



STARFISH Models Definition of a STARFISH Model

Fabric Type

A STARFISH Model is defined primarily by the choice of Fabric Type.

The current version of STARFISH can make predictions for eight basic Fabric Types; Interlock, 1x1 Rib, 2x2 Rib, Plain Single Jersey, Double, Single Crosstuck, Six-thread Crosstuck and Two-thread Fleece.

Only one Fabric Model can be Active at a time but Current and Default Models are provided for each Fabric Type to allow different fabric development problems to be worked on simultaneously. The selection of a different Fabric Type opens the Current or "Last Active" Model for the selected Fabric Type in the Prediction Window: View By Quality. If the Fabric Type has not been used previously then the "Last Active" Model is the same as the Default Model.

Once a Fabric Type has been selected the Model Environment is defined by the selections made for the Fabric Manufacturing System and the Working Environment.

Within each Fabric Model, each Quality is specified by the individual Quality Values and identified by a Quality Number. The data for all the Qualities are presented for review and editing in the View Windows. The arrangement of the data and the editing options available depends on the particular Window that is opened.

The environment of a STARFISH Model is dynamic, all aspects are inter-linked and interdependent. When a change is made either to the Fabric Manufacturing System, the Working Environment or the individual Quality Values, STARFISH calculates the effect of the change on the Finished Fabric Properties and displays the results.

Fabric Manufacturing System

The Fabric Manufacturing System is defined by the selections made for the

- Yarn Type
- Wet Process
- Depth of Shade
- Knitting Machines

The choices made for the Fabric Manufacturing System affect the Reference Dimensions of the finished fabric. The Reference Dimensions determine the balance of Fabric Properties that can be obtained in the "as delivered" finished fabric.

Yarn Type, Wet Process, Depth of Shade

The choice of Yarn Type, Wet Process and Depth of Shade determine which of the standard STARFISH Prediction Equations will be used to calculate the Reference Yarn Count, Stitch Length, Courses, Wales and Weight of the Finished Fabric. These equations are applied to all of the Qualities within the Model. Therefore, only one Yarn Type, Wet Process and Depth of Shade combination can be selected at a time.

The Standard options provided by STARFISH represent average values for the various sets of conditions encountered during our research and are derived from the fabric qualities and processing conditions represented in the STARFISH database. It is important to realise that, even though they are named after real sets of conditions, these standard option names are actually only place holders designed to cover the full range of processing conditions that is likely to be encountered. This means that it is your responsibility to discover which of the standard options is most relevant to your own situation. For example, you might find that a process labelled "Continuous" gives a good prediction of what you actually measure even though your wet process involves batch methods rather than continuous ones.

By comparing STARFISH predictions with the known properties of one or more of your standard qualities you can easily discover which of the standard options comes closest to what you actually measure. Usually this will be close enough, especially to start with. However, if the best of the standard options does not provide a sufficiently accurate prediction, you can calibrate STARFISH so that it conforms exactly, by feeding in your own QC data. Calibration is carried out using the Prediction Window: Seek Calibration.



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When a change is made to any of the selections for Yarn Type, Wet Process or Depth of Shade the Finished Fabric Properties data for all of the Qualities in the Active Model are recalculated and updated in the Prediction Windows.

Knitting Machines

The choice of Knitting Machine, specifically the Number of Active Needles, together with the Reference Wale Density determines the Reference Width of the fabric and therefore the Width that can be delivered at a specified Width Shrinkage.

To provide maximum flexibility in the choice of Knitting Quality or when developing fabrics to meet specific body width targets up to nine different knitting machines can be selected for simultaneous evaluation within each Model. Different Knitting Qualities can be examined on the same Machine or the same Quality can be evaluated on different Machines.

The Active Machine Selections can be changed repeatedly and independently of any other selection.

When an existing Machine is replaced STARFISH maintains the same Quality Values and makes the necessary adjustments to e.g. the Course Length and Fabric Width automatically.

When a new Machine is added existing Yarn Counts are copied to the new Machine using Default Values.

Note:

STARFISH does not check that the existing Yarn Count Values are appropriate for the new machine.

Working Environment

The Working Environment is defined by the selections made for the Units, the Finishing Targets and the Weight Mode.

These selections determine how data are entered and displayed and how STARFISH makes the calculations for the Finished Fabric Properties while changes are made to the Knitting Parameters. The choices made are applied to all of the Qualities in the Active Model.

Units

The selections made for the Units determine how the Knitting Parameters, the Finished Fabric Properties and the Knitting Production Parameters are presented in the Predictions Tables. They allow the output of the program to be tailored to suit local conditions or the individual preference of the user or the customer. Both imperial and metric units are available.

All of the data affected are converted automatically when a different Unit is selected.

Finishing Targets

The Finishing Targets options determine which two properties of the Finished Fabric are held constant whilst alternative Knitting Qualities are examined or when a change is made to the Fabric Manufacturing System.

The Finishing Targets options enable fabric development problems to be approached from two different perspectives; either from the point of view of the Customer's Performance Targets or from the point of view of the Finisher's Control Targets.

The **Customer's Performance Targets** are those particular performance properties that the customer requires in the delivered fabric. For example, a certain weight and width, or a certain maximum level of length and width shrinkage.

The **Finisher's Control Targets** are those two properties that the finisher must control to ensure that the Customer's Performance Targets will be delivered, namely the Finished Width and the Finished Courses per unit length.

When a change is made either to the Knitting Quality Values or to the Fabric Manufacturing System, the Finishing Quality Target Values are held constant while the values of the other finished fabric properties are recalculated.



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Weight Mode

The Weight Mode option controls how changes that are made to the target finished fabric Weight per unit area are applied to the recalculation of the other Fabric Properties.

When the "Maintain a fixed Width" option is chosen, adjustments to the fabric dimensions are made only in the length direction leaving the width constant.

When the "Maintain balanced Shrinkages" option is chosen, the fabric dimensions are adjusted in both length and width in equal proportion so that a balanced fabric performance can be maintained.

Note:

The Weight Mode setting is applied globally. The current selection is applied until it is changed.

Quality Values

The Quality Values are those values that uniquely specify how each individual Fabric Quality is produced on the knitting machine and delivered at the end of the finishing line.

Knitting Quality

The Knitting Quality for each Knitting Machine is specified by the individual Values that are entered for the Yarn Count and the Stitch Length.

The average grey Yarn Count and the average knitted Stitch Length are the key dimensional control parameters of a knitted fabric.

For a given Fabric Manufacturing System, the Values for the grey Yarn Count and Stitch Length determine the Reference Dimensions of the finished fabric. The Reference Dimensions of the Finished Fabric determine the balance of Fabric Properties that can be delivered at the end of the finishing line.

In STARFISH, Qualities are added or deleted from a Model by entering or deleting Values for Yarn Count. Up to nine different Yarn Count Values can be entered, or the same Value can be entered nine times. In addition, either the same or a different Value for Stitch Length can be specified for each Yarn Count on each Knitting Machine.

The Values for Stitch Length can be changed either directly or indirectly by changing one of the other Knitting Parameters that affect the Stitch Length, i.e. Tightness Factor or Course Length.

The Values for Yarn Count and Stitch Length can be changed repeatedly. As each change is made, the Finished Fabric Properties are recalculated.

Finishing Quality

The Finishing Quality for each Knitting Quality is specified by the Target Values that are entered for the two Fabric Properties that have been chosen as Finishing Targets. For a particular Fabric Manufacturing System and Knitting Quality, these Finishing Quality Target Values determine all of the other properties of the "as delivered" finished fabric.

A different combination of Target Values can be entered for each Knitting Quality on each Knitting Machine, or the same values can be applied to all of the Knitting Qualities and all of the Knitting Machines.

When a change is made either to the individual Knitting Quality Values or to the Fabric Manufacturing System, the Finishing Quality Target Values are held constant while the Values of the other finished Fabric Properties are recalculated.

The Finishing Quality Target Values can be changed repeatedly either directly or by altering the values of the Dependent Properties. As each change is made the dependent properties of the finished fabric are re-calculated.

The Knitting Quality Values are not affected by changes that are made only to the Finished Fabric Properties.

Important Note:

The range of values that is allowed by STARFISH for any individual Knitting Parameter or fabric property depends on the particular combination of options chosen for the Fabric Manufacturing System and Working Environment, and the rules of fabric geometry.



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The range is wide to allow maximum flexibility for experimentation. It is the responsibility of the user to ensure that the practical and commercial limitations of yarn suppliers and knitting and processing machinery are taken into account when entering values for the Yarn Count, Stitch Length and Finishing Targets.



STARFISH Models Types of Model

Types of Model

The Fabric Type is the primary definition of a STARFISH Model. Only one Fabric Type Model can be worked on at a time, therefore several different types of Model have been provided to help users work more efficiently and effectively.

Active Model

The Active Model is the Working Model for one particular Fabric Type that is open in the application window.

Current Models

A Current or "Last Active" Model is the most recent Model for a Fabric Type that has been worked on during the current or a previous working session, whether or not it has been named and saved.

Default Models

A Default Model is a Model for which all of the selections have already been made and which is stored by STARFISH to provide a rapid starting point for each new development exercise. A Default Model is stored for each Fabric Type.

Old Models

Old Models are Models that have been named and saved either to the hard disk or to other removable media.

Active Model

The Active Model is the Working Model for a particular Fabric Type that is open in the application window. Only one Fabric Model can be open or Active at a time. Selecting a different Fabric Type opens the Current or "Last Active" Model for that Fabric Type, which then becomes the Active Model.

Every aspect of the Active Model can be changed, and changed repeatedly until a satisfactory solution to the particular development problem has been discovered. As each change is made, STARFISH automatically recalculates the data affected so that the effect of each change can be evaluated immediately.

The data are presented in the View Windows. These Windows provide different ways for reviewing and editing the data so that each development exercise can be approached from different perspectives. The View Windows are completely integrated so that a change made to the data in one View is updated automatically in each of the other Views.

All of the data in the Active Model can be sent to a printer or exported to text files, and the entire Model can be named and saved for future recall.

The Active Model also provides the starting point for using the Seek New Quality Window and for developing Calibrations using the Seek Calibration Window.

Current or Last Active Model

A Current or "Last Active" Model is the most recent Model for a Fabric Type that has been worked on during either the current or a previous working session whether or not it has been named and saved.

Current Models simply provide temporary storage for a development exercise that has not yet been completed so that several Models, one for each different Fabric Type, can be in work simultaneously.

Note:

To permanently save the selections and data in a Current Model it must first be opened as the Active Model.

During a Working Session, whenever a different a Fabric Type is chosen, or if a Default or Old Model is selected, STARFISH first saves the data and selections for the Active Model before opening the selection as the new Active Model. The previous Active Model becomes the Current Model for that Fabric Type.



STARFISH Models Types of Model

If the New Model is either a Current Model, a Default Model or an Old Model for a different Fabric Type then the Current Model for the previous Fabric Type can be recovered by reselecting the Fabric Type from the Active Fabric Type Option List.

If the New Model is either a Default Model or an Old Model for the same Fabric Type then the previous Active Model can be recovered by selecting "Last Active" from the New Start dialog.

► **Note:**

It is only possible to recover the "Last Active" Model for the Active Fabric Type during the current Working Session provided that no other Fabric Model has been opened subsequently. If a different Model is opened the Current Active Model replaces the "Last Active" Model for that Fabric Type.

When STARFISH is closed at the end of a Working Session the Active Model and all of the Current Models are saved automatically to special internal Model Files. These become the "Last Active" Models for each Fabric Type.

Each time STARFISH is loaded, the "Last Active" Model for a Fabric Type can be instantly recovered by selecting the "Last Active" Model option thus allowing work on a previously unresolved problem to be resumed rapidly.

If the Current or "Last Active" Model for the chosen Fabric Type is no longer relevant then a New Start can be made by choosing either the Default Model or the Model from File option. This Model then becomes the Active Model for the chosen Fabric Type.

The "Last Active" Models for the other Fabric Types can still be recovered once STARFISH is running either by selecting the appropriate Fabric Type from the Active Fabric Type option list or by selecting the Fabric Type and "Last Active" options from the New Start dialog.

► **Notes:**

- ❑ The first time that STARFISH is run or if a Fabric Type has never been used then the Current or "Last Active" Model is the same as the Default Model for the Fabric Type.
- ❑ If you have upgraded from Version 6.0 and have chosen to import your Version 6.0 Active Model Files then these will have replaced the Version 6.5 "Last Active" Model Files for each Fabric Type except 2x2 Rib.

Default Models

A Default Model is a Model for which all of the selections have already been made and which is stored by STARFISH to provide a rapid starting point for each new development exercise. Fully specified Default Models are provided for each Fabric Type.

The initial Default Settings for all of the STARFISH Default Models are pre-selected during the preparation of each new copy of the STARFISH software. Once STARFISH has been installed and run for the first time these STARFISH Default Settings can be changed for each Fabric Type Default Model using the options provided on the Defaults Menu.

The Default Settings can be changed at any time. Whenever a change is made the internal Default Model files are updated. The previous Default Settings cannot be recovered.

Tip:

To save the original STARFISH Default Model for a Fabric Type before making changes to the Default Settings, first open the Default Model as the Active Model for the Fabric Type and then Name and Save it to File using the "Save Active Model As" dialog.

The Default Settings are recalled when a Default Model is opened or if one of the Restore options is chosen from the Restore Menu.

A Default Model can be opened as the Active Model when STARFISH is first loaded, or when New Start is selected from the File Menu. In addition, the Default Model for the Active Fabric Type can be recovered at any time by selecting Default Model from the Restore Menu.

The Restore option also allows the Default Qualities the Default Knitting Machines, the Default Production Values and the Default Units for the Active Fabric Type to be recovered independently.



STARFISH Models Types of Model

When a Default Model is selected it is first opened in the Prediction Window: View By Quality. The selections and values that have been saved for the Default Model are used to make the initial predictions for the Default Qualities.

Once a Default Model has been opened it becomes the Active Model for that Fabric Type. To change any of the selections or data for the Active Model, use the options provided on the Change Menu and the data entry boxes in the View Windows.

Changing the selections or data in the Active Model does not affect the Default Model for the Active Fabric Type unless the Use as Defaults option on an Active Model dialog has been turned ON.

► Notes:

- ❑ The STARFISH Default Settings define each Fabric Type Default Model until they are changed. If you do not change the STARFISH Default Settings then these are the settings that will be recovered when a Default Model is selected.
- ❑ If you have upgraded from Version 6.0 and have chosen to import your Version 6.0 Default Model Files then these will have replaced the Version 6.5 Default Models for each Fabric Type except 2x2 Rib.

Old Models

Old Models are simply Models that has been named and saved to file. For convenience a Default Models Folder is provided in your STARFISH 6.5 Program folder. If STARFISH has been installed in the Default Location then the location of the STARFISH Models Folder is

C:\Program Files\CTI Starfish\Starfish 6.5\Models

Only the Active Model can be named and saved. To save either a Current or a Default Model it must first be opened as the Active Model.

To name and save the Active Model use the "Save Active Model As" dialog.

An Active Model can be saved either to the hard disk or to other removable media such as a floppy disk or CDR that can be accessed by the computer system.

Models that have been named and saved to a floppy disk or CDR are fully transportable. They can be used with any other computer running a legal copy of the STARFISH 6.5 software.

When the Active Model is saved **all** of the selections and data in the Active Model are saved to the file. When an Old Model is retrieved from the file and opened as the Active Model all of this original information is recovered and is still available for use.

This applies even if the selected Knitting Machines or User Defined Process have been subsequently changed or deleted. The information is only lost to the Active Model if the original selections are replaced by different selections using the current information held by STARFISH.

The Old Model file is not affected unless it is replaced.

The list of Old Models currently on File can be sent to a printer or the Model File Names changed or Old Models deleted from the file using the Edit Models Files dialog.

Tip:

It is a good idea to save backup copies of your important STARFISH Models to a floppy disk or other removable media periodically so that they can be recovered if your hard disk becomes corrupted.

► Important Note:

When a Version 6.0x Model is opened by Version 6.5 it is converted to the new format and cannot be resaved in Version 6.0x format. If the Model is resaved it is saved to a new file in Version 6.5 format. However, the old Version 6.0 Model is retained on the file and can still be used by Version 6.0. Version 6.5 Models cannot be opened by Version 6.0.



STARFISH Models Default Settings

Default Settings

The Default Settings define each Fabric Type Default Model.

The **Default Selections** are the selections for Yarn Type, Wet Process, Depth of Shade, Knitting Machines, Finishing Targets and Units.

The **Default Values** are the Values for Yarn Count, Tightness Factor, Shrinkage and Trimming Allowance and the Production Values for Roll Weight, Total Yarn Weight, Machine Efficiency, Knitting Waste and Shift Time.

The Default Settings are used to make the initial calculations for the Finished Fabric Properties and Knitting Production Parameters whenever a Default Model is opened.

In addition, the Default Values for Tightness Factor, Shrinkage and Production are also used when a new Quality or a new Machine is added to the Active Model.

The Default Production Values are used to make the initial calculations the first time that the Active Model is opened in the View Production.

When STARFISH is first installed the Default Settings for each of the Default Models are pre-selected. Once STARFISH has been run the first time these STARFISH Default Settings for each Fabric Type can be changed using the options provided on the Defaults Menu.

In addition, all of the Default Selections and the Default Values for Yarn Count and Trimming Allowance for the Active Fabric Type can also be altered from the Active Model dialogs.

The Default Settings can be changed at any time. Whenever a change is made the internal Default Model files are updated. The previous Default Settings cannot be recovered.

Changing the Default Settings does not affect the existing selections or data in either the Active or in any of the Current Models.

Tip:

To save the original STARFISH Default Model for a Fabric Type before making changes to the Default Settings, first open the Default Model as the Active Model and then Name and Save it to File using the "Save Active Model As" dialog.



Notes:

- The STARFISH Default Settings define each Fabric Type Default Model until they are changed. If you do not change the STARFISH Default Settings then these are the settings that will be recovered when a Default Model is selected.
- If you have upgraded from Version 6.0 and have chosen to import your Version 6.0 Default Model Files then these will have replaced the Version 6.5 Default Models for all Fabric Types except 2x2 Rib.

STARFISH Default Models

The following Default Settings define the STARFISH Default Models for each Fabric Type when STARFISH 6.5 is first issued.

Default Fabric Type: Plain Jersey

Default Machine Selection

Fabric Type	Gauge	Diam	Needles	Feeds	RPM	Speed Factor	Speed
Interlock	20.1	30	1896	84	26.7	800	1.0640
Rib 1x1	14.0	30	1320	60	30.0	900	1.1969
Rib 2x2	14.0	30	1320	60	30.0	900	1.1969
Plain Jersey	23.9	30	2256	90	33.3	1000	1.3299
Single Crosstuck	23.9	30	2256	90	33.3	1000	1.3299
Double Crosstuck	23.9	30	2256	90	33.3	1000	1.3299
Six-thread Crosstuck	23.9	30	2256	90	33.3	1000	1.3299
Two-thread Fleece	18.3	30	1728	90	33.3	1000	1.3299



STARFISH Models Default Settings

Default Needle set-out for 2x2 Rib is Swiss (2/1)

Default Yarn Type, Yarn Counts and Tightness Factors

Fabric Type	Yarn Type	Yarn Count	Tightness Factor
Interlock	Single Combed Ring	38 Ne	12.5 cgs
Rib 1x1	Single Combed Ring	30 Ne	15.5 cgs
Rib 2x2	Single Combed Ring	30 Ne	15.5 cgs
Plain Jersey	Single Combed Ring	30 Ne	15.5 cgs
Single Crosstuck	Single Combed Ring	30 Ne	15.5 cgs
Double Crosstuck	Single Combed Ring	30 Ne	15.5 cgs
Six Thread Crosstuck	Single Combed Ring	30 Ne	15.5 cgs
Two-thread Fleece, Face	Single Combed Ring	20 Ne	15.0 cgs
Two-thread Fleece, Inlay	Single Combed Ring	10 Ne	1.33 itf

All Fabric Type Default Models

Default Wet Process	Winch-Jet : Mid Tension
Calibration	Standard Values
Default Depth of Shade	Pastel
Weight Change	-5.0%
Default Finishing Targets	Length & Width Shrinkage
Default Shrinkage Values	5% x 5%
Default Trimming Allowance	5 cm

Default Units

Property	Units
Stitch Length	millimetres (mm)
Yarn Count	English cotton count (Ne)
Tightness Factor	square root tex / stitch length, centimetres (cgs)
Inlay Tightness Factor	stitch length, inches * gauge, needles per inch (itf)
Stitches	courses and wales per centimetre (c/cm, w/cm)
Weight	grams per square metre (g/sm)
Width	centimetres, tubular (cmT)
Yield	metres per kilogram (m/kg)

Default Production Values

Property	Values
Roll Weight	25 kilograms
Total Yarn Weight	1000 kilograms
Efficiency	90%
Knitting Waste	0%
Shift Time	8 hours

Note

If you have upgraded from Version 6.0 and have chosen to import your Version 6.0 Default Model Files then these will have replaced the STARFISH Version 6.5 Default Models for each Fabric Type except 2x2 Rib.

Global Default Settings

Although most of the Default Settings can be changed for each Fabric Type, certain of the settings are retained as Global Settings and apply to all of the Models.

Job Reference

The STARFISH Default Job Reference is the current System Date. This is the Job Reference that is allocated to all Default Models when they are first opened. The Active Model retains this date unless it is changed.

The STARFISH Default Job Reference cannot be altered from within STARFISH.

To find out how to change the System Date, consult your Windows Help File.



STARFISH Models Default Settings

Weight Mode

The STARFISH Default Setting for the Weight Mode is "Maintain a fixed Width". This setting applies to all Models unless it is changed.

If the Weight Mode option is changed this becomes the new Default Setting until it is changed again.

Run-in Ratio

The STARFISH Default Run-in Ratio is 1.0.

Run-in Ratio applies only to Crosstuck Fabrics that include an all-knit course. It is used to make the initial calculations when a Single Crosstuck or Six-thread Crosstuck. Default Model is opened and when using the Seek New Quality Window.

The Active Run-in Ratio for each individual Quality can be changed in the View By Quality the View By Machine. It can also be specified as a Seek criterion for the Seek New Quality calculations.

The Default Run-in Ratio cannot be changed.

Inlay Tightness Factor Unit

For Two-thread Fleece fabrics the Inlay Tightness Factor is a convenient way of comparing qualities across machines.

Inlay Tightness Factor is a dimensionless unit. It is the ratio between Course Length (CL) and Machine Circumference ($\pi * D$).

It is conveniently calculated as $ITF = SL * G$

where,

ITF is the Inlay Tightness Factor; SL is the Stitch Length of the Inlay Yarn in inches, and G is the Machine Gauge in needles per inch.

The STARFISH Default Inlay Tightness Factor Unit cannot be changed.