1.0 The SECANT Job

The optimization capabilities of SECANT can be accessed via a Dynamic Linked Library (DLL), a Windows executable or through the SECANT Automatic mode. In all cases the calling application is responsible for creating a SECANT job file which is used to specify the job requirement, and is then populated by SECANT with the resultant optimised patterns.

A SECANT job is defined by a single flat text file with the extension *SEC* e.g. <jobname>.sec.

The file contains eight chapters, four input and four output, which are defined using a square bracket header line. The four input chapters should be created by the calling application, upon completion of the optimisation SECANT will generate the four output chapters.

1.1 Input chapters

A calling application should generate single SEC file containing the following chapters:

[JOB] – identify certain parameters for the job
[CUT] – the cutting list
[STK] – the stock list (optional – see below)
[CTL] – the program controls (optional – see below)

These sections should be created by the application before calling the Optimise entry point of the DLL, or the Windows executable, or alternatively a single two section CSV file may be passed and a default control file used.

[JOB] chapter

Certain parameters of the JOB chapter may be created with standard content. These contain a description of the job and the user preferences for displaying and editing the job which must be present but the content of which not relevant for applications using the SECANT DLL.

There are two keywords within the [JOB] section which are relevant for an integrated solution, which define a fully qualified filename including directory and extension for:

- defstk – default stock file
- defctl - default control file

These files will be used to generate content for the [STK] and [CTL] sections accordingly if these sections are omitted from the SEC file. Standard control files for both sheet cutting (sheet.ctl) and bar cutting (bar.ctl) can be found in the SYSTEM directory of the SECANT installation.

[CUT] chapter

The [CUT] chapter describes the pieces that are to be cut. The chapter contains one record per piece. The fields of each record are described in section 3.2 Cutting List.

[STK] chapter

The [STK] chapter describes the stock materials that are available for this job. The chapter contains one record per stock item. The fields of each record are described in section 3.3 Stock File.

If this section is empty then the stock availability defined in the default stock file defined by the keyword *defstk* in the [JOB] chapter will be used for this job.

[CTL] chapter

The [CTL] chapter describes the program controls that are to be used for this job. See section 3.5 for a full description of the control file format.

An application may create a control chapter for a job by copying the contents from a set of standard controls. Alternatively, an application may offer its user the choice of changing individual controls. A [CTL] chapter need not be complete and define all SECANT controls. SECANT will default all control values not given explicitly in the chapter.

If this section is empty then the cutting controls defined in the default control file defined by the keyword *defctl* in the [JOB] chapter will be used for this job. Standard control files for both sheet cutting (sheet.ctl) and bar cutting (bar.ctl) can be found in the SYSTEM directory of the installation.

1.2 Output chapters

Four chapters in the SEC file are created by the optimiser. They summarize the yield, detail the stock items used and the return of offcuts to stock, detail the pieces cut and describe the cutting patterns.

[SUM] – summary information
[PAT] – pattern information
[OVM] – overmake information
[USD] – usage information

Bespoke file formats can also be configured.

[SUM] chapter

This completion chapter is a simple metric list in Windows INI file format. As well as the execution time and the basic yield information, it will also contain any error messages such as an inability to complete cutting because of lack of material.

[PAT] chapter

This chapter defines the patterns that are to be used to cut the job. The information in this file when cross referenced with the cutting list and the stock file is used to produce all SECANT reports and diagrams. See the topic Pattern chapter format in the section 3.4.

[USD] chapter

This chapter lists the stock items used by the job and the offcuts returned to stock. The format of the chapter is identical to that of the [STK] chapter. For stock items used by the job the Quantity field is negative and gives the number of that stock item that is used. For offcuts produced when cutting the job the Quantity field is positive and gives the number of that size and type of offcut that is returned to stock.

[OVM] chapter

The chapter contains one record for each different piece that is produced. The fields within a record are comma separated. The fields are:

- Piece identifier.
- Piece description
- Number made.
- Number required.
- Overmake (i.e. made-required).

2.0 Calling SECANT

The optimization capabilities of SECANT can be accessed either via Dynamic Linked Library (DLL) or via a Windows executable

2.1 The SECANT DLL

A job is optimized by calling the exported **Optimise** function of the **WOPT32DLL.DLL** (32-bit) or **WOPT64DLL.DLL** (640bit) library. **Optimise** uses the standard C calling convention. Alternatively **Optimise** may be called by its ordinal number (1).

long __export
Optimise (HWND hWnd, char *pszDir, char *pszJob, char *pszSystem long jFlags, long lpfnCallBack)

- **hWnd -** the Windows handle of the calling application. This may be set to zero.
- **pszDir** - the full path name of the directory where the job to be optimised is found (including the final backslash).
- **pszJob -** the name of the job file excluding the extension.
- **pszSystem -** the name of the directory on which the files **lines.fed** and **wsec.typ** can be found. These files can be copied from the SYSTEM directory of the issued system.
- **jFlags** - a three-digit flag. The first digit is for internal use and should be set to zero. The second digit is set to 1 if an incomplete set of patterns provided by the user in the pattern file are to be added to by this call so as to create a complete pattern set. The third digit is set to 1 if the in-built progress dialog is to be suppressed.
- **lpfnCallBack -** the address of a call back function that is supplied by the application programmer and is called periodically by the *Optimise* function to pass progress information back to the user and to speed up or cancel requests from the user. If this address is zero and a progress dialog has been requested (see *jFlags*) then the progress dialog built into the DLL will be used instead. See the SECANT Help system for a description of the arguments of the callback function.

- **Return Value -**
  Returns 0 if the procedure was aborted by the user.
  Returns 1 otherwise.

2.2 The SECANT executable

A job is optimized by calling the WOPT Windows executable with the following command line arguments:

- **pszDir** - the full path name of the directory where the job to be optimised is found (including the final backslash).
- **pszJob -** the name of the job excluding the extension.
- **pszSystem -** the name of the directory on which the files **lines.fed** and **wsec.typ** can be found. These files can be copied from the SYSTEM directory of the issued system.

3.0 SECANT Chapter Formats

3.1 [CUT] - Cutting List

The SECANT cutting list contains a list of parts to be produced in the job, and is defined in the chapter [CUT] of the SECANT job file.

This chapter is a Comma Separated Variable (CSV) section with each line defining a unique cut part to be produced.

The following table gives details of the parameters which may be specified for a cut part. Please note certain fields are only relevant for certain industries. The only compulsory fields are:

1D optimization - Quantity and Length
2D optimization - Quantity, Length and Width

No “thousands” separator should be used in numerical fields.
The decimal point to be used is “.”
Fields of type “TEXT” should be enclosed in double quotes if the text contains a comma

SECANT can be configured to metric or imperial units, and can accept either decimal or fractional values. If feet and inches are being used then the use of ` for the foot unit is permitted, (e.g. 6`3 1/2 means six foot three and one half inches).

Field number	Name	Description
1	Quantity	The minimum quantity of this panel that must be produced. A user with a regular demand for a fixed range of cut pieces may choose to maintain a single cutting list and simply alter the quantity figures to reflect the current demand. Any panel with a zero quantity and a zero overmake will simply be ignored.
2	Overmake	The maximum number of this panel that may be cut in excess of the strict requirement. If no overmake figure is given then a standard percentage overmake is assumed. This standard figure is given as the OVERMAKE % parameter of the Cutting Controls. This control may be set to zero to prevent any excess panels being produced.
3	Length	The length of a panel. Any units may be used for these dimensions. Units are set as a part of the Cutting Controls. SECANT can be configured to accept either decimal or fractional values.
4	Width	The width of a panel. Any units may be used for these dimensions. Units are set as a part of the Cutting Controls. SECANT can be configured to accept either decimal or fractional values
5	Grain	If a piece must be aligned with the grain of the material or with the direction of the strip when it is cut then a Grain code can be set against the piece in the cutting list. The permitted values are; GR - the piece must be aligned with the material grain but can be plotted along or across a strip, UG- the piece need not be aligned with either the material or the strip direction, AG- the piece must be aligned with the strip direction and with the grain of the material, AU- the piece must be aligned with the strip direction but can be plotted along or across the material grain. XG-the piece must be cut with its length across the strip and be aligned with the material grain, XU- the piece must be cut with its length across the strip but can be plotted along or across the material grain. If the Grain field is left blank in the cutting list then the Default Grain specified in the control file will be used.
6	Class	The class of a panel along with its material type will restrict the stock material from which it can be cut. For example some pieces may be cut from any material as they are not critical to the appearance of the end product while other pieces are restricted to the higher quality material types. The class of each item in the stock list along with the class of each panel in the cutting list defines the stock items that may be used when cutting a panel. Any group of letters may be used as a panel class. A panel may only be cut from sheet material where the class name of the stock item includes the letter or letters of the panel class. If a panel's class is left blank then it is not restricted by class in the materials that may be used. It is not efficient to use class simply to allow cutting lists

		of different materials to be planned together in cases where no pieces have a choice of material. Constructing separate lists or using the Material property described below is a better approach.
7	Identifier	This name is used to identify the panel when editing, viewing or printing patterns. The identifier may use any alphanumeric character. The identifier must be unique. If the identifier entered by the user is not unique then an underscore and the row number will be added to make it unique.
8	Material	The material of a panel restricts the stock items that may be used to produce the panel but in a much broader way than with panel class. Only those stock items whose Material field matches the cut part Material may be used. If a cutting list contains groups of panels that must be cut from different materials then please ensure that the System/Configuration Advanced/ System Controls have been set for Multiple Material on installation. Otherwise the Material field will be regarded as merely descriptive and pieces will be cut freely from any stock item.
9	Description	
10	Formation	This item is used for the Cover boards report on the stacking of cut pieces on pallets and when calculating stack dimensions for piece to destacking station compatibility.. The panel formation describes the layout of panels on a stack. A panel's formation is a three digit number of the form `panels across the stack –panels down the stack -panel orientation (1 – rotated, 0 - un-rotated)'. For example, six rotated panels in a three by two stack have a formation value of 321.
11	Stack Height	The maximum stack height for this panel on the pallet
12	Split	Cover board type. Check the box if the top cover board is to be split. This option should only be used in conjunction with Panel Formation
13	Type	Type of piece. This field is used to hold the *pallet type* if pallet based feedlines are being used or to hold the *destacking station panel type* if destacking station feedlines are being used.
14	Tie H	This field is for developer use only
15	Goods Free	This field is for developer use only
16	Orig Demand	Used to hold the original demand when the cutting list has been consolidated. This is not a user entry field
17	Orig Overmake	Used to hold the original overmake when the cutting list has been consolidated. This is not a user entry field
18	Edge	Describes the edging requirements of the panel. The code is up to four digits long comprising the characters L and W. For example, LW or LLWW. For each L in the code one length edge of the panel will be assumed to require edging material. For each W in the code, one width edge will be assumed to require edging material. These codes do not affect cut planning but edging codes are displayed on the cutting patterns and the total edging requirements will appear in the pattern summary and the overall summary reports
19	Segment	If production sequence names are given then SECANT will endeavour to produce patterns that will deliver cut pieces in alphabetically

		increasing order of their production sequence names. For example, if panels in the cutting list are grouped into production sequences A, B and C, then patterns for panels of production sequence group A are produced first (with panels in groups B and C being treated as optional panels and only included in the patterns where there would otherwise be waste). Patterns for production sequence B are produced next (with panels from group C being treated as optional) and finally the remaining panels of group C are produced. See also the control #13 Segment ranking in the Work flow chapter of the machines controls file for non-alphabetic sequencing of production.
20	Batch name	This field is for developer use only
21	Batches	This field is for developer use only
22	Mitre	Set the mitre flag to 1 if the piece has one or more mitre angles specified
23	Type	Description of the type of mitre. This field is descriptive and is used for reporting only.
24	Top Len	The length measured along the top of the cut piece (mms). For a straight unmitred cut the top length is the same as both the bottom length and the nominal piece length
25	Bottom Len	The length measured along the bottom of the cut piece (mms). For a straight unmitred cut the bottom length is the same as both the top length and the nominal piece length
26	Rear Ang	A positive (forward sloping) or negative (backward sloping) angle for the trailing edge cut. This angle is given in degrees measured from the normal. A straight unmitred cut would have an angle of zero degrees
27	Front Ang	A positive (forward sloping) or negative (backward sloping) angle for the leading edge cut. This angle is given in degrees measured from the normal. A straight unmitred cut would have an angle of zero degrees
28	Mitre Width	The width from the top edge to the bottom edge of the bar measure on the face through which the angle cut is being made
29	Face	The number (between 1 and 4) of the face that is being angle cut. If there is a change in face between two consecutive cuts then no nesting of angles can occur.
30	Symmetric	This two digit flag indicates whether a cross section is symmetric across none, two or all of its faces. The level of symmetry will affect the number of ways in which mitred angles can be abutted in the cutting patterns. A square cross section is symmetric across both pairs of faces and would have a flag of 11. A U shaped cross section when cut from the side would have symmetry with its opposite face but the adjacent faces would not be symmetric and so would have a flag of 1. The same cross section when the cut angle is across the top face would have a flag of 10 indicating symmetry between the adjacent faces only
31	Turn flag	Setting passed to the Anthon download to indicate the orientation of the piece in the finished goods store.
32	Priority	This field is for developer use only
33	Gauge	The thickness of the stock material. If a gauge is given then cubic material usage figures will be added to the summary report
34	Min coil@gauge	Coil optimization only

35	Max coil@gauge	Coil optimization only
36	Min inner@diameter	Coil optimization only
37	Max inner@diameter	Coil optimization only
38	Min outer@diameter	Coil optimization only
39	Max outer@diameter	Coil optimization only
40	Order@weight	Coil optimization only
41	Max coil@ weight	Coil optimization only
42	Min process@length	Minimum additional length removed from the piece by other processing after cutting. Used to adjust the piece length before cutting.
43	Min process@width	Minimum additional width removed from the piece by other processing after cutting. Used to adjust the piece width before cutting.
44	Max process@length	Maximum additional length removed from the piece by other processing after cutting.
45	Max process@width	Maximum additional width removed from the piece by other processing after cutting
46	Produced@weight	Coil optimization only
47	Part code	Descriptive field used in reporting
48	Compound	This field is for developer use only
49	Material A	SECANT User interface use only
50	Material B	SECANT User interface use only
51	Material C	SECANT User interface use only
52	Material D	SECANT User interface use only
53	Material E	SECANT User interface use only

3.2 [STK] - Stock List

The SECANT stock list contains a list of stock which can be used to produce the job, and is defined in the [STK] section of the SECANT job file. If the [STK] section is omitted or empty then the stock list defined in the *defstk* keyword of the [JOB] section will be used.

This chapter is a Comma Separated Variable (CSV) section with each line defining a unique stock item which can be used in the job.

The following table gives details of the parameters which may be specified for a stock item. Please note certain fields are only relevant for certain industries. The only compulsory fields are:

1D optimization - Quantity and Length
2D optimization - Quantity, Length and Width

No “thousands” separator should be used in numerical fields.
The decimal point to be used is “.”
Fields should be enclosed in double quotes if the text contains a comma

SECANT can be configured to metric or imperial units, and can accept either decimal or fractional values. If feet and inches are being used then the use of ` for the foot unit is permitted, (e.g. 6`3 1/2 means six foot three and one half inches).

Field number	Name	Description
1	Length	The length of the sheet. For grained material the length of the sheet must always be along the grain. Any units may be used for these dimensions. Units are set as a part of the cutting control file. SECANT can be configured to accept either decimal or fractional values
2	Width	The width of the sheet. Any units may be used for these dimensions. Units are set as a part of the cutting control file. SECANT can be configured to accept either decimal or fractional values.
3	Quantity	The quantity of this stock item that is available for use. Users may wish to retain out-of-stock items in the list with a zero Quantity and so avoid re-keying when further stocks are purchased.
4	Value	Value per unit area for this material. Value is used by SECANT to plan cutting using the minimum value of stock material. If all stocks are of equal value then this is equivalent to minimizing wastage. The Value will normally be the re-purchase price per unit area but this figure may be reduced for offcut material and similar material whose use is to be encouraged. Sheet values are also used in pattern costing. If an Offcut Value Table is specified in the Cutting Controls then a value derived from this control is used when pattern generating and the value entered here is ignored.
5	Classes	Classes are used to restrict the stocks that may be used in cutting certain panels. A panel may only be cut from a stock sheet if the class of the panel is one of the classes entered for this stock. For example a sheet with a classes value of ABC may be used for panels of class A or of class AB or of class B or of class ABC. Please note, a panel with no class may be cut from

		any stock sheet. A stock sheet with no class may ONLY be used to make panels without class
6	Thickness	The thickness of the stock material. If a gauge is given then a cubic material usage figures will be added to the summary report.
7	Identifier	The name is used to identify the stock sheet in diagrams and other reports
8	Description	A general description field, where information such as date of purchase, supplier, stock code and other information may be stored. The description is separated into sections using forward slash characters. Parts of the description can be included in the text to appear on labels.
9	Batch	Not in use
10	Opened	A value of O for this field indicates that the stock item is an opened pack of stock sheets. This field does not affect pattern building but SECANT can be told to give priority to opened packs when recommending sheets to cut. If SECANT is given an open pack and a closed pack of the same stock item then the open pack will be used first.
11	Pattern	The pattern used to create this offcut. This field is not required in a normal stock file but is used in the <jobname>.usd file that is created during pattern generation and holds the stocks used by the job and the offcuts generated.
12	Allocated	The number of units of this item (sheets or bars) that are reserved for ongoing jobs
13	Job Allocated	The ongoing jobs that have been allocated units of this stock item. See also the Allocate field.
14	Price	Price per stock item. Please note that if any two of the Price, Value, Cost per kg and Weight are given then the remaining two fields are calculated automatically when the file is saved
15	Weight	The weight of this stock. This is an optional data field.
16	Cost per kg	An optional cost per kilogram figure may be entered for information only.
17	N Length	The nominal length of this stock item. An item may have a nominal length as well as an actual length. If a nominal length is given then utilization statistics are reported in terms of both the actual and nominal dimensions.
18	N Width	The nominal width of this stock item. An item may have a nominal width as well as an actual width. If a nominal width is given then utilization statistics are reported in terms of both the actual and nominal dimensions.
19	Material	The material of a stock item restricts the cut parts that may be produced from it. Only those stock items whose Material field matches the cut part Material may be used. If a cutting list contains groups of panels that must be cut from different materials then please ensure that the System/Configuration Advanced/ System Controls have been set for Multiple Material on installation. Otherwise the Material field will be regarded as merely descriptive and pieces will be cut freely from any stock item.
20	Procurement cost	This field can be used to add an additional disincentive to the selection of a stock and is used in conjunction with the value field when planning cutting using the minimum value of stock material.
21	Priority	This field can be used to assign an absolute priority to the sequence of stock usage. Stock with a higher priority will be used first wherever possible regardless of the impact on yield
22	Material A	SECANT User interface use only

23	Material B	SECANT User interface use only
24	Material C	SECANT User interface use only
25	Material D	SECANT User interface use only
26	Material E	SECANT User interface use only

3.3 [PAT] - Pattern Definition

Each record in the pattern file is classified by the first character in the record.

A **P** record marks the beginning of a pattern. All records that follow refer to that pattern until a new P record is reached.

An **X** record marks the beginning of a section of the current pattern. All records that follow refer to this section until an x record is reached. (NOTE: The optimizer will currently only produce single section patterns however the pattern editor may be used to build patterns using more than one section.)

An **S** record marks the beginning of a strip that is to be cut from the current section. All records that follow refer to this strip until a new S record is reached. A section may consist of several strips. Strips within a section may be in different directions.

A **p** record marks one or more repeats of the same panel being cut across a strip. Normally several p records will appear describing the contents of each strip.

A **z** record follows each p record and classifies any area of unused material in the width of the current strip as waste or offcut.

An **e** record classifies an area of unused material (waste or offcut) at the end of the current strip as waste or offcut.

An **f** record classifies an unused strip at the end of a pattern as waste or offcut. This is sometimes called a falling piece.

The same format is used to record both plate and bar cutting patterns. In the case of bar cutting the following simplifications can be assumed.

The **P** record defines the bar (or bars) that is to be cut to a given pattern.
Each pattern has a single strip **S** record.
Each **p** record following the **S** record refers to the cutting of a single piece from the bar.
The **e** record following the series of **p** records refers to the remnant at the end of the bar.
All other records may be ignored.

Each record is made up of the classification character described above and a number of parameters separated by commas.

3.3.1 The P record

Parameter	Description
Classification	P
Pattern number	The patterns are numbered from 1 for each material
Repeat	The number of stock items (bars or sheets) cut to this pattern
Stock item	The line number in the <jobname>.STK file of the stock item used by this pattern

3.3.2 The X record

Parameter	Description
Classification	X
Left offset	Offset of this pattern section from the left hand edge of the sheet. For the first section this will be the left hand clean edge trim
Top offset	Offset of this pattern section from the top edge of the sheet. For the first section this will be the top clean edge trim.
Length	Length of section
Width	Width of section

3.3.3 The x record

This record has the fixed format: x,w,0

3.3.4 The S record

Parameter	Description
Classification	S
Strip direction	Takes a value of R for a horizontal (rip) strip and of H for a vertical (head) strip
Repeat	The number of times this strip is repeated in the pattern section
Length	The strip length
Width	The strip width
Unused	Set to 0

3.3.5 The p record

Parameter	Description
Classification	p
Item	The record number of the cut piece in the <jobname>.CUT file
Repeat	The number of times this item is cut ACROSS the current strip. Always 1 for bar cutting
Rotation	Set to r if this item is rotated so that its length is aligned across the strip. Set to - otherwise
Code	The mitre code for bar cutting or the destacking code for sheet/plate cutting
User marker	A marker that can be set by the user in pattern editing to highlight (colour red) one or more pieces

3.3.6 The z record

Parameter	Description
Classification	z
Offcut?	Set to o if the unused material in the width of the current strip after cutting the items described by the last p record is classified as offcut. Set to w if it is classified as waste
Null?	Set to 1 if there is no waste in the width of the strip. Set to 0 otherwise.

3.3.7 The e record

Parameter	Description
Classification	e
Offcut?	Set to o if the unused material at the end of the current strip is classified as offcut. Set to w if it is classified as waste
Null?	Set to 1 if there is no waste at the end of the strip. Set to 0 otherwise

3.3.8 The f record

Parameter	Description
Classification	f
Offcut?	Set to o if the unused material at the end of the pattern after all sections have been cut is classified as offcut. Set to w if it is classified as waste
Null?	Set to 1 if there is no falling piece. Set to 0 otherwise

3.4 [CTL] - Control definition

SECANT uses over two hundred controls to enable it to handle a wide range of cutting practices. However, a much smaller group of controls will be applicable to any particular operation. For ease of use these controls are arranged into three main sections: System, Machine and Policy.

Controls for an individual job are defined in [CTL] chapter of the SECANT job file, or through the *defctl* keyword of the [JOB] chapter.

SECANT controls are group together by common functionality in the following section 3.4.1, alternatively a full list of all controls available can be found in section 3.4.2.

3.4.1.1 Cutting operation
3.4.1.2 Trims and Kerfs
3.4.1.3 Cutting restrictions
3.4.1.4 Book Height
3.4.1.5 Anthon
3.4.1.6 Holzma
3.4.1.7 Timing
3.4.1.8 Mitre Cutting
3.4.1.9 Work flow
3.4.1.10 Work spread
3.4.1.11 Offcuts
3.4.1.12 Defaults and options
3.4.1.13 Penalties

A control file has the following layout:

[sections]
<section definition 1>
<section definition 2>
...
[<section 1>]
<control definition 1>
<control definition 2>
...
[<section 2>]
<control definition 1>
<control definition 2>.

For example the [sections] chapter contains the entry:
#40004=;1,-1,40004 // a section definition

Later in the file a heading [#40004] marks the beginning of the section in the file defining a group of clean edge trim and kerf (swarf) controls.

[#40004]
#33024=10;1,-1,33021 // a control definition

A section definition line has the syntax:

#<section identifier>=;<user interface parameters>

The user interface parameters are used to link the section to the data entry and on-line help systems. These parameters are not used by the Optimize function.

A control definition line has the syntax:

#<control identifier>=<value of control>;<user interface parameters>

Again the user interface parameters are used to link the section to the data entry and on-line help systems. These parameters are not used by the Optimize function.

See section 3.4.1 - Secant Control Identifiers for a list of all supported controls and their identifiers. Developers should also refer to the SECANT User Manual for a description of the scope and meaning of the controls.

NOTE: The use of section identifiers is predominantly used for the user interface. It is acceptable for a control file to contain a single section.

The <value of a control> is normally a single figure or text string. However with many controls there is an option to give a table of values where different values are specified for different phases of a pattern or for different materials. A table value is given in the form:

(first value,phase number 1,material 1),(second value,phase number 2,material 2),...

For example the maximum strip length control might take the form:

#33030=(1800,1),(1000,2);1,-1,33030

A maximum strip length of 1800 mm is imposed for the rip phases of a pattern (horizontal strips) and 1000 mm for the head phases (vertical strips).

Or,

#33030=(1800,,mat1),(1000,,mat2);1,-1,33030

A maximum strip length of 1800 mm is imposed for sheets of material mat1 and 1000 mm for sheets of material mat2.

The <value of control> that provides the valuation of stock material and the valuation of offcuts being returned to stock is given as a table of data pairs.

For example:

#33136=([0.1,0.02],1),([0.2,0.5],2)..;1,-1,33136

This control provides a series of stock valuation points. The first figure in the data pair is the fraction of the standard stock value per unit area. The second figure in the data pair is the offcut size in M2. SECANT interpolates between the data points to value any specific size of offcut. The example shows that an offcut of .02 M2 has a value per unit area of 10% (0.1) of a full stock sheet and an offcut of 0.5 M2 has a value per unit area of 20% (0.2) of a full stock sheet. Note that in this case the second parameter is used to give an index to the series and is not interpreted as a phase number.

3.4.1.1 Cutting Operation

1	Dimensions.	Set this control to 1 for bar cutting, 2 for sheet or plate cutting, 3 for block cutting and 4 for coil cutting.	2
2	Mode.	Set this control to s if the Material field in the cutting list is for information only and any item in the cutting list can be cut from any stock sheet in the stock file. Set this control to q if each item in the cutting list may only be cut from those stocks where either the whole or first part of the Identifier of the stock matches the Material of the cut item. See the Multi Material topic in the reference manual for advice on optimizing a cutting list containing more than one type of material.	s
7	Units.	SECANT will accept dimensions expressed in either imperial or metric units but NOT a mixture of the two. Choose imperial or metric as the units to be used for this job. In the program documentation reference is made to metric units but in all cases imperial units may be substituted.	metric
44	Tcut build limit.	SECANT will explore strips for each width and length of piece in the cutting list. SECANT will also develop strips that are defined by T cutting the same piece across the strip width several times. In default operation the number of repetitions of a T cut piece in defining a strip is limited to 3. This control allows this limit to be changed. BEWARE. Significantly increasing this limit will greatly increase the time taken to generate a pattern set.	3

3.4.1.2 Trims and Kerfs

19 20	Kerfs: Rip kerf. Cross kerf.	The kerf (or swarf) is the amount of material lost by the saw blade. Different kerfs may be specified for the blade that cuts the material into strips (Rip kerf) and for the blade that cuts the strips down into finished pieces (Cross kerf). UNITS mm.	The rip kerf defaults to zero and the cross kerf defaults to the rip kerf
21 22 24 25	Trims: Left trim. Right trim. Top trim. Bottom trim.	The sheet may require trimming to create a clean edge before piece cutting can begin. SECANT allows you to specify different trims for the front, the back, the top and the bottom of the sheet. Do not enter any value for these controls if clean edge trims are not to be taken. If a zero value is entered then a small dust trim is assumed. This will have the affect of preventing a piece from being cut from a sheet whose dimensions are identical to that of the piece. Also where trim balancing (adjusting cutting to give equal front and back trims) is supported by a saw a zero trim will allow trim balancing while a blank trim will not. UNITS mm.	No trims are made
23	Clamp allowance.	If a strip needs to be gripped at its ends to allow pieces to be cut from it then SECANT must be prevented from planning pieces too close to the end of the strip. However it is possible that provided the last piece makes full use of the entire remaining strip then no final cut need be made. If a clamp allowance figure is given then the waste piece at the end of the strip must be zero OR must be greater than the allowance specified. If the allowance is required in all cases and hence a zero waste piece is not permitted, use the Strip trim controls and leave the Clamp allowance control blank. UNITS mm.	0
26 27	Strip trims: Front strip trim. Back strip trim.	If a strip needs to be gripped at its ends to allow pieces to be cut from it then SECANT must be prevented from planning	No strip trims are made

		pieces too close to the end of the strip. Strip trims may be specified at both ends of the strip. Note that if a sheet also has a clean edge trim specified then the clean edge trim will count towards any required strip trim. For example, if a clean edge trim of 15mm is specified for all edges and a strip trim of 10mm front and 20mm back is also required then the total trims taken off a strip will be 15mm front and 20mm back. These being, in each case, the greater of the clean edge trim and the strip trim. However it is possible that provided the last piece makes full use of the entire remaining strip then no final trim need be made. If this is the case then use the Clamp allowance control and leave the Strip trim control blank. A zero strip trim will cause a dust trim to be assumed and hence a strip with zero waste at the end of the strip will not be permitted. UNITS mm.	
28 29	Turn trims: Trim after turn to head. Trim after turn to rip.	SECANT creates patterns as a series of strips that are then cut down into the finished pieces. The direction in which the strips run (left to right (rip) or top to bottom (head)) may change several times in a pattern so as to give the highest yield. When the direction of cutting changes it may be necessary to re-trim the sheet to give a clean edge for the next block of strips. The Trims after turn controls specify the size of such trims. Different trims may be given for a turn after a series of rip cuts and for a turn after a series of head cuts. A zero turn trim will cause a dust trim to be assumed and so a pattern that makes use of the full remaining sheet after a turn will not be permitted. UNITS mm.	No trim turns are made
255	Third phase trim	Following a crosscut the material may need to be trimmed before third phase cuts are made to produce the final part. This control defines the size of the trim.	

		UNITS mm	
276	Min trim board length	If there is a tolerance in the size of the trim when a single part is planned in a strip, or a single strip is planned in the pattern, this control can be used to specify the minimum trim which must be taken in these cases. UNITS mm	
278	Min trim board width	If there is a tolerance in the size of the trim when a single part is planned in a strip, or a single strip is planned in the pattern, this control can be used to specify the minimum trim which must be taken in these cases. UNITS mm	

3.4.1.3 Cutting restrictions

30 31	Strip length: Maximum strip length. Minimum strip length.	It may be undesirable for operational reasons to cut strips that are either too long or too short. If there is a limit on the reach of the saw it may be necessary to cut several head strips from a sheet before it is physically possible to cut lengthwise rip strips. Similarly changing the direction of a strip late in the pattern may give rise to very short strips that are inefficient to cut. SECANT allows you to place minimum and maximum limits on the length of a strip. This control may take different values for the different phases of the pattern. For example the maximum length of a rip strip may be different to the maximum length of a head strip. UNITS mm. Values of this control may be given for the different phases of the pattern.	Unrestricted strip lengths
35 36 37 38 279	Z cutting: Minimum Z-Cut. Maximum Z-Cut without penalty. Maximum Z-Cut. Maximum Z-Cut length. Minimum Z-Cut length	A Z cut is a third phase cut following the rip and the cross cuts that reduces a piece down to its finished size. There will normally be some limit as to how small the Z-cut width can be and a Minimum Z-cut control is available for this purpose. Z-cutting may be performed automatically by the saw up to some limit beyond which it becomes necessary to re-feed the piece back through the saw for Z-cutting. The former is clearly preferable to the latter. SECANT therefore provides two Maximum Z-cut limits and a Z-cut Penalty (see Penalties chapter) that is imposed when violating the lower of the two limits. The controls described above all constrain the width of a Z-cut. There may be operational reasons why we may wish to restrict the length of the Z-	Unrestricted Z-cutting with no penalty

		cut and so Minimum and Maximum Z-cut Length controls are provided. UNITS mm Values of this control may be given for the different phases of the pattern.	
40 42	T-cutting: Maximum rip T-cut. Maximum head T-cut.	A T-Cut is a cut that divides a piece that has been cross cut from a strip into two or more finished pieces. The T-cut controls allow you to restrict the number of identical pieces that can be plotted across a strip and also to impose a penalty on the use of T-cutting. When building a strip we refer to the piece that fits exactly across the strip (either singly or as a repeated T-cut) as the defining piece. In normal operation SECANT will not build strips whose defining piece is T-cut more than three times across the strip. This is unlikely to impose any restriction on the patterns that can be built. However this restriction can be relaxed by setting the T-cut Build Limit control (see Cutting Operation controls). Values of this control may be given for the different phases of the pattern.	Unlimited T-cutting
57 58	Strip width: Minimum strip width. Maximum strip width.	Restrictions on strip width normally arise from the limitations of the saw. A saw may have a limited mouth in the feed to the cross cut blade implying a maximum width of strip that can be cut. In addition cutting very narrow strips may cause the material to distort. SECANT allows you to place minimum and maximum limits on the width of a strip. UNITS mm. Values of this control may be given for the different phases of the pattern.	Unrestricted strip widths
59	Chequerboard width:	Groups of strips that can be cross cut together are called chequerboards.	Unrestricted chequerboard widths

60	Minimum chequerboard width. Maximum chequerboard width.	Cutting of chequerboards tends to be efficient as a single pass of the cross cut blade can cut the next piece off each of the strips simultaneously. The maximum chequerboard width is often set to the mouth of the cross cut saw. UNITS mm. Values of this control may be given for the different phases of the pattern.	
61 62	Cross cut length: Minimum cross cut length. Maximum cross cut length.	The cross cut length is the distance between two consecutive cuts of the cross cut saw. The saw may place a limit on the minimum or maximum distance between cuts.. SECANT will respond to a cross cut gap restriction by rotating the piece in the strip where necessary. UNITS mm. Values of this control may be given for the different phases of the pattern.	Unrestricted cross cut gaps
63	Aspect ratio.	If the cross cut saw is used to cut a narrow piece across a strip then the piece may distort. SECANT can be told to avoid such problems by plotting these pieces down the strip. A setting of 2 for the strip width to cross cut gap aspect ratio prevents any panel whose length is more than twice its width from being cut with its length across the strip.	100
68	Max number of turns.	The number of times the strip direction can change within a pattern. This is an additional restriction to that applied by the Complexity control. For example a complexity of 1-2-1 with a turn limit of 1 is equivalent to a Complexity of 1-2/2-1.	
71	Maximum number of phases.	Similar to the maximum number of turns control. However when using phases greater than 2 to model areas of the pattern with special restrictions it is possible to specify more than one phase in the rip or head directions.	999

181 182	No-go on strip: Min no-go on a strip. Max no-go on a strip.	The saw may be unable to make a cross cut within a region close to the end of the strip because of clamping. Controls #181, #182 specify a prohibited region measured from the end of the strip.	
183 184	No-go on falling piece: Min no-go falling piece. Max no-go falling piece.	The saw may be unable to make a rip cut within a region close to the end of the board because of clamping. Controls #183, #184 specify a prohibited region measured from the end of the board.	
221	Clamping positions	Use this control to define a set of min/max clamping positions. If clamping positions are given, each strip must be clamped in its centre. Each clamp may be positioned anywhere between the min and max values.	
229	Oversize strips prohibited	An oversize strip (one where the strip width is greater than any constituent pieces) may be created if reducing the strip width would violate for example minimum Z-cut or minimum strip width. The production of strips of this type may be forbidden for any phase by entering the value 1 for this control.	0 (oversize strips permitted)
230	Minimum phase width	Restrictions on phase width normally arise from the limitations of the saw. SECANT allows you to place minimum and maximum limits on the width of a phase.	
231	Maximum phase width	Restrictions on phase width normally arise from the limitations of the saw. SECANT allows you to place minimum and maximum limits on the width of a phase.	
252	Minimum clamp grip	The minimum amount by which a strip must be held by a clamp defined by control 221.	
253	Thin piece clamp tolerance	TBC	
259	Max third phase stations	A restriction can be placed on the number of third phase stations which may be planned within a strip Different values of this control may be given for the different phases of the pattern.	
260	Cross cut reach	TBC	

261	Rip cut reach	TBC	
263	Crosscut min block	TBC	
264	Crosscut min block repeat	TBC	
272	Max zcut strips per phase	A restriction can be placed on the number of strips containing a third phase cut which may be planned within a phase. Different values of this control may be given for the different phases of the pattern.	

3.4.1.4 Book Height

64 65 66	Book restrictions: Maximum boards per book (planned). Maximum book height (planned). Minimum boards per book (planned).	It may be possible to cut more than one board at a time. A group of boards being cut simultaneously to the same pattern is called a book. Clearly there are efficiency advantages in planning patterns that can be cut to the maximum book that the cutting device can handle. SECANT provides four controls related to the book. The Maximum book height control is only used if the Maximum number of boards in a book is blank. The height control is to be preferred if a range of sheet thicknesses are being used. The maximum number of sheets in a book is then calculated by dividing the book height by the gauge of the sheet. Each pattern produced by SECANT will have a repetition greater than or equal to the Minimum book. If a Minimum book is specified then SECANT may exceed the permitted overmake if it needs to do so to meet the minimum book requirement. As a general rule the number of books will decrease as the Penalty per machine cycle is increased (see Penalties chapter)	Max boards per book = 999. Max book height = 0. Min boards per book = 1.
133	Max book size (reporting).	The book height that is used when calculating machine cycles for reports and for the pattern timing calculations. (See #064 and #065 for book height assumptions during optimisation.). The value is interpreted as the maximum number of boards in a book.	1
222	Max book height (reporting)	The book height that is used when calculating machine cycles for reports and for the pattern timing calculations. (See #064 and #065 for book height assumptions during optimisation.). The given value is interpreted as book height in mm or inches.	
262	Full book cutting	When this control is specified then the maximum possible book height of the saw must be used by all patterns. The setting of this control is equivalent to	

		setting the minimum and maximum boards per book to the same value but can be used when materials of different thicknesses are planned. If this control is specified then SECANT may exceed the permitted overmake if it needs to do so to meet the book requirement	
269	Offcut single sheet	If this control is specified then the system considers that any sheet defined as an offcut in the stock file must be cut as a single sheet repeat, regardless of the quantity of that offcut available. E.g. if the control is specified then book cutting of offcuts is prohibited.	

3.4.1.5 Anthon Controls

88 89	Chute widths: Rip chute width. Cross chute width.	These Anthon saw controls allow you to specify how the saw is configured. They impact purely on the codes that are produced to control the cutting of the pattern set at the saw. They do not affect pattern generation. The rip chute takes strips of waste material away from the saw and the cross cut chute takes remnants of strip cross cutting away from the saw. Any waste material that cannot fit down the chutes is handled as though it were a cut piece. It is possible to request that leading and trailing trims be balanced so that they can fit down the chute in cases where the falling piece would otherwise be too wide. It is also possible to request that waste material be repeatedly cut so as to fit the chute. See Chute mode for these controls.	9999
90	Chute mode.	By default waste material formed in cutting the patterns must either pass down a waste chute (see Anthon: Chutes) or be handled as though it were a cut piece. The Chute Mode control allows you to influence the treatment of waste. Balancing is the procedure of taking a larger trim off the front of a strip or sheet to reduce the waste at the end of a strip or sheet. This control does not affect pattern generation. The options are: Trim - equalize the trims taken at the front and back of each strip and equalize the initial sheet trim and the falling piece if by so doing all trims and waste can pass down the chutes. Cut down - cut down all waste material by successive trims until it can pass down the chutes. None - make no trim adjustments. Note that a trim may only be balanced if it is specified (see Clean edge trims.) If the minimum trim requirement is set at zero then it is treated a nominal trim and can be balanced. If it is left un-set then no balancing will be considered. A second trim balancing control can be specified for offcuts that have been reclassified as waste during pattern editing.	Trim

91	Last strip grip.	The final strip in any phase of a pattern must be gripped while it is being cut. Although the strips in a phase may be sorted so that the largest strip is cut last (see Sorting strips in a pattern) it is still important that the width of the largest strip in a phase is no less than the gripper width. This control allows us to specify the gripper width.	Value of control #023 – clamp allowance
92	Like strip merge.	When creating the download codes for a pattern, repeated strips that cannot pass down the cross cut throat are broken down into smaller repetitions that can. The Like strip merge control allows the download to make the opposite adjustment of combining identical strips to make more efficient use of the cross cut throat.	Set
93 94 95 96 97 98	Anthon controls: Saw identifier. Mirror function. B2 function. A1 function. A2 function. Minimum balanced trim.	saw identifier A two character identifier of the saw and stacking station. The first character is written to the first line of the download section of the numeric control (NC) file created for a pattern set and identifies the saw (s or S). The second character is written to the first line of the destacking information and marks the start of the destacking information. The saw identifier is always assumed to be s if destacking is not in use (see Stacking flag). mirror function. Mirror cutting indicator that is passed to the pattern download file. Set to s to enable mirror cutting. b2/a1/a2 functions. Algorithm indicators for Anthon saws. Passed to the download file. minimum balanced trim. The minimum balanced trim (half the sum of the trim and the width of the falling piece) for which balancing codes are to be generated. In cases where a smaller trim would result the balancing is not performed.	saw identifier – sa. mirror function - null. b2/a1/a2 functions - null. minimum balanced trim – 0.
99 100 101 102 103 104	Destacking controls: Destacking controls flag. Height measure. Stack type. Stacks on pallet length.	Stacking/destacking is the process of collating pieces at the end of a feed line. The following controls are used by automatic stacking/destacking equipment. destacking controls flag. Set this flag if destacking instructions are to be added to the download file.	Destacking control flag = set. Height measure = No layers. Stack type = t. Stacks on pallet length = 1. Stacks on pallet width = 1.

	Stacks on pallet width. Information.	height measure. The units in which stack height is expressed in the destacking section of the download. No layers - the stack height is expressed as a number of layers, Height (mm) - the stack height is expressed in millimeters else Height (scaled) - the stack height is the entered height (in the cutting list) multiplied by a factor of 0.3937. stack type. Type of destacking. stacks on pallet length. Number of stacks lengthwise on a pallet stacks on pallet width. Number of stacks widthwise on a pallet. information. Set this flag if the piece information (piece identifier, demand etc) is to be added to the destacking information. If unchecked then the general description field of the destacking information is left blank.	Information = unset.
105 202	Cross cut throat. Cross cut throat, head plant.	Strips are cut down into pieces by the cross cut saw. Several identical strips may be cut together if their accumulated width is less than or equal to the reach of the cross cut blade. This is called the cross cut throat. The throat affects pattern timing and the downloading of patterns to the saw controller. Head plant controls only apply to timing mode 2.	99999
106 203	Cross cut throat flag. Cross cut throat flag, head plant.	If a strip is so big that it cannot fit onto the cross cut saw bed (bigger than the cross cut throat #105) then normally no cross cutting instructions will be sent to the saw. If this flag is set then the cross cut instructions are sent anyway. Head plant controls only apply to timing mode 2.	Unset
185 200	Number of pushers. Number of pushers for the head plant.	When different strips are loaded into the throat of the cross cut saw a pusher may be used to align the cross cut positions. The number of pushers therefore determines the number of different strips that can be cut by a single stroke. If insufficient pushers are available then	1

		a strip which could fit in the throat must wait until the throat has been cleared before it can be cut. Head plant controls only apply to timing mode 2.	
186 201	Clear throat policy. Clear throat policy for the head plant.	Indicates when the cross cut throat is cleared. The throat may be cleared on the completion of each PHASE (on a turn in the pattern), BOOK (on each machine cycle) or PATTERN (on each change of pattern). Head plant controls only apply to timing mode 2.	Phase
187	Kh switch.	Reserved	0
193	Default turn flag.	Destacking turn flag to use when no turn flag is specified in the cutting list.	0
237	Min width of largest strip		
254	Min balanced trim 3rd phase	The minimum balanced trim for 3rd phase cuts (half the sum of the trim and the width of the falling piece) for which balancing codes are to be generated. In cases where a smaller trim would result the balancing is not performed	
   265 266 267 268	Minimum waste length Maximum waste length Minimum waste width Maximum waste width	If waste is to be cut down into manageable size for disposal to a feedline rather than repeated trim cuts to dispose of via the sluice then these controls can be used to define the permitted dimensions of the waste.	
     270 271	 Thin strip limit Thin strip throat	For certain saws thin strips must be handled as a special case. These thin strips must be loaded into a crosscut throat on their own, and not mixed with any other strip. When these special strips are loaded the total widths of the combined strips must not exceed a given maximum. The controls thin strip limit and thin strip throat are used to define these values.	
   273 274 275	Destacking move time Destacking clear time Destacking drop distance	If optimization of destacking is performed to allocate parts of the same size/identifier to different stations in order to avoid unnecessary waiting for a free station then these controls must be specified	
 280	Trim extractor active	Set this control to prevent the final trim being accounted for in pattern timings	

3.4.1.6 Holzma Controls

156 157 158 159 160 161 162 163 164 165	HOLZMA NC controls: Minimum last cut Rip saw speed Cross saw speed Head saw speed Inc T&D for divide Inc T&D for recut Split waste Preserve offcuts Recuts against fence Microprocessor	The following controls are used to pass information to the HOLZMA saw via the NC file. They are not needed for the PTX download format. Please Note. The Sorting strips control should be set to WD> and with certain controllers the number of turns in the pattern must be restricted to one.	Minimum size of last cut = 0.0 Rip cut saw speed = 0.0 Crosscut saw speed = 0.0 Headcut saw speed = 0.0 Include times and dimensions for a divide head = 0 Include times and dimensions for a re-cut = 0 Split waste = 0 Preserve offcuts = 0 Re-cuts against fence = 0 Microprocessor type = 0
190 191	Min block size (CPOUT) Max block size (CPOUT)	Restrictions on the length of any block of the same piece in a strip when downloading using the CPOUT format.	0 (P) – 99999 (P)

3.4.1.7 Timing

107 108 109 110 111 112 113 114 115 116 117 118 119 120	Strip cut timing: Book load time (before rip). Rip trim time (fixed). Rip trim time (per mm). Number of parallel rip saws. Rip cut time (fixed). Rip cut time (per mm). Time to turn to a head strip. Book load time (before head). Head trim time (fixed). Head trim time (per mm). Number of parallel head saws. Head cut time (fixed). Head cut time (per mm). Time to turn to a rip strip.	Strip cuts are timed one book of material at a time using the following procedure. The strip cutting time is calculated as: • The time to load the book (first phase only). • The time taken to turn the sheet if this phase is in a different direction to the previous phase. • The time taken to trim the sheet if necessary (fixed trim time plus a variable time per mm). Note that a zero trim (dust trim) is timed. • The time taken to cut the strips (fixed time plus a variable time per mm). The timing model recognizes that several parallel saws may be available for strip cutting and assumes that the strip cutting is evenly loaded across these saws. Different figures may be given for the rip and head phases. Note that the book height used for timing is given by the control #133 Maximum book size reporting. . This book height may differ from the Book height control used during pattern generation.	Book load time = 0 secs Trim time (fixed) = 0 secs Trim time (per mm) = 0 secs No parallel saws = 1 Cut time (fixed) = 0 secs Cut time (per mm) = 0 secs
121 122 256 257 258	Zcut timing: Zcut time (fixed). Zcut time (per mm). Z-cut load time Z-cut trim time (fixed) Z-cut trim time (per mm)	Z cuts or third Phase cuts are also considered to be made to a book of pieces. The cutting down of each book of pieces is timed with a fixed time per cut and a time per mm of length of the Z cut. Z cut times are accounted as part of cross cutting.	All zero
123 124 125 126 127 128 194 195	Cross cut timing: Cross cut load time. Cross trim time (fixed). Cross trim time (per mm).	Cross cuts are timed for each book of strips that can fit through the throat of the cross cut saw. Several books of strips with identical cross cut requirements (chequerboards) will normally be cut at the same time. The cross cutting time is calculated as:	Cross cut load time = 0 seconds Trim time (fixed) = 0 seconds Trim time (per mm) = 0 seconds per mm No parallel saws = 1 Cut time (fixed) = 0

196 197 198 199	Number of cross cut saws. Cross cut time (fixed). Cross cut time (per mm). Cross cut load time, head plant. Cross cut trim, head plant. Cross cut trim/length, head plant. Number of cross cut saws, head plant. Cross cut time, head plant. Cross cut time/length, head plant.	• The time taken to load the cross cut throat. • The time taken to trim the strips if necessary (fixed trim time plus a variable time per mm). Note that a zero trim (dust trim) is timed. • The time taken to cut the strips into pieces (fixed time plus a variable time per mm). The timing model recognizes that several parallel saws may be available for cross cutting and assumes that the cross cutting is evenly loaded across these saws.	Cut time (per mm) = 0
129 130 131 132	Timing method: Timing method. First pattern start up time. Last pattern close down time. Pattern changeover time.	SECANT supports three timing methods. In method 0 the total job time is calculated as: The first pattern start up time plus for each pattern • the larger of the strip cutting time per book and the cross cutting time per book times the number of books cut to the pattern plus • the pattern changeover time. For the last pattern the last pattern close down time is used instead of the pattern changeover time. In method 1 the total job time is calculated as: The first pattern start up time plus for each pattern • the sum of the strip cutting time per book and the cross cutting time per book times the number of books cut to the pattern plus • the pattern changeover time. For the last pattern the last pattern close down time is used instead of the pattern changeover time	All zero

		In method 2 the total job time is calculated in the same manner as for method 1 but the cutting of any head phase (both strip and piece cutting) is assumed to be performed on an independent saw plant. The overall pattern time is taken as the maximum of the rip plant time and the head plant time. Note that the book height used for timing is given by control #133 Max book height (reporting). This book height may differ from the Book height control used during pattern generation.	

3.4.1.8 Mitre Controls

The cutting of mitres (sloping cuts) is fully modeled within SECANT. The angles of the mitre are specified in the cutting list and a number of controls are given to specify the costs and restrictions of mitre cutting.

142	Mitre flag.	Set this flag if the angle information in the cutting list is to be used when cut planning. If unset the angle information is ignored and all pieces are planned as square cut.	Unset
143	Mitre kerf cost.	A value expressed in an equivalent number of millimetres. This cost is added to the material cost for each cut that is made.	0
144	Mitre clamp width.	The amount of material that must be pushed past the blade when an angle cut is made so that both sides of the cut may be gripped.	0
145	Mitre minimum saw angle.	The largest angle sloping back from the normal that may be cut by the saw.	90
146	Mitre maximum saw angle.	The largest angle sloping forward from the normal that may be cut by the saw.	90
147	Mitre rotation cost.	A value expressed in an equivalent number of millimetres. This cost is added to the material cost for each time the bar must be rotated about its central axis while cutting.	0
148	Mitre turn cost.	A value expressed in an equivalent number of millimetres. This cost is added to the material cost for each time that the feed direction of the bar is changed during cutting.	Value of control #147 – Mitre rotation cost

3.4.1.9 Work flow

12	Segment horizon.	Where a cutting list is being cut planned one production segment at a time the Production segment look ahead is the number of future segments from which optional panels can be drawn to improve the yield. See the tutorial Controlling the production sequence.	0
13	Segment rank.	Segment identifiers may be entered against each piece in the cutting list. All the pieces in the first segment will be cut planned first (with pieces drawn from future segments to make use of waste areas). The process is then repeated for the remaining pieces of the second segment and then for the third segment and so on. It may not be convenient to label the segments numerically so this control allows you to define the order in which the segments will be considered. For example a setting of W52,-W1-W2-W3 will produce patterns in the order segment W52, segment W1, segment W2, segment W3.	Cut segments in alphabetic order.
137 141	Feedlines: Maximum feedlines. Feedline type.	A feedline is a mechanism following the saw that takes stacks of the same piece away for further processing. The feed line controls are; Maximum feedlines: patterns will not be generated that cannot be handled by the available lines. Feedline type: Anonymous – anonymous feedlines (set Maximum feedlines to the number of feedlines available) Reserved – reserved Pallet type – number of pallet types. Several different pieces may be stacked to the same pallet type. See the Type property of a cut piece for the assignment of pieces to pallet type. Named station – named destacking stations. Data is provided in the LINES.FED file to describe the number and sizes of destacking stations that are available.	Maximum feed lines = 99. Feedline type = Anonymous.
188	Max items on a pallet.	Used in the pallet report to determine the number of pallets required. Settings #188, #189 do not affect pattern building. The feedline type #141 may be set to 2 to restrict the	32000

		number of pallet types that are active at any time but when a pallet is full it is simply replaced by another pallet of the same type.	
189	Max weight on a pallet.	Used in the pallet report to determine the number of pallets required.	999999
217	Min active piece length per pattern	The minimum length of the main priority piece that must be produced in each pattern to maintain flow to another machine	-1 (no active piece)
219	Piece similarity tolerance	Used to specify the minimum difference in size for pieces within the same strip. If this control is non-zero then neither the length nor width of two different pieces within a strip can be within this tolerance of one another.	0 (no restriction)
233	Round requirement	Round requirement to next complete layer	
234	Default placement	Default placement on stack	
235 236	Max overhang perc length Max overhang perc width	Permitted overhang percentage when using stacked feedlines	
246	Recycle offcuts	This control can be used in conjunction with Production Segments to recycle offcuts which are produced in one production segment for reuse in a later production segment	
247	Offcut discount percentage	Use this control to discount the value of an offcut specified in the stock file to incentivise its use. This discount is automatically applied when offcuts are recycled using the above control.	

3.4.1.10 Work spread

45 46	Strip restrictions: Max physical pieces per strip. Max piece identifiers per strip.	It is possible to restrict both the number of physical pieces per strip and the number of identifiers per strip (number of different pieces) in the patterns generated by SECANT. For the purposes of these controls two pieces are different if they are defined on separate lines of the cutting list irrespective of the names of the pieces. Values of this control may be given for the different phases of the pattern.	No restriction on the pieces in a strip
48 49	Restricting the pieces in a pattern: Max physical pieces per pattern. Max piece identifiers per pattern.	It is possible to restrict both the number of physical pieces and the number of identifiers (number of different pieces) in the patterns generated by SECANT. For the purposes of these controls two pieces are different if they are defined on separate lines of the cutting list irrespective of the names of the pieces. As an alternative to restricting the number of identifiers in a pattern it is possible to place a penalty against each use of an identifier. In this way the patterns can be biased towards simplicity while retaining the option to combine a larger number of different pieces when this is warranted by the improvement in yield.	No restriction on the pieces in a pattern
51 56	Restricting the strips in a pattern: Maximum strips per pattern. Maximum different strips per pattern.	It is possible to control the number of strips in a pattern and also the number of different strips in a pattern. Two strips are different if they contain different panels. If a restriction on the number of different strips per pattern is being imposed to reduce the cutting time then it may be worthwhile considering the alternative of associating a penalty with each cross cut stroke using control #054 Strips per phase penalty. (See Penalties chapter)	No restriction on the strips in a pattern
52 53 55	Phase restrictions: Maximum strips per phase. Maximum different strips per phase. Maximum piece identifiers per phase.	A phase is a block of consecutive strips within a pattern each with the same length and direction. A pattern is always made up of one or more phases. For a complete definition of phases refer to the Pattern Complexity control. It is possible to control the number of strips in a phase, the number of different strips (i.e. with	No restriction on the pieces in a strip or phase

		different panels in the strip) and also the number of different piece identifiers in a phase. Sometimes these restrictions must be imposed because of the physical limits of the cutting device or may be imposed to simplify the administration of the patterns. If a negative value is given for control #053 then two strips are considered to be identical if their cross cut positions are identical even if the strips have different width and content. For example a setting of -2 imposes a limit of two chequerboard sections within the phase. Values of this control may be given for the different phases of the pattern.	
82	Pattern complexity.	The complexity specifies the type of pattern that is permissible. The control value is a string of phase numbers connected by forward slash characters (meaning or) and hyphens (meaning and). For example a complexity of 1-2/2-1 restricts patterns to those made up of a phase 1 section and then a phase 2 section or a phase 2 section then a phase 1 section. A phase 1 section is a group of rip (horizontal) strips and a phase 2 section is a group of head (vertical) strips. Please note that a phase may be empty so a complexity of 2-1 includes all head patterns, all rip patterns and all patterns with a head section and then a rip section. Other phase numbers (3,4, etc) may be used. Odd numbers always refer to rip phases and even numbers to head phases. Many controls may be given different values for different phases and so phase 3 (say) may be used to refer to a rip phase with a restricted strip length. For example a complexity of 1-2-1 allows a pattern with two changes of strip direction (rip-head-rip), a complexity of 1-2-3 is very similar but the second rip phase must obey any restrictions on a phase 3 strip.	1/2

3.4.1.11 Offcuts

83 84 85 281	Classifying offcuts: Minimum offcut length. Minimum offcut width. Orientated offcut. Minimum offcut area	The offcut length and width set by these controls are used primarily to classify waste materials as either waste or offcut in reporting and in their display in the cutting diagrams. The classification of a piece of material as offcut does not automatically alter its valuation by the optimizer. Unless told otherwise by the offcut returns table control, or offcut percentage value, all waste AND all offcuts are considered to be valueless. If the oriented offcut flag is not set then a waste piece qualifies as an offcut if its longer dimension is no smaller than the larger of the offcut length and width and if its shorter dimension is no smaller than the smaller of the offcut length and width. If the flag is set (=1) then the length of the waste piece must be no smaller than the offcut length and the width of the waste piece must be no smaller than the offcut width before it will be classified as an offcut. To qualify as an offcut the area must also be greater than the minimum offcut area	Minimum offcut length 999999. Minimum offcut width 999999. Orientated offcut 1. Minimum offcut area 999999.
135	Value of waste.	The value per unit area of waste material (a remnant less than the minimum offcut dimensions) as a fraction of full sheet value.	0
136	Offcut returns table.	The value per unit area of an offcut returned to stock is calculated as a fraction of the value of a full sheet. (The value of a full sheet may be set through the material valuation control or may be given explicitly in the stock file. If different values per unit area are given for different dimensions of sheet material in the stock file then the value per unit area of the largest sheet is used for offcut costing.) The value is determined from the offcut returns table as follows. Several pairs of figures giving value (fraction) and area (M2) should be entered to define a table of return values for various sizes of offcuts. The value of an offcut whose size lies between two given sizes is interpolated from the values of the given sizes. Be sure to give sufficient values in the offcut table to cover all sizes of offcut that might be produced. e.g. Value Area 0.10 0.01 0.45 0.5 0.99 5.0	All offcuts have zero value.

		This table values an offcut at 10% at a size of one hundredth of a sq metre, 45% at half a sq metre and 99% at 5 sq metres.	
150	Material handling cost.	If time is limited then we may wish to discourage the pattern generator from making extensive use of offcuts because of the overhead in finding and loading the material. We could do this by modifying the material valuation table but an alternative and faster way would be to set the material handling control. The value of this control increases the cost per sq metre of any stock item by value/stock item area (M2). Hence a setting of 1 would increase the value/unit area of a 5 sq metre sheet by 0.2 and that of a one tenth of a metre offcut by 10. Hence use of the control discourages the use of offcuts.	0
152	Material valuation table.	The valuation of stock material for the purposes of cutting optimization should reflect the expected return in saleable product from cutting up that stock item. When using an offcut returns table to value returns of offcuts to stock it is important to also have a consistent valuation of the offcuts taken from stock. If not, the optimizer may find it profitable to take an offcut from stock, leave it uncut and return it back to stock. The material valuation table is used to value the material in the stock file as follows. Several pairs of figures giving value (fraction) and area (M2) should be entered to define a table of valuations for various sizes of stock. The value of an item whose size lies between two given sizes is interpolated from the values of the given sizes. Be sure to give sufficient values in this table to cover all sizes of stock that might be in the stock file. The value of an offcut in the material valuation table should always be greater that its valuation in the offcut returns table. e.g. Value Area 0.15 0.01 0.50 0.5 1.00 5.0 This table values an offcut in stock at 15% at a size of one hundredth of a sq metre, 50% at half a sq metre and 100% at 5 sq metres.	All stock material is valued as given in the stock file.
180	Offcut value gap	When using controls #152 and #136 for offcut valuation it is essential that for any size of stock item its value/unit area when taken from stock is greater than its value when returned to stock. A simple way of ensuring this is to provide only one of the tables and have the other calculated using this value gap figure. At any data point,	

		Stock value = return value + value gap.	
223 238	Offcut return handling cost Offcut restock cost per unit area	Each time an offcut is produced man time is required to catalogue and return the offcut to stock. Use the offcut return handling cost controls to associated a penalty with each offcut produced to reflect this additional time.	
239	Enable offcut table	If this control is checked then the values in the offcut returns table are used to determine the value of an offcut produced during optimization	
240	Enable material valuation table	If this control is checked then the values in the material valuation table are used to determine the value per unit area of a stock item used during optimization	
283 284 285	Min offcut length (large) Min offcut width (large) Min offcut area (large)	As well as the standard offcut defined by controls 33083, 33084 and 33281 it is possible to define a second offcut class as a “large offcut”. These controls should only be used if the valuation of the offcut is to be performed using the Offcut Percentage value controls below (33286 and 33287)	
286 287	Offcut perc value (small) Offcut perc value (large)	This is an alternative way to value an offcut produced during optimization where the value per unit area of the offcut returned is defined as a percentage of the value of the parent stock. Different values can be given for “small” and “large” offcuts	

3.4.1.12 Defaults and Options

72	Speed.	The speed with which patterns are generated is generally proportional to the size of the cutting list, the number of materials in the stock file and the complexity of the patterns being cut. The Speed control sets the depth to which the pattern generation algorithm will search in forming patterns, and also the method that will be used for pattern generation. On installation SECANT is supplied with three different speed settings: Deep, Normal, and Quick	Normal
14	Default grain.	If a piece must be aligned with the grain of the material or with the direction of the strip when it is cut then a Grain code can be set against the piece in the cutting list. If all (or most) pieces have the same requirement then it may be more convenient to leave the Grain field blank in the cutting list and set a default value here. Note that this default value will be used for all pieces with a blank Grain. The permitted values are; GR - the piece must be aligned with the material grain but can be plotted along or across a strip, UG- the piece need not be aligned with either the material or the strip direction, AG- the piece must be aligned with the strip direction and with the grain of the material, AU- the piece must be aligned with the strip direction but can be plotted along or across the material grain. XG-the piece must be cut with its length across the strip and be aligned with the material grain, XU- the piece must be cut with its length across the strip but can be plotted along or across the material grain.	UG
16	Overmake percentage.	The Overmake field in the cutting list gives the maximum number of the piece that may be produced IN EXCESS of the requirement if by so doing the yield can be improved. However, if it is more	0

		convenient then the Overmake field may be left blank and a percentage overmake figure given here. The permitted overmake is then determined by multiplying the strict requirement for the piece by the given percentage. A setting of –1 is interpreted as permitting unlimited overmake. Sufficient overmake will always be permitted to allow one book to be cut (at minimum height) for any pattern. UNITS percentage.	
17	Optional piece value.	An optional piece is one that appears in the cutting list with no strict requirement but with some permitted level of overmake. Such pieces need not appear at all in the patterns produced for this job by SECANT. They are included only where and if they improve the total yield. The Optional piece value allows you to control the circumstances under which optional pieces will be included in the patterns. If optional pieces appear in a pattern then the pattern is not costed at the full value of the material but is credited with a fraction of the area taken up by optional pieces. This fraction is given by the Optional piece value. So for example, if a pattern uses a 5 M2 sheet of material and the pattern includes 2 M2 of optional pieces with an Optional piece value control of 0.5 then the sheet is costed as 5-2*0.5 = 4 M2 of material. Suggested settings. If optional pieces are to be used only to replace wasted areas of a pattern then use a value in the range 0.01 to 0.2. If optional pieces are to be used to improve yield then use a value of 0.8 to 0.9. If optional pieces are being produced for stock and would normally be produced with 15% wastage then use a value of 1.15.	0.01

18	Value of overmake	An overmade piece is credited with this proportion of its area when accounting the value of the pattern set.	0.09
86	Strip sort.	The strip sort control lets you specify how the strips of a pattern are to appear within a diagram when printed, when viewed at the screen or when downloaded to the saw (if appropriate). Strips are sorted within each phase of the pattern. Strips may not be sorted across phases. The strip sort control is specified as one or more sort keys followed by a ">"symbol for a sort in decreasing order or a "<"symbol for a sort in an increasing order. The sort keys are; CU - sort by cross cut position (the position of the first cut is considered first and then where this is the same for two strips, the position of the second cut and so on). WD- sort on the strip width. WB - sort on the width of a repeated block of identical strips. HR - sort on the highest numbered piece record in the strip. LR - sort on the lowest numbered piece record in the strip. NO - no sort	CU>WD> This default sorts on cross cut position (largest first). If two strips are identical in all cross cut positions (i.e. chequerboard) then the widest strip is shown first.
87	Panel sort.	The panel sort control lets you specify how the pieces within a strip are to appear in the diagram when printed, when viewed at the screen or when downloaded to the saw (if appropriate). Typically sorting is used to move Z cutting to the end of a strip. The panel sort control is specified as one or more sort keys followed by a ">" symbol for a sort in decreasing order or a "<" symbol for a sort in an increasing order. The sort keys are; RN - sort on the piece record number (i.e. the line number of the cutting list). LN - sort on the piece length. WD - sort on the piece width.	WD> This default sorts pieces within a strip by width (largest first). Hence any Z cut pieces will be moved to the end of the strip.

		LB - sort on the length of a block of the same piece repeated. NO – no sort	
149	Default sheet value	The default value/unit area of a board. The offcut value and offcut returns tables express offcut values as a fraction of this default value.	1
154 155	Stock updating: Stock updating (length unit). Stock updating (width unit).	During automatic stock updating an offcut may be introduced into stock that is nominally equivalent to one already in stock. In such cases we increase the availability of the existing stock item rather than introducing a new item. The stock updating (length unit) and stock updating (width unit) controls define the acceptable increase in size between the new offcut and the stock item before a new stock record is created. For example, If a stock list contained a 100x100 offcut and stock update - significant width = 10 and stock update - significant length = 20 setting then offcuts as large as 120x110 would be returned to stock as nominal 100x100 offcuts.	0.01
166	Edging flag.	The Edge field of a piece in the cutting list can be used to show where there is a requirement to edge the piece. If the edging flag is set then this edging requirement is shown on patterns, on the pattern summaries and on the overall summary. If the edging flag is unset it is assumed that all pieces are edged on all sides.	Unset
178	Post processes.	Various options are available to post process the patterns to suit different modes of operation. Check the checkbox beside each post process that is to be performed. Keyword OFFOPT. The waste or offcut at the end of a group of strips may be replaced by a single offcut strip taken off before the group is cut. A set of rip strips may be preceded by an empty head strip or a group of head strips may be preceded by an empty rip	

		strip. These adjustments are made to increase the value of the offcuts being returned to stock. Keyword OPENSTK. The allocation of stock sheets to patterns is adjusted so that open books of sheets are used first. Keyword MINHEAD. All unnecessary head cuts are removed. Keyword MERGETC. Both head and rip strips are merged if by so doing they form larger TCut strips. Keyword MERGETH. Head strips only are merged if by so doing they form larger TCut strips. Keyword MERGETR. Rips strips only are merged if by so doing they form larger TCut strips. Keyword SHEETSPLIT (Also enter a value nn in the adjacent edit box). The sheet sizes in the stock file are divided lengthwise into nn identical sub-sheets. Pattern building is performed using these sub-sheets and then the resulting patterns are recombined to give feasible patterns for the original sheet sizes. If a fixed book height is being used then all sub-patterns are used in multiples of this height. Sub patterns are recombined as books. If a variable book height is being used then all sub-patterns are generated in multiples of the nn sheet divisor.	
179	Panel grouping.	Set the panel grouping flag to show groups of identical panels as a single block on all diagrams. This feature is used where the block will be cut and treated before the panels are cut down to their finished size.	Unset
218	Max execution time	Set this control to specify the maximum time in seconds for which the algorithm will search for a solution.	No limit

		If a -ve value is specified, then the system will run for that number of secs regardless of the iteration limit specified. If a +ve value is given, then the system will run until the execution time limit is reached, or until the iteration limit is reached, depending on which occurs first.	
220	Full pack cutting	Set the full pack cutting flag to ensure that the optimizer generates patterns such that once a “pack” of stock has been opened (represented by a single line in the stock file) that pack will continue to be used until it has been completed, or there are no further pieces to cut	Unset
232	Edging overlap	An overlap/excess of edging tape can be assumed by SECANT when calculating the edging requirement for a job. This control gives the additional length which should be assumed for each side of the panel to be edged.	0
242	Optional piece decrement	This control should be used when planning production segments to reduce the value of pieces brought forward from future segments for planning. It is applied to each segment in turn so for example a value of 0.5 would result in optional pieces from the 2nd segment being valued at 50% of pieces in the current segment, whilst pieces in the 3rd segment would be valued at 25%	
243 244 245	Composite stock cutting Composite join cost Composite min length	Specific to the metal 1D industry it is possible to weld together component parts together to produce a part of the cut length required. This has an associated cost and also restrictions on the minimum size of each component part. These controls allow the activation of this functionality and specification of its use	
277	Stock orientation	By default stock entered into the stock file must be used in the orientation given. If it is permitted to turn the stock before presenting it to the saw this control allows the user to specify this option	

3.4.1.13 Penalties

32 33 34 39 41 43	Cutting penalties: Rip cut penalty. Head cut penalty. Cross cut penalty. Z cut penalty. Rip T-cut penalty. Head T-cut penalty.	Penalties can be used to control the shape of the patterns in a less stringent way than imposing limits on the direction of the strips or on the number of changes of strip direction. Each penalty is costed as an equivalent number of millimeters of material per millimeter cut. For example a Rip cut penalty of 10 would cost a 2 meter rip cut at the value of 20,000 mm2 or 0.02 M2of material. Penalties can be placed on rip cutting, on head cutting, on cross cutting and on third phase cutting. Penalizing rip cuts will tend to introduce more head cutting into a pattern and penalizing head cuts will tend to introduce more rip cutting into a pattern. Penalizing cross cuts will reduce the workload on the cross cut saw at the expense of the ripping saw. Penalizing third phase cuts such as Z ot T cuts will reduce the occurrence of these time consuming operations. Normal values for these penalties are in the range 0.0 – 0.1. UNITS mm2 (giving equivalent material cost per mm2 of cut).	No penalties
47 50 54	Unique piece penalties: Piece identifier per strip penalty Piece identifier per pattern penalty Penalty per unique strip per phase.	Penalties can be used to control the mixture of pieces in a pattern, phase or strip. Penalties are expressed in terms of an equivalent amount of material. For example a Penalty per unique piece per strip of 1.0 adds the cost of a square mm of material to the pattern cost for each unique piece in the strip. Normal values for these penalties are in the range 1 – 10. UNITS mm2 (giving equivalent material cost per piece/strip).	No penalties
67	Penalty per machine cycle	The penalty per machine cycle may be used to reduce the number of cycles (books) in the generated patterns. The setting is expressed in terms of an equivalent number of boards. (The largest board is assumed if more than one stock item is given,) For example, a setting of 1.0 for a single stock record job will minimize the sum of the boards used and the machine cycles. Normal value for this penalty is in the range 0.1 to 1.0.	0

		UNITS (equivalent number of the largest board).	
69 70	Phase and turn penalties:Turn penalty. Phase penalty.	Penalties can be used to bias towards simpler and hence faster cutting patterns. Penalties are expressed in terms of an equivalent amount of material. The Turn penalty is imposed for each change of direction of the strips within the pattern. The Phase penalty is imposed for each new (non-empty) phase. For example a Turn penalty of 1.0 will add the cost of one mm of material to the pattern cost. Normal value for this penalty is in the range 10 to 100. UNITS mm2 (giving equivalent material cost per turn/phase).	0
224	Cost per cut	Penalty associated with each pass of the saw blade.	
225	Cost per unique stock item	Penalty associated with picking a new stock item from storage	
226	Penalty per cut (reporting)	Penalty associated with each pass of the saw blade-used in reporting only.	
227	Penalty per unique stock item (reporting)	Penalty associated with picking a new stock item from storage – used in reporting only	
228	Piece identifier per strip penalty (reporting)	Penalty associated with changing the stop positions of the saw to cut a new piece – used in reporting only	
241	Penalty per cutting minute	This control can be used to associate a penalty with each minute of cutting time for a job (this must be used in conjunction with the controls specified in the Timing chapter) The control can either be entered in units of sq mm to give an equivalent material cost, or can be entered in monetary units providing the value of stock items is also given in the same unit The system will then balance the cost of production against the cost of stock used	
282	Penalty per pack break	Most regularly used during metal 1D optimization this allows a penalty to be associated with breaking a pack of stock into separate patterns. The pack size of the stock is defined in the stock file.	

3.4.2 SECANT Control Identifiers

Control identifier	Description	Major section	Minor section
33001	Dimension	System	Cutting operation
33002	Material mode	System	Cutting operation
33007	Units (imperial/metric)	System	Cutting operation
33010	Weight conversion	Machine	Coils
33012	Segment horizon	Policy	Work flow
33013	Segment rank	Policy	Work flow
33014	Grain and alignment default	Policy	Defaults and options
33016	Overmake percentage default	Policy	Defaults and options
33017	Value of optionals	Policy	Defaults and options
33018	Value of overmake	Policy	Defaults and options
33019	Rip kerf	Machine	Trims and kerfs
33020	Cross kerf	Machine	Trims and kerfs
33021	Trim left	Machine	Trims and kerfs
33022	Trim right	Machine	Trims and kerfs
33023	Clamp allowance	Machine	Trims and kerfs
33024	Trim top	Machine	Trims and kerfs
33025	Trim bottom	Machine	Trims and kerfs
33026	Trim strip front	Machine	Trims and kerfs
33027	Trim strip back	Machine	Trims and kerfs
33028	Trim after turn to head	Machine	Trims and kerfs
33029	Trim after turn to rip	Machine	Trims and kerfs
33030	Maximum strip length	Machine	Cutting restrictions
33031	Minimum strip length	Machine	Cutting restrictions
33032	Rip cut penalty	Policy	Penalties
33033	Head cut penalty	Policy	Penalties
33034	Cross cut penalty	Policy	Penalties
33035	Minimum Z cut	Machine	Cutting restrictions
33036	Max Zcut without penalty	Machine	Cutting restrictions
33037	Max Zcut with penalty	Machine	Cutting restrictions
33038	Maximum length of Zcut	Machine	Cutting restrictions
33039	Z-cut penalty	Policy	Penalties
33040	Maximum rip T cut	Machine	Cutting restrictions
33041	Rip T-cut penalty	Policy	Penalties
33042	Maximum head T cut	Machine	Cutting restrictions
33043	Head T-cut penalty	Policy	Penalties
33044	T-Cut build limit	System	Cutting operation
33045	Max physical pieces per strip	Policy	Work spread
33046	Max piece identifiers per strip	Policy	Work spread
33047	Piece identifier per strip penalty	Policy	Penalties
33048	Max physical pieces per pattern	Policy	Work spread
33049	Max piece identifiers per pattern	Policy	Work spread
33050	Piece identifier per pattern penalty	Policy	Penalties
33051	Max strips per pattern	Policy	Work spread
33052	Max strips per phase	Policy	Work spread

33053	Max different strips per phase	Policy	Work spread
33054	Strips per phase penalty	Policy	Penalties
33055	Max piece identifiers per phase	Policy	Work spread
33056	Max different strips per pattern	Policy	Work spread
33057	Minimum strip width	Machine	Cutting restrictions
33058	Maximum strip width	Machine	Cutting restrictions
33059	Minimum chequerboard width	Machine	Cutting restrictions
33060	Maximum chequerboard width	Machine	Cutting restrictions
33061	Minimum cross cut length	Machine	Cutting restrictions
33062	Maximum cross cut length	Machine	Cutting restrictions
33063	Aspect ratio	Machine	Cutting restrictions
33064	Max boards/book (planned)	Machine	Book Height
33065	Max book height (planned)	Machine	Book Height
33066	Min boards per book (planned)	Machine	Book Height
33067	Penalty per machine cycle	Policy	Penalties
33068	Max number of turns	Machine	Cutting restrictions
33069	Turn penalty	Policy	Penalties
33070	Phase penalty	Policy	Penalties
33071	Maximum number of phases	Machine	Cutting restrictions
33072	Speed	Policy	Defaults and Options
33073	Alg limit 1	System	Algorithm
33074	Alg limit 2	System	Algorithm
33075	Minimum gradient	System	Algorithm
33076	Elasticity	System	Algorithm
33077	Search tree depth	System	Algorithm
33078	Extended widths flag	System	Algorithm
33079	Projection limit	System	Algorithm
33080	Tabu search iterations	System	Algorithm
33081	Lp only flag	System	Algorithm
33082	Pattern complexity	Policy	Work spread
33083	Min offcut length	Policy	Offcuts
33084	Min offcut width	Policy	Offcuts
33085	Oriented offcut	Policy	Offcuts
33086	Strip sort	Policy	Defaults and Options
33087	Panel sort	Policy	Defaults and Options
33088	Rip chute width	Machine	Anthon
33089	Cross chute width	Machine	Anthon
33090	Chute mode	Machine	Anthon
33091	Last strip grip	Machine	Anthon
33092	Like strip merge	Machine	Anthon
33093	Saw identifier	Machine	Anthon
33094	Mirror function	Machine	Anthon
33095	B2 function	Machine	Anthon
33096	A1 function	Machine	Anthon
33097	A2 function	Machine	Anthon
33098	Minimum balanced trim	Machine	Anthon
33099	Destacking controls flag	Machine	Anthon

33100	Height measure	Machine	Anthon
33101	Stack type	Machine	Anthon
33102	Stacks on pallet length	Machine	Anthon
33103	Stacks on pallet width	Machine	Anthon
33104	Information	Machine	Anthon
33105	Cross cut throat	Machine	Anthon
33106	Cross cut throat flag	Machine	Anthon
33107	Book load time (before rip)	Machine	Timing
33108	Rip trim time (fixed)	Machine	Timing
33109	Rip trim time (per mm)	Machine	Timing
33110	Number of parallel rip saws	Machine	Timing
33111	Rip cut time (fixed)	Machine	Timing
33112	Rip cut time (per mm)	Machine	Timing
33113	Time to turn to a head strip	Machine	Timing
33114	Book load time (before head)	Machine	Timing
33115	Head trim time (fixed)	Machine	Timing
33116	Head trim time (per mm)	Machine	Timing
33117	Number of parallel head saws	Machine	Timing
33118	Head cut time (fixed)	Machine	Timing
33119	Head cut time (per mm)	Machine	Timing
33120	Time to turn to a rip strip	Machine	Timing
33121	Z-cut time (fixed)	Machine	Timing
33122	Z-cut time (per mm)	Machine	Timing
33123	Cross cut load time	Machine	Timing
33124	Cross trim time (fixed)	Machine	Timing
33125	Cross trim time (per mm)	Machine	Timing
33126	Number of cross cut saws	Machine	Timing
33127	Cross cut time (fixed)	Machine	Timing
33128	Cross cut time (per mm)	Machine	Timing
33129	Timing method	Machine	Timing
33130	First pattern start up time	Machine	Timing
33131	Last pattern close down time	Machine	Timing
33132	Pattern changeover time	Machine	Timing
33133	Max book size (reporting)	Machine	Book Height
33135	Value of waste	Policy	Offcuts
33136	Offcut returns table	Policy	Offcuts
33137	Max feedlines	Policy	Work flow
33141	Feedline type	Policy	Work flow
33142	Mitre flag	Machine	Mitre Cutting
33143	Mitre kerf cost	Machine	Mitre Cutting
33144	Mitre clamp width	Machine	Mitre Cutting
33145	Mitre minimum saw angle	Machine	Mitre Cutting
33146	Mitre maximum saw angle	Machine	Mitre Cutting
33147	Mitre rotation cost	Machine	Mitre Cutting
33148	Mitre turn cost	Machine	Mitre Cutting
33149	Default sheet value	Policy	Defaults and Options
33150	Material handling cost	Policy	Offcuts

33152	Material valuation table	Policy	Offcuts
33153	Penalty per unique piece per strip	Policy	Penalties
33154	Stock updating (length unit)	Policy	Defaults and Options
33155	Stock updating (width unit)	Policy	Defaults and Options
33156	Parameter for the saw controller	Machine	Holzma
33157	Parameter for the saw controller	Machine	Holzma
33158	Parameter for the saw controller	Machine	Holzma
33159	Parameter for the saw controller	Machine	Holzma
33160	Parameter for the saw controller	Machine	Holzma
33161	Parameter for the saw controller	Machine	Holzma
33162	Parameter for the saw controller	Machine	Holzma
33163	Parameter for the saw controller	Machine	Holzma
33164	Parameter for the saw controller	Machine	Holzma
33165	Parameter for the saw controller	Machine	Holzma
33166	Edging flag	Policy	Defaults and options
33178	Post processes	Policy	Defaults and options
33180	Offcut value gap	Policy	Offcuts
33181	Minimum nogo on strip	Machine	Cutting Restrictions
33182	Maximum nogo on strip	Machine	Cutting Restrictions
33183	Minimum nogo falling piece	Machine	Cutting Restrictions
33184	Maximum nogo falling piece	Machine	Cutting Restrictions
33185	Number of pushers	Machine	Anthon
33186	Clear throat policy	Machine	Anthon
33187	Kh switch (Rauch)	Machine	Anthon
33188	Max items on pallet	Policy	Work flow
33189	Max weight on pallet	Policy	Work flow
33190	min block size (CPOUT)	Machine	Holzma
33191	max block size (CPOUT)	Machine	Holzma
33193	Default turn flag	Machine	Anthon
33194	Cross cut setting (head plant)	Machine	Timing
33195	Cross cut trim (head plant)	Machine	Timing
33196	Cross cut trim/length (head pl)	Machine	Timing
33197	Number of cross cut saws (head)	Machine	Timing
33198	Cross cut time (head)	Machine	Timing
33199	Cross cut time/length (head)	Machine	Timing
33200	Number of pushers (head)	Machine	Anthon
33201	Throat clear policy (head)	Machine	Anthon
33202	Mouth (head plant)	Machine	Anthon
33203	Mouth flag (head plant)	Machine	Anthon
33204	Default min inner diameter	Machine	Coils
33205	Default max inner diameter	Machine	Coils
33206	Default min outer diameter	Machine	Coils
33207	Default max outer diameter	Machine	Coils
33208	Default min coil weight	Machine	Coils
33209	Default max coil weight	Machine	Coils
33210	Max cycle sample	System	Algorithm
33211	Repeated width search	System	Algorithm

33212	Strip alg 1	System	Algorithm
33213	Strip alg 2	System	Algorithm
33214	Max master coil weight	Machine	Coils
33215	Max master coil outer diameter	Machine	Coils
33216	Max master coil width	Machine	Coils
33217	Min active piece length per pattern	Policy	Work flow
33218	Max execution time	Policy	Defaults and Options
33219	Piece similarity tolerance	Policy	Work flow
33220	Full pack cutting	Policy	Defaults and Options
33221	Clamping positions	Machine	Cutting Restrictions
33222	Max book height (reporting)	Machine	Book Height
33223	Offcut return handling cost	Policy	Offcuts
33224	Cost per cut	Policy	Penalties
33225	Cost per unique stock item	Policy	Penalties
33226	Penalty per cut (reporting)	Policy	Penalties
33227	Penalty per unique stock item (rep)	Policy	Penalties
33228	Piece id per strip penalty (rep)	Policy	Penalties
33229	Oversize strips prohibited	Machine	Cutting Restrictions
33230	Minimum phase width	Machine	Cutting Restrictions
33231	Maximum phase width	Machine	Cutting Restrictions
33232	Edging Overlap	Policy	Defaults and Options
33233	Round requirement	Policy	Work flow
33234	Default placement	Policy	Work flow
33235	Max overhang perc length	Policy	Work flow
33236	Max overhang perc width	Policy	Work flow
33237	Min width of largest strip	Machine	Anthon
33238	Offcut restock cost per unit	Policy	Offcuts
33239	Enable offcut table	Policy	Offcuts
33240	Enable mat val table	Policy	Offcuts
33241	Penalty per cutting minute	Policy	Penalties
33242	Optional piece increment	Policy	Defaults and Options
33243	Composite stock cutting	Policy	Defaults and Options
33244	Composite join cost	Policy	Defaults and Options
33245	Composite min length	Policy	Defaults and Options
33246	Recycle offcuts	Policy	Work flow
33247	Offcut discount percentage	Policy	Work flow
33248	Stock balance bias	Policy	Defaults and Options
33249	Overhead Costs	Policy	Costs
33250	Cost per book	Policy	Costs
33251	Cost per piece	Policy	Costs
33252	Minimum clamp grip	Machine	Cutting restrictions
33253	Thin piece clamp tolerance	Machine	Cutting restrictions
33254	Min balanced trim 3rd phase	Machine	Anthon
33255	Third phase trim	Machine	Trims and kerfs
33256	Z-cut load time	Machine	Timing
33257	Z-cut trim time (fixed)	Machine	Timing
33258	Z-cut trim time (per mm)	Machine	Timing

33259	Max third phase stations	Machine	Cutting restrictions
33260	Cross cut reach	Machine	Cutting restrictions
33261	Rip cut reach	Machine	Cutting restrictions
33262	Full book cutting	Machine	Book Height
33263	Crosscut min block	Machine	Cutting restrictions
33264	Crosscut min block repeat	Machine	Cutting restrictions
33265	Minimum waste length	Machine	Anthon
33266	Maximum waste length	Machine	Anthon
33267	Minimum waste width	Machine	Anthon
33268	Maximum waste width	Machine	Anthon
33269	Offcut single sheet	Machine	Book Height
33270	Thin strip limit	Machine	Anthon
33271	Thin strip throat	Machine	Anthon
33272	Max zcut strips per phase	Machine	Cutting restrictions
33273	Destacking move time	Machine	Anthon
33274	Destacking clear time	Machine	Anthon
33275	Destacking drop distance	Machine	Anthon
33276	Min strip trim LR	Machine	Trims and kerfs
33277	Stock orientation	Policy	Defaults and Options
33278	Min strip trim	Machine	Trims and kerfs
33279	Min zcut piece length	Machine	Cutting restrictions
33280	Trim extractor active	Machine	Anthon
33281	Min offcut area	Policy	Offcuts
33282	Penalty per pack break	Policy	Penalties
33283	Min offcut length (large)	Policy	Offcuts
33284	Min offcut width (large)	Policy	Offcuts
33285	Min offcut area (large)	Policy	Offcuts
33286	Offcut perc value (small)	Policy	Offcuts
33287	Offcut perc value (large)	Policy	Offcuts