Active Stitch Density Units are changed the Values for Course Density and Wale Density are converted automatically.
- ❑ Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

Fabric Weight

Weight is a measure of the quantity of material. In STARFISH, Fabric Weight is calculated by unit area.

The STARFISH predictions for Fabric Weight automatically take account of the "true" course and wale densities in the fabric.

Fabric Weight Units

The Units provided are

- grams per square metre
- ounces per square yard

Active Model

The Active Fabric Weight Unit is chosen from the option list in the Active Weight Units dialog.

▷ **Note:**

The chosen Weight Unit is also used to present Weight related data in the View Production. If the Active Weight Unit is changed all Weight related Values are converted automatically.

Use as Default check box

The Active Weight Unit can also be designated as the Default Weight Unit for the Active Fabric Type by checking the Use as Default check box.

To change the Default Weight Unit for any other Fabric Type use the Default Units dialog.

Default Models

Weight Units for the Default Models are chosen from the Weight Tab on the Default Units dialog.

▷ **Note:**

Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

Fabric Weight Values

Active Model

The Weight of the finished fabric is calculated dynamically according to the selections for the Fabric Manufacturing System, the Working Environment and the entered Quality Values.

When a change is made to the Active Model environment the values for Fabric Weight are recalculated.

The values are presented in the Prediction Windows in the chosen Units. If the Weight Units are changed then the Values are converted automatically.

The Values for Fabric Weight in the finished delivered fabric can also be changed using the Edit column data entry boxes adjacent to the Finishing Quality section of the Predictions Tables in the View By Quality and View By Machine.

New Values can be entered either directly by typing a new value for the Fabric Weight, or indirectly by changing one of the other properties that affect the Weight of the delivered finished fabric. e.g. length or width shrinkage.

When a new value is entered the Dependent Fabric Properties are recalculated and the Predictions Tables updated.

Default Models

When a Default Model is first opened the values for Fabric Weight are determined by the Default Settings.

Important Notes:

- The values for Fabric Weight that are predicted by STARFISH refer to the weight of the fabric after it has been properly conditioned in the standard atmosphere for testing textiles specified in BS 1051 and ISO 139 as 65 ±2% RH at 20 ±2 °C

- Values for Fabric Weight which are determined on fabrics that have not been so conditioned, or that are based on methods that assume a standard value for Regain or Moisture Content will not correspond to the values predicted by STARFISH.

  Typically,
  - The Moisture Content of conventionally finished and properly conditioned cotton knitgoods is between 6.0 and 6.5%
  - The Moisture Content of piece mercerised, finished and properly conditioned cotton knitgoods is between 7.5 and 8.0%
  - The Moisture Content of resin finished and properly conditioned cotton knitgoods is between 3.5 and 6.0%
  - The Moisture Content of piece mercerised, resin finished and properly conditioned cotton knitgoods is between 5.0 and 7.0%

Fabric Weight Limits

The actual range of values that can be entered for Fabric Weight depends on the selection of Fabric Type, the specified Fabric Quality and the chosen Units. The range is wide enough to allow room for experimentation and evaluation of qualities outside of normal commercial practice.

This means that within the normal range of practical and commercial limits any value can be entered, so that the effect of changing the delivered weight on the other Fabric Properties, e.g. length and width shrinkage, can be evaluated.

Restrictions to data entry are imposed only when the entered Weight Values are calculated to produce a potential Length and / or Width Shrinkage in the Finished "As Delivered" Fabric outside the range -5 to 25%.

When a value for Fabric Weight is entered that exceeds the maximum range allowed a Warning Message is generated. This message provides information on the actual range of Values allowed for the selected Fabric Quality.

Weight Mode

Whenever a change is made to the finished fabric area weight STARFISH has to calculate how the change in weight affects other properties, such as course density, wale density, width, and shrinkage.

The Weight Mode option provides a facility for the user to control how changes that are made to the target finished fabric Weight per unit area will be applied to the recalculation of other Fabric Properties.

STARFISH Model Environment
Fabric Properties

The Weight Mode option is selected from the Weight Mode dialog. The picture on the Weight Mode shortcut button, located on the Active Model toolbar, indicates the option that is currently selected.

▷ **Notes:**

- ❑ The Weight Mode selection is applied globally. Whichever option is chosen this is the setting that is used for all Models until it is changed.

- ❑ The Units, Values and Limits that apply for Fabric Weight are not affected by the choice of Weight Mode.

Maintain a Fixed Width

When the "Maintain a fixed Width" option is selected, changes that are made to the values for Fabric Weight are applied to the other Fabric Properties only in the length direction leaving the width constant.

Most often the finished Fabric Width forms an integral part of the required specification. e.g. For the garment maker the delivered Fabric Width is important for the efficiency of his lay plan and pattern cutting. Consequently, when the Weight of the finished fabric has to be adjusted, this is most often achieved by adjusting the Course Density or length of the fabric while maintaining the delivered width at the appropriate level.

The Weight Mode option "Maintain a fixed Width" simulates this approach by allowing the Fabric Weight to be adjusted without altering the Fabric Width. All of the consequent changes to the proportions of the delivered fabric are applied only in the length direction. i.e. they affect only the delivered Course Density and Length Shrinkage.

"Maintain a fixed Width" is the STARFISH Default setting since it is what happens most often in the practical mill situation.

Maintain Balanced Shrinkage

When the "Maintain balanced Shrinkage" option is selected and the delivered Fabric Weight is altered, STARFISH adjusts the fabric dimensions in both the length and width in equal proportion. This enables a balanced fabric performance to be maintained.

Ideally cotton knitgoods should be delivered with equal or balanced levels of Shrinkage in both the length and width directions.

The Weight Mode option "Maintain balanced Shrinkage" simulates this approach by dividing the effect of changes that are made to the values for the delivered Fabric Weight in equal proportion between the length and width directions of the fabric. This means that the Course Density, the Length Shrinkage, the Wale Density, the Width and the Width Shrinkage all change as the Fabric Weight is altered.

The relative balance in the Values for the Length and Width Shrinkage that were entered or predicted before the Fabric Weight was altered is maintained.

Fabric Width

Fabric Width is defined as the distance from one edge to the other of a fabric when laid flat without tension.

In STARFISH, Fabric Width is calculated from the Values that are either entered or predicted for Wale Density and the Number of Active Needles in the selected Knitting Machine. It can be calculated for tubular as well as for open width finished fabrics.

For open-width finished fabrics, STARFISH provides a facility for calculating the Useable Width of the fabric by the deduction of a standard Trimming Allowance.

▷ **Notes:**

- ❑ If the Number of Active Machine Needles is changed, STARFISH recalculates the Fabric Width automatically.

- ❑ For 2x2 Rib Fabrics, two needle set-out options are provided. STARFISH adjusts the Number of Active Needles automatically for the chosen needle set-out and notifies the adjustment by adding a * to the Machine ID in the Active Machines Memory Prompt.

STARFISH Model Environment
Fabric Properties

Fabric Width Units

The Units provided are
- Centimetres Tubular
- Inches Tubular
- Centimetres Open
- Inches Open
- Centimetres Open Trimmed
- Inches Open Trimmed

Active Model

The Active Width Units is chosen from the option list in the Active Width Units dialog.

▷ **Note:**

    If the Active Width Unit is changed the Values for Fabric Width are converted automatically.

Use as Default check box

The Active Width Unit can also be designated as the Default Width Unit for the Active Fabric Type by checking the Use as Default check box.

To change the Default Width Unit for any other Fabric Type, use the Default Units dialog.

Default Models

Width Units for the Default Models are chosen from the Width Tab on the Default Units dialog.

▷ **Note:**

    Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

Fabric Width Values

Active Model

Finished Fabric Width is calculated dynamically according to the selections for the Fabric Manufacturing System and Working Environment and the entered Quality Values.

When a change is made to the Active Model environment the values for Fabric Width are recalculated.

The values are presented in the Prediction Windows in the chosen Units. If the Width Units are changed then the Values in the Predictions Tables are converted automatically.

Tubular Width Values are calculated by dividing the number of needles in the knitting machine (cylinder only) by the number of Wales per unit width and then multiplying the result by 0.5. e.g.

- Tubular Width cm = 0.5 * (needles / wales per cm)

Open Width Values are calculated by dividing the number of needles in the knitting machine (cylinder only) by the Wales per unit width. Open Units calculate the full open width or natural width of the fabric, no allowance is made for trimming during stentering. e.g.

- Full Open Width cm = needles/ wales per cm

Open Trimmed or Useable Width Values are calculated by deducting a standard Trimming Allowance from the full open width of the fabric. e.g.

- Useable Width = (needles / wales per cm) - trimming allowance

The Values for Fabric Width in the finished delivered fabric can also be changed using the Edit Column data entry boxes adjacent to the Finishing Quality section of the Predictions Tables in View By Quality and View By Machine.

New Values can be entered either directly by typing a new value for the Fabric Width or indirectly by changing one of the other properties that affect the Width of the delivered finished fabric. e.g. width shrinkage.

When a new value is entered the Dependent Fabric Properties are recalculated and the Predictions Tables updated.

Default Models

When a Default Model is first opened the Values for Fabric Width are determined by the Default Settings.

Fabric Width Limits

The actual range of values that can be entered for Fabric Width depends on the selection of Fabric Type and Knitting Machine, the specified Fabric Quality and the chosen Units. The range is wide enough to allow room for experimentation and evaluation of qualities outside of normal commercial practice.

This means that within the normal range of practical and commercial limits any value can be entered, so that the effect of changing the delivered Fabric Width on the other Fabric Properties, e.g. width shrinkage and weight, can be evaluated.

Restrictions to data entry are imposed only when the entered Values for Fabric Width are calculated to produce a potential Width Shrinkage in the Finished Delivered Fabric outside the range -5 to 25%.

When a value for the Fabric Width is entered that exceeds the maximum range allowed a Warning Message is generated. This message provides information on the actual range of Values allowed for the selected Fabric Quality.

Important Notes:

- ❑ The STARFISH Standard Predictions refer to the Width of the fabric as it is delivered at the end of the finishing line. No allowance is included to take account of changes that may occur in the Fabric Width during transportation from the end of the finishing line to the cutting table.

- ❑ It is important to consult with the fabric finisher and / or to maintain accurate records to establish by how much the width of a particular fabric quality can be expected to change. This information can then be used to make an allowance in the specification to account for any potential relaxation (or growth), if width on the cutting table is critical.

- ❑ Many finishers make an allowance for creep-back (width relaxation) by finishing the fabric slightly wider than specified to ensure that the width is correct on delivery.

- ❑ Fabric is more likely to relax if it is plaited. Fabrics delivered on a roll have less opportunity to relax before laying and cutting.

- ❑ The greater the potential width shrinkage in the fabric the greater will be the subsequent relaxation. Fabric delivered with high length shrinkage and low width shrinkage may grow in width by relaxation.

Fabric Yield

Fabric Yield is a measure of the length or area of a fabric that will be obtained from a given weight of finished fabric. It is usually expressed in Units of length or area per unit Weight.

Alternatively Yield can be expressed in terms of Weight per unit length. In either case the width of the fabric is unspecified.

STARFISH calculates Fabric Yield automatically. The Values are presented in the chosen units in the Predictions Tables in the View By Quality and View By Machine and in the Fabric Production Specification in View Specification.

Fabric Yield Units

The Units provided are:
- Grams per running metre
- Ounces per running yard
- Grams per running yard
- Running metres per kilogram
- Running yards per pound
- Square metres per kilogram
- Square yards per pound

Active Model

The Active Yield Units are chosen from the option list in the Active Yield Units dialog.

▷ **Note:**

If the Active Yield Unit is changed the Values for Fabric Yield are converted automatically

Use as Defaults check box

The Active Yield Units can also be designated as the Default Yield Units for the Active Fabric Type by checking the Use as Default check box.

To change the Default Yield Unit for any other Fabric Type, use the Default Units dialog.

Default Models

Yield Units for the Default Models are chosen from the Yield Tab on the Default Units dialog.

▷ **Note:**

Changing the Default Units selections affects only the Default Models for the selected Fabric Types. The Units currently selected for use in the Active Model or any of the Current Models are not affected.

Fabric Yield Values

Finished Fabric Yield Values are calculated dynamically according to the selections made for the Fabric Manufacturing System and the Working Environment and the entered Quality Values.

When a change is made to the Active Model environment the values for Fabric Yield are recalculated.

The values are presented in the Prediction Windows in the chosen Units. If the Yield Units are changed the Values are converted automatically.

The Values for Fabric Yield in the finished delivered fabric cannot be changed directly. They are calculated from the other Fabric Properties and displayed automatically.

When the value of a property that affects the Fabric Yield is altered, the Value for the Fabric Yield is recalculated and the Prediction Windows updated.

Fabric Yield Limits

The Values for Fabric Yield are strictly dependent on the predicted or entered values for the other Fabric Properties and cannot be altered directly.

It is the limits imposed on the values for the other fabric properties that dictate the possible range of Yield Values that can be calculated.

Shrinkage

Shrinkage is simply the change in fabric dimensions brought about by some relaxation procedure or process.

In STARFISH, shrinkage is defined as the change in fabric dimensions brought about by means of the Reference Relaxation Procedure.

Shrinkage Units

Shrinkage Values are expressed as a percentage and displayed as positive numbers (no sign). An extension is indicated by a minus (-) sign.

STARFISH calculates the potential shrinkage in the Finished "As Delivered" Fabric from the Values which are predicted for the Reference Courses and Wales and those which must be delivered in order to meet the Finishing Quality Target Values, as follows

Length Shrinkage %　　=　100 * (CR - CD) / CR

Width Shrinkage %　　=　100 * (WR - WD) / WR

where

CR and WR are the Reference Courses and Wales, and

CD and WD are the Courses and Wales in the Finished Fabric As Delivered

The Reference Dimensions of a particular Fabric Quality are determined by the selections that have been made for the Fabric Type, Yarn Type, Knitting Machine, Wet Process and Depth of Shade and the Values entered for the Yarn Count and the Stitch Length.

Shrinkage Values

Active Model

The Values for Shrinkage in the finished fabric are calculated dynamically according to the selections for the Fabric Manufacturing System, the Working Environment and the entered Quality Values.

When a change is made to the Active Model Environment the Shrinkage Values are recalculated. Shrinkage Values are presented as positive values in the Prediction Windows.

The Shrinkage Values in the finished delivered fabric can also be changed using the Edit Column data entry boxes adjacent to the Finishing Quality section of the Predictions Tables in the View By Quality and the View By Machine.

New Values can be entered directly by typing values for the Length and Width Shrinkage, or indirectly by changing one of the other properties that affect the Shrinkage Values in the delivered fabric. e.g. Course Density or Wale Density.

When a new shrinkage value is entered the Dependent Fabric Properties are recalculated and the Predictions Table updated.

Default Models

Shrinkage Values for the Default Models are entered using the Default Shrinkage Values dialog.

Default Shrinkage Values are also used to make the initial calculations for the finished fabric properties whenever a New Machine or a New Quality is added to the Active Model.

▷ **Note:**

> Changing the Default Shrinkage Values affects only the Default Models for the selected Fabric Types. The Shrinkage Values that have been entered in the Active Model or any of the Current Models are not affected.

Shrinkage Limits

Active Model

The maximum range in Shrinkage Values that can be entered has been fixed at -5% to 25%. This range is considered wide enough to allow room for experimentation and evaluation of qualities outside of normal commercial practice.

It also means that within the normal range of practical and commercial limits any value can be entered, so that the effect of changing the delivered Shrinkage Values on the other Fabric Properties e.g. weight and width can be evaluated.

The maximum range in Shrinkage Values is also imposed on all other fabric properties. If a change to any value is calculated to result in a Shrinkage Value outside the range -5% to 25% then a Warning Message is generated and the change is disallowed.

In addition, if Shrinkage Values outside the range 0 to 15% are entered or predicted the shrinkage values displayed in the data entry boxes for the selected Quality change to red to provide a warning.

Default Models

The limits on the values that can be entered as Default Shrinkage Values are 0 and 15%.