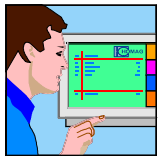
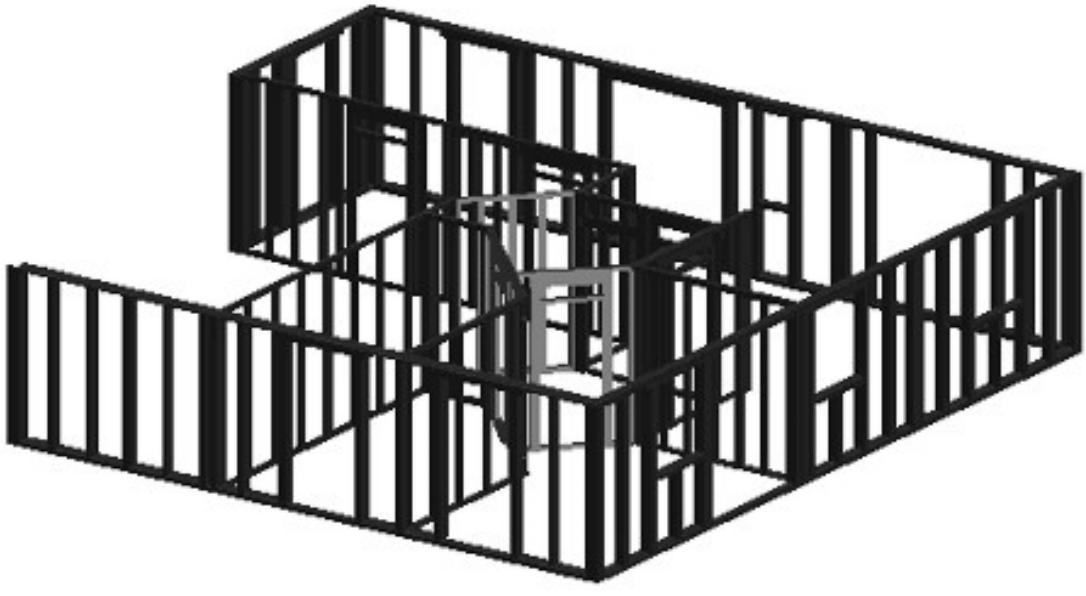


Interface description for prefabricated house elements



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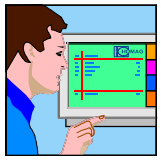
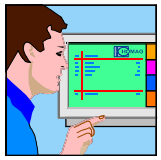
The party responsible for the development and maintenance of this interface is:
WEINMANN Holzbausytemtechnik GmbH, Forchenstr. 50, 72813 St. Johann, Germany

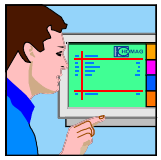
Interface version 3.4.1

As at: 4/19/17



Contents:

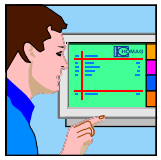




1 General

This document describes the structure of an element of a prefabricated house.

With one exception, the document does not contain any specific definitions for specific machines.
WEINMANN recommends using the file extension "wup".

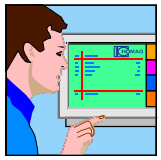


1.1 File structure

The file must be available in MS-DOS text format. Line break: CR/LF (#0D0A).
Permissible codings are: ASCII and UTF-16 (BMP, LITTLE ENDIAN).

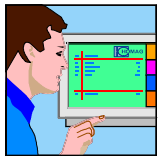
File header: VERSION, ANR, ELB, ELN, ZNR, REIHE, ELA, ELM, WNP, CAD, CADRELEASE				
	Optional: definition of unprocessed parts: RT			
		(A) Definition of components of the frame work, introduced by the definition of a component: UG, OG, LS, QS, BT4, BT6, EBT, BTn		
			Attributes of a component: PROPERTY	
			Component processing steps: UNIT, SG, PSG, TA, KN, MPL, PAF, PZF, PSF, SZ Spatial processing plane RBE/RBE2, followed by component processing steps	
		(B) Definition of component layers, introduced by the definition of layered components of the same type: PLI0...PLI10, PLA0...PLA10, SLI1...SLI10, SLA0...SLA10		
			Layer processing steps: UNIT, PSG, PAF, PSF, NR, NBR, PSZ, PML, KN Spatial processing plane RBE/RBE2, followed by the corresponding processing steps	
		(C) Definition of modules: MODUL, ENDMODUL		
			Definition of the component positions (B) or components of the frame work (A).	

Multiple specifications of definitions of the categories (A), (B), or (C) are possible. The definition of a category is completed by the definition of a new category.



1.2 General syntax/value ranges

- Maximum line length: 250 characters.
- Spaces and tabs are permissible between keywords and/or parameters
- Any line can be designed as a "comment" line. The line begins with the keyword "TXT".
- Each definition of a header date, a component, a processing step, or a comment ends with the limiter "**;**". Characters located behind the limiter are deemed to be comments
- Parameter range for integers, unless specified otherwise:
  -32768...+32767
- Parameter range for floating point numbers, unless specified otherwise:
  +- 3.402 * 1038.
  Max. three decimal points separated by a point, not specified exponentially. Floating point numbers are used for lines, radii, angles, and coordinates
- Positions and dimensions are specified in mm.
- Angles are specified in degrees
- Within full version numbers, such as 3.0–3.9, the keywords remain constant
- In this document, optional parameters are specified in square brackets (e.g. [z]). Standard settings are specified in curly brackets (e.g. {0}).
- "*" behind a parameter indicates any frequent reproducibility of the parameter
- Explicitly named data types are listed in brackets preceded by a colon. Character string (:string), floating point number (:float), integer (:int), natural number (:uint)
- Format of individual data types:
  Character string: printable characters, with the exception of a semicolon and comma
  Floating point number: maximum of three decimal places, dot as a decimal separator.
  No support for exponential notation.

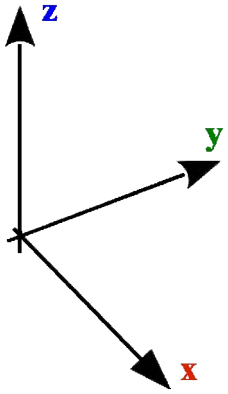


1.3 Coordinate systems

All coordinate systems are right-rotating coordinate systems.

1.3.1 Element coordinate system

A right-rotating coordinate system is used as the basis for sizing components and layer processing steps.



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1.3.2 Component coordinate system

The component processing steps SG, SZ, BOX, BOY, BOZ, FRY, FRZ, PFZ, PFY, and REFKER are based on the following coordinate system:

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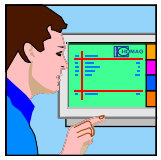
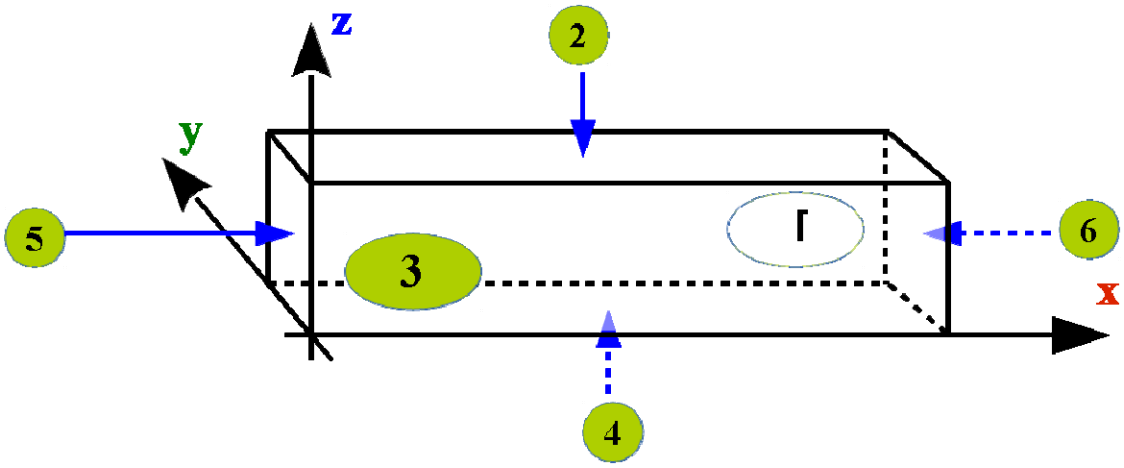


Reference planes
Definition of the reference levels of hexahedral components: UG, OG, LS, QS, RT



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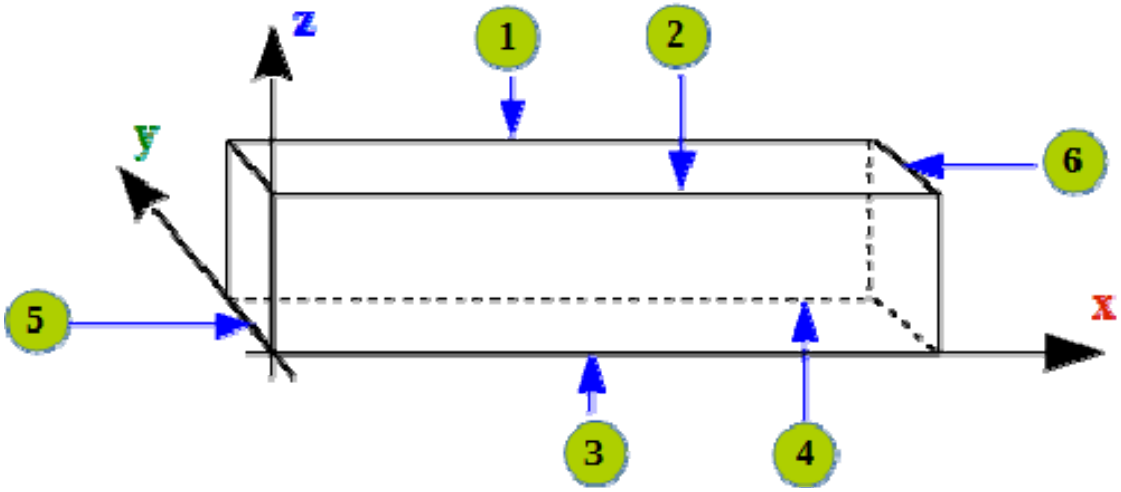
1.3.3 Reference edges

Definition of the reference edges of components: UG, OG, LS, QS, RT



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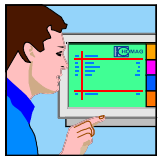
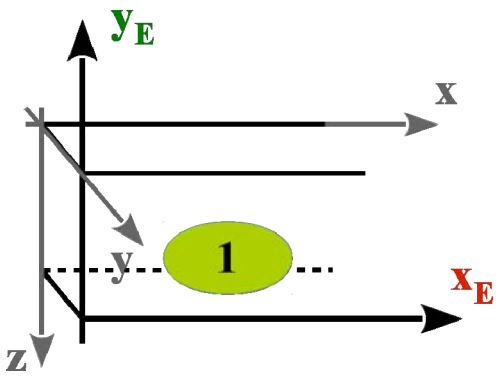


1.3.4 Plane coordinate system

The processing steps PSG, TA, KN, MPL, PAF, PZF, PSF as well as the spatial processing plane RBE2 are based on the following definitions of the plane and the following coordinate systems:



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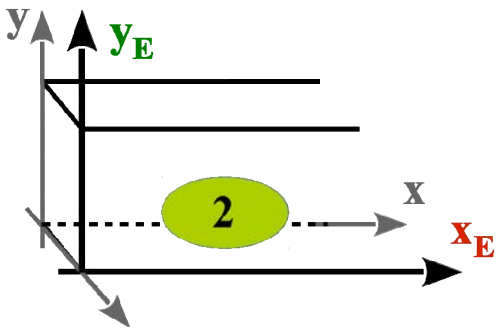
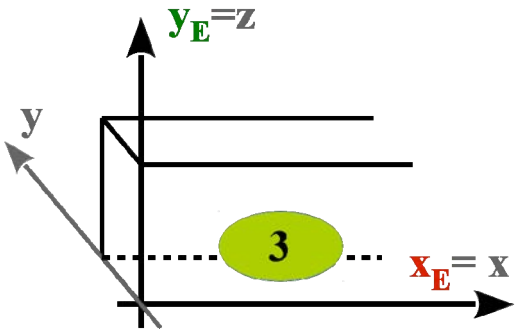
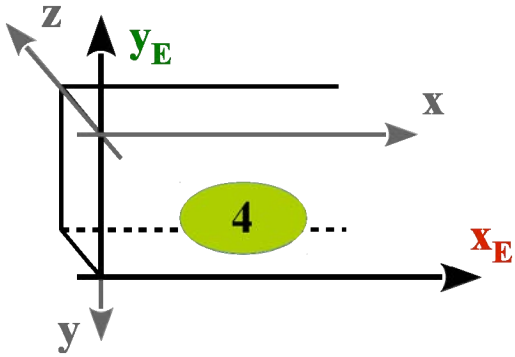


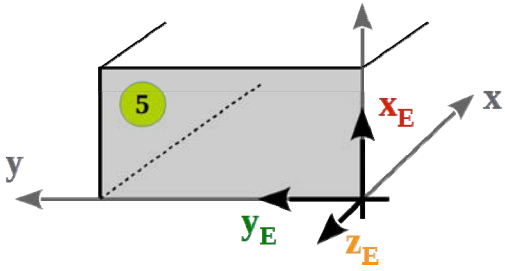
T:\\8482\\472051\\X00070TD.png



T:\\8482\\472051\\X00100TD.png



T:\\8482\\472051\\X00090TD.png



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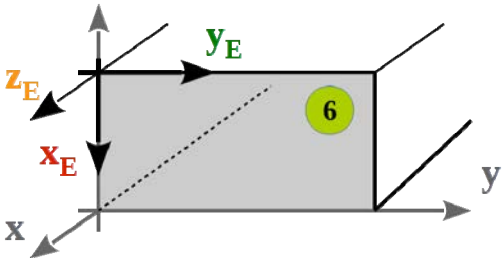

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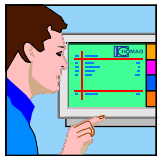

1.3.5 Spatial processing coordinate system

The definition of a spatial processing plane defines a new coordinate system.
All processing steps applied to it must be defined with reference plane 2.

Original plane

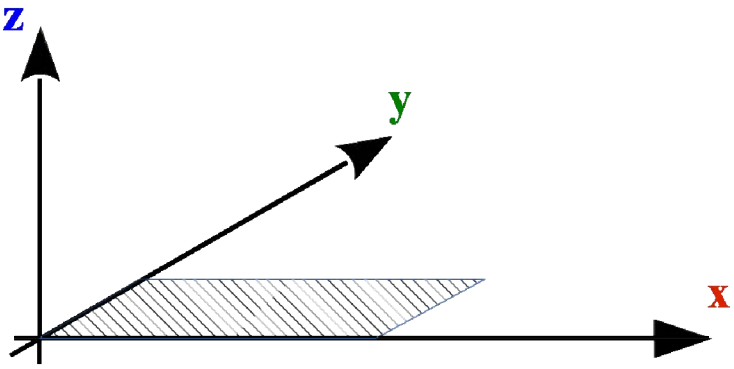

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Figure a

Transformation of the original plane via rotation around the Z axis

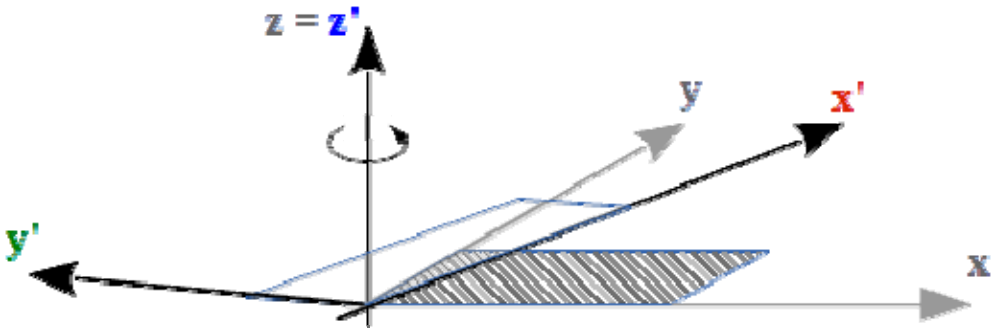

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Figure

Transformation of the plane via tilting around the X' axis

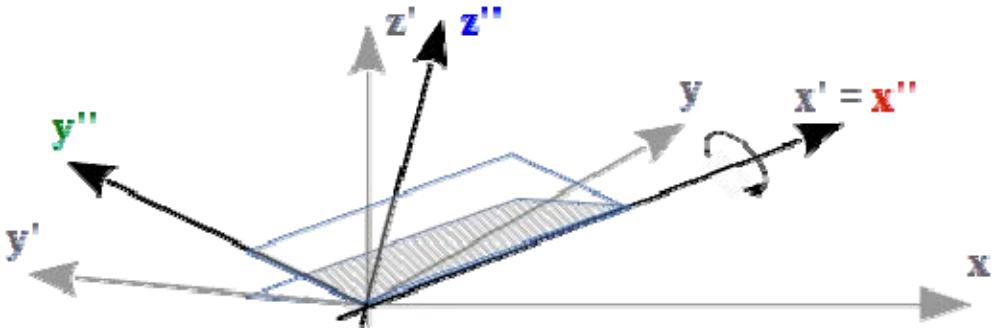

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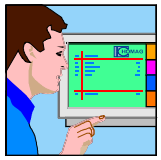
Figure c



1.4 Processing the file

When processing a wup file, you must take into account that component and processing definitions can contain incomplete parameter sets.
A processing program of a wup file should check the minimum number of parameters and complete missing values by adding default values. The default values are always specified in the relevant definition by values that are placed in curly brackets.
New parameters added are always located at the end of the parameter set. The parameters never replace preceding parameters. If parameters contradict other parameters, the parameters to the right have priority.

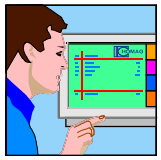
2 Change history

2.1 Changes from interface version 1.x

- Interface version number introduced. Keyword: VERSION.
- BT4 and BT6 replace QSS
- Introduction of element-oriented (ABE) and component-oriented (ABB) sections
- The keyword SG replaces SGO and SGU
- PLI1...PLI9 and PLA1...PLA9 replace SPI, SPA, and RPI
- Introduction of the blocked zone SZ for the bottom and top plates
- Introduction of the marking line MPL
- Introduction of the assembly keywords MODUL and ENDMODUL
- Introduction of built-in parts (EBT)

2.2 Changes for interface version 2.x

2.1: Introduction of polygon trimming on components PFZ, PFY.
2.2: Introduction of shuttering SLI, SLA.
2.3: The changes for interface version 2.3 are not documented.



2.3 Changes for interface version 3.x

2.3.1 Interface version 3.0

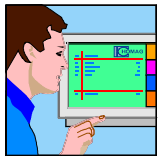
- Introduction of the series REIHE
- Keywords ABE/ABB, NBA, PNR are no longer required
- Component processing steps are generally sized in the component coordinate system
- Panel processing steps are generally sized in the element coordinate system
- NBR is limited to use with wood components
- Introduction of the standard notch in roof production: REFKER
- Additional parameters added for the material index and name for panels and components
- Introduction of the polygon which describes the outline, after the panel definition
- The combination PP, PP is no longer permitted for blocked areas

2.3.2 Interface version 3.1

- Introduction of the NC program call-up for components
- Addition of the keyword SG for components
- Introduction of the protection zone in panel processing
- Additional parameters for the depth and index for centers of circles MP
- Introduction of the marking line for panel processing
- Introduction of the tilt angle for saw and trim lines in panel processing
- Introduction of floating point numbers for angles and radii

2.3.3 Interface version 3.2

- Introduction of the arc
- Introduction of the Z coordinates for polygon points
- Addition of the keyword WNP (workpiece zero point) to the file header
- Additional parameters for the keyword KN (beam processing): y, z, i
- The keyword also applies to layer processing

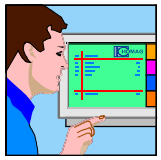


2.3.4 Interface version 3.3

- Introduction of the Z ordinate for: OG, UG, LS, QS, EBT, BT4, BT6, PLI, PLA, SLI, SLA, MODUL
- Component name is no longer optional for: OG, UG, LS, QS, EBT, BT4, BT6, PLI, PLA, SLI, SLA
- Introduction of the tilt angle β for SG
- Change for NC
- The keywords PAF and PSG are also valid for beam processing
- Expansion of the polygon trimming line and the polygon saw cut around the reference plane for beam processing
- Introduction of the PZF tenon joint for beam processing
- Introduction of planes 5 and 6 for beam processing
- Introduction of planes 7 and 8 for component BT6
- Introduction of the processing group. Keywords UNIT and ENDUNIT
- The keyword PLZ is no longer required
- PFY and PFZ designated as obsolete. Replacement PAF with reference plane
- Introduction of spatial processing plane RBE for beams.
- Special rule for depth = 0. Utilization of the entire layer thickness and/or component thickness.
- The layers 0 and 10 introduced: PLI0, PLA0, PLI10, PLA10, SLI10, SLA10
- The workpiece zero point WNP is limited to the value "Bottom left"

2.3.5 Interface version 3.4

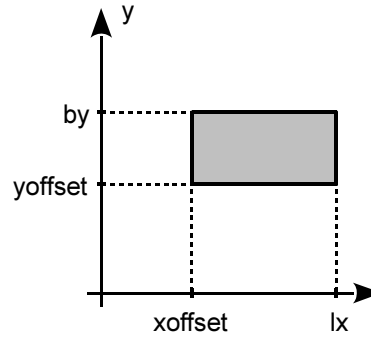
- Support for Unicode format (UTF-16 / BMP)
- Introduction of definitions in the file header: CAD, CADRELEASE
- Withdrawal of the WNP definition in the file header
- Introduction of components RT, BTn
- Introduction of spatial processing plane RBE2, ENDRBE2
- Introduction of processing step TA
- Introduction of a definition for attributes of a component: PROPERTY
- The polygon blocked surface PSF can be used in the context of component processing steps
- Additional parameters for the tool number for the processing steps PAF, ...
  Withdrawal of the keywords: BOX, BOY, BOZ, FRZ, FRY, PFY, PFZ, KER, REFKER and RBE. These definitions should no longer be used in future. There is an adequate replacement for each keyword.
- Withdrawal of Z-alignment within the installation position. See: Installation position of UG, OG, LS, QS, EBT. This should no longer be used in future.
- KN as a panel processing step no longer has any specification of the reference plane
- The trimming as part of the PAF processing step is controlled via parameters
- Some parameters, optional until interface version 3.3, are now mandatory
- The special rules for interface version 3.3 have been removed
- Thousands position (line type) removed in the case of marking

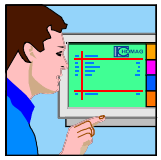


3 Syntax

3.1 The file header

Elements of the file header must be located at the beginning of each file. The keyword VERSION, with information about the interface version, must be in the first line of the file.

Command	Parameter	Optional	Description
VERSION	Version.issue		Version and issue Example: 3.4
ANR	number	X	Number of the order
ELB	name		Element name for unique identification of the wall type
ELN	name	X	Element name
ZNR	number	X	Drawing number
SERIES	number	X	Production sequence.
ELA	view		Element view {INNEN} Value range: INNEN, AUSSEN, INTERIOR, EXTERIOR, INTERNAL, EXTERNAL
ELM	lx, by, hz [,n [,X offset[,Y offset]]]  T:\\8482\\472050\\X00160TD.wmf		Element dimensions of a prefabricated house element. lx: Maximum value of the x ordinate (:float) by: Maximum value of the y ordinate (:float) hz: Maximum value of the z ordinate (:float) n: Quantity {1} (:unsigned int) X offset: Offset dimension in x direction {0} (:float) Y offset: Offset dimension in y direction {0} (:float)
WNP	value	X	Workpiece zero point Sole permissible value: BOTTOM LEFT WNP should no longer be used.
CAD	value	X	Specification of the CAD program (free text)
CADRELEASE	value	X	Specification of the CAD version (free text)

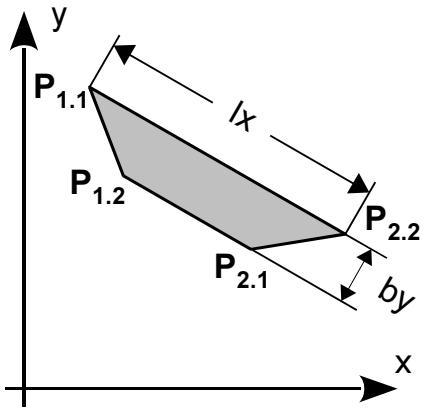


3.2 Components

3.2.1 Single components, single bars

.

Command	Parameter	Description
OG	lx, by, hz, x, y, i, name, z	Top plate lx: Length by: Width hz: Height x, y: Position i: Material index and installation position name: Component name (optional up to interface version 3.1) z: Position {0}
UG	lx, by, hz, x, y, i, name, z	Bottom plate: Parameters and syntax as top plate
Rip	lx, by, hz, x, y, i, name, z	Longitudinal stud: Parameters and syntax as top plate
Xct	ly, bx, hz, x, y, i, name, z	Stud ly: Length, along the Y axis bx: Width, along the X axis Remaining parameters and syntax as top plate
BT4	lx, by, hz, x1, y1, x2, y2, x3, y3, x4, y4, i, name, z	Component with 4 corner points lx: Length by: Width hz: Height x11, y11: Coordinates, point 1.1 x12, y12: Coordinates, point 1.2 x21, y21: Coordinates, point 2.1 x22, y22: Coordinates, point 2.2 i: Material Index name: Component name z: Position {0}



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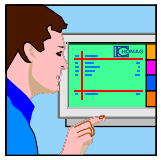
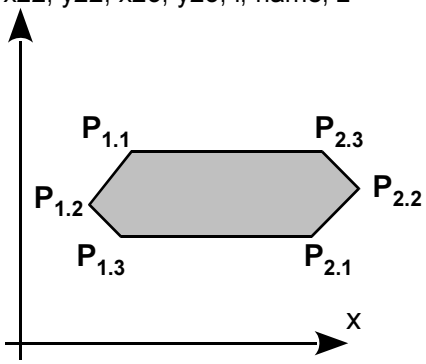
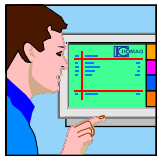
Points P1.1...P2.2 were called Plu, Pru, Pro and Plo in previous versions.
The line P1.1-P2.2 and/or P1.2-P2.1 determines the timber grain direction and forms the basis of the length calculation.
Both lines must be parallel.
If points coincide, the remaining line is used as a reference.



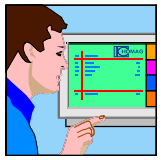
Command	Parameter	Description
BT6	lx, by, hz, x11, y11, x12, y12, x13, y13, x21, y21, x22, y22, x23, y23, i, name, z	Component with 6 corner points lx: Entire length by: Entire width hz: Entire height x11, y11: Coordinates, point 1.1 x12, y12: Coordinates, point 1.2 x13, y13: Coordinates, point 1.3 x21, y21: Coordinates, point 2.1 x22, y22: Coordinates, point 2.2 x23, y23: Coordinates, point 2.3 i: Material Index name: Component name z: Position {0} The length of the component is calculated from the maximum distance of P1.x to P2.x Points 1.1...P2.3 were called Plu, Pmu, Pru, Pro, Pmo and Plo in previous versions. The line P1.1-P2.3 and/or P1.3-P2.1 determines the timber grain direction and forms the basis of the length calculation. Both lines must be parallel. If points coincide, the remaining line is used as a reference.
BTn	lx, by, hz, x, y, z, i, name	Component with N corner points, followed by polygon points of type PP or KB lx: Entire length by: Entire width hz: Entire height x, y, z: Position i: Material index name Component name
EBT	lx, by, hz, x, y, i, name, z	Built-in part, e.g. iron girder, triangular studs, etc. lx: Length by: Width hz: Height x,y,z: Installation position i: Material index and installation position name: Item designation z: Position {0}



T:\\8482\\472050\\X00140TD.wmf



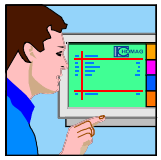
For the components LS, QS, OG, UG, BT4 and BT6 the parameter [z] was optional up to interface version 3.3.
All data types, with the exception of "name" and "i": Floating point number.
Data type of i: Natural number.
Data type of name: Character string.



3.2.2 Panels and shuttering

The start of a panel definition or shuttering definition starts the definition of a component position. The component layer ends with the start of a new panel or shuttering definition for a different layer.

Command	Parameter	Description
PLI0 … PLI10	lx, by, hz, x, y, i, name [, z]	Inside panels, layer 0–10 lx: Length by: Width hz: Height x, y: Position i: Material Index name: Name z: Position {value is calculated} **Note:** PLI0 is a panel within the beam layer
PLA0 … PLA10	lx, by, hz, x, y, i, name [, z]	Outside panels, layer 0–10 lx: Length by: Width hz: Height x, y: Position i: Material Index name: Name z: Position {value is calculated} **Note:** PLA0 is a panel within the beam layer
SLI1 … SLI10	lx, by, hz, xlu, ylu, xmu, ymu, xru, yru, xro, yro, xmo, ymo, xlo, ylo, i, name [,z]	Inside shuttering, layer 1–10 lx: Length by: Width hz: Height xlu, ylu: Bottom left coordinates xmu, ymu: Bottom center coordinates xru, yru: Bottom right coordinates xro, yro: Top right coordinates xmo, ymo: Top center coordinates xlo, ylo: Top left coordinates i: Material Index name: Name z: Position {value is calculated}

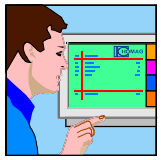


SLA1	lx, by, hz, xlu, ylu,	Outside shuttering 1–10
…	xmu, ymu, xru, yru, xro, yro,	lx: Length
SLA10	xmo, ymo, xlo, ylo, i, name [,z]	by: Width
		hz: Height
		xlu, ylu: Bottom left coordinates
		xmu, ymu: Bottom center coordinates
		xru, yru: Bottom right coordinates
		xro, yro: Top right coordinates
		xmo, ymo: Top center coordinates
		xlo, ylo: Top left coordinates
		i: Material Index
		name: Name
		z: Position {value is calculated}

The parameter [z] was optional up to interface version 3.3.
All data types, with the exception of "name" and "i": Floating point number.
Data type of i: Natural number.
Data type of name: Character string.

Note:

- Panels are generally defined precisely by the outlining polygon.
- If polygon points are specified for PLI and PLA, the definition of the polygon points takes precedence over the parameters "lx" and "by". In total, polygon points must define one plane. Optional, missing attributes of PLI or PLA can be specified in more detail using attributes of the polygon points. The polygon points must describe precisely one surface. The polygon path should be closed. It is not possible to define warped planes.
- If different height definitions are specified within a panel layer, the lowest height applies as the height for the entire panel layer. This means that at certain positions, the tool is lower than permissible and there is a risk of collision. Therefore, define the Z coordinates of all panels completely.
- Panels with a height of 1 mm and less are not taken into account during the offset calculation.



3.2.3 Unprocessed parts

Nesting can be defined using unprocessed parts.
An unprocessed part can contain one or more components of the types LS, QS, OG, UG, BTn.
The unprocessed part itself does not have any processing steps.

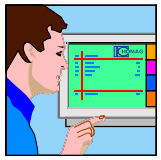
Command	Parameter	Description
RT	lx, by, hz, x, y, z, i, name	Unprocessed part, followed by the component definitions lx: Entire length by: Entire width hz: Entire height x, y, z: Position i: Material index name Component name

3.2.4 Modules

Defines prefabricated components, and their processing steps, that are combined into an assembly.

Command	Parameter	Description
MODULE	lx, by, hz, x, y, name[,z]	Assembly, followed by components and their processing steps lx: Length (:float) by: Width (:float) hz: Height (:float) x, y: Position (:float) name: Designation (:string) z: Position {0} (:uint)
ENDMODULE		End of assembly definition

Components and processing steps within a module refer to an element coordinate system that starts in the origin of the module.



3.3 Spatial processing plane

The spatial processing plane defines a new coordinate system.

Command	Parameter	Description
RBE2	e, x, y, z,α, γ, δ	Spatial processing plane for beams e: Reference plane. value range: - Component processing steps: 1...6 - Panel processing steps: 2 x,y,z: Position α: Rotation angle in relation to the X axis γ: Tilt angle in relation to the y' axis δ: Rotation angle in relation to the x'' axis
ENDRBE2		

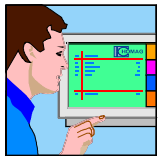
Data types: Floating point number. Exceptions "e": Natural numbers.
Processing steps that can be combined with RBE2: PAF, PZF and TA.
The processing steps within an RBE2/ENDRBE2 bracket with the same nesting index refer to the coordinate system drawn out with RBE2.
The spatial processing plane RBE2 can generally be nested. However, only one nesting level is possible at present.

Rotations around alpha, gamma and delta follow movements in the X, Y and Z direction. The dependency of the angles is as follows: delta is dependent on gamma, gamma is dependent on alpha.
Alpha describes a rotation around the Z axis, gamma a rotation around the X axis, and delta a rotation around the z'' axis. In each case the rotation is in the mathematically positive direction, i.e. for a coordinate arrow directed towards itself, counter-clockwise.

The depth of eroding processing must be specified as a positive value. The processing operates counter to the z'' axis of the new coordinate system drawn out. Specifications of the length refer to the x'' axis, width specifications to the y'' axis.

No longer supported form of the spatial processing plane

Command	Parameter	Description
RBE	x, y, z, α, γ, e	Spatial processing plane for beams x, y, z: Position α: Observe the rotation angle of the RBE reference plane γ: Observe the tilt angle of the RBE reference plane e: Reference plane. value range: 1...4 **Note:** This keyword has been withdrawn.

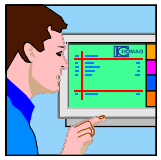


3.4 Processing

3.4.1 Component processing steps

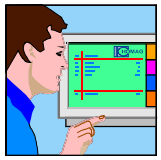
Component processing steps can be applied to the components: UG, OG, LS, QS, BT4, BT4, BTn, RT.

Command	Parameter	Description
SG	x, y, z, α, γ, h, e, i [, β [, s]]	Sawing x, y, z: Position in the element coordinate system α: Rotation angle of the saw γ: Tilt angle of the saw h: Depth of the saw cut vertical to the reference plane in the position (x, y, z) e: Reference plane for angle (1–6) i: Control code 1=positive correction relative to the X axis 2=negative correction relative to the X axis 3=no correction *For reference plane 5 and 6, the correction is relative to the Y axis.* β: Gradient angle in the cutting surface {0} s: s = 1: Relative to cutting surfaces s = 0: Relative to reference edges (standard value) **Note:** SG defines a half-plane along the sawing line. Define point-to-point saw cuts with PSG.
KN	x, e, txt [, y [, z [, i]]]	Identification x: Position e: Reference plane txt: Identification (max. 40 characters) *All readable characters from the* ASCII *character set are allowed.* *Exceptions:* , < > : # $ % = ; ! \ | y: Position {0} z: Position {0} i: Control code {0}
MPL	xa, ya, xe, ye, i, e	Marking line xa, ya: Start point xe, ye: End point i: Control code e: Reference plane **Note:** PML will replace MPL in the medium term.
PML	e	Marking line, subsequent polygon points e: Reference plane



Command	Parameter	Description
PAF	e [,i [, T]]	Start of countersinking, subsequent polygon points e: Reference plane i: Trimming according to the rules of the machine (0), No trimming (1), Trimming (2) {0} T: Tool number {0} Up to and including interface version 3.3, the machine's control system determined whether the material was trimmed depending on the contour surface. There was no trimming with complex contours. Complex contours are those with which the surface cannot be calculated directly. From interface version 3.4, the polygon trimming (PAF) control code controls whether trimming takes place.
PSG	e [, T]	Start of a sawing polygon, subsequent polygon points e: Reference plane T: Tool number {0} **Note:** PSG must not separate a component longitudinally. Only polygon points of the type "PP" permitted
PZF	e	Start of a tenon joint, subsequent polygon points e: Reference plane
SZ	x, l	Blocked zone of plates. This zone describes the area between two elements that are attached to one another (e.g. in a "multiwall"). No processing can take place in this area. In addition, any processing of an overhanging panel cannot infringe on this zone (e.g. a mounting). x: Position on the plate l: Length of the blocked zone

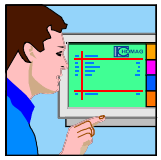
Notes:
The tool number T = 0 causes the machine to determine the tool.



Processing steps no longer supported

Command	Parameter	Description
KER	x, txt	Standard notch for roofing parts x: Position txt: Designation 2 x SG replaces KER completely
REFKER	x,txt	Standard notch for roofing parts x: Position txt: Designation
BOZ	x, y, d, t	Drilling in the Z direction x, y: Position d: Diameter t: Signed depth in the Z direction PAF/MP replaces BOZ
BOY	x, z, d, t	Drilling in the Y direction x, z: Position d: Diameter t: Signed depth in the Y direction PAF/MP replaces BOY
BOX	y, z, d, t	Drilling in the X direction y, z: Position d: Diameter t: Signed depth in the x direction PAF/MP replaces BOX
FRZ	x, xb, ty, tz	Trimming in the z direction x Position xb Trimming width ty Depth in the Y direction tz Signed depth in the Z direction PAF/PP replaces FRZ
FRY	x,xb,ty,tz	Trimming in the Y direction x: Position xb: Trimming width ty: Depth in the Y direction tz: Signed depth in the Z direction PAF/PP replaces FRY
PFZ	tz	Trimming in the z direction tz: Signed depth in the Z direction Subsequent trimming polygon PAF/PP replaces PFZ
PFY	ty	Trimming in the Y direction ty: Signed depth in the Y direction Subsequent trimming polygon PAF/PP replaces PFY

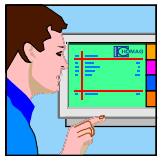
All data types, with the exception of "e", "i" and "txt": Floating point number.
Data types of e and i: Natural number.
Data type of txt: Character string.
If a number value is specified as less than zero in the case of the signed depth for BO_, FR_ and PF_, the depth takes effect in the opposite direction to the direction of the corresponding coordinate axis.



3.4.2 Panel processing steps, shuttering processing steps

Panel processing steps can be applied to the components: PLI, PLA, SLI and SLA.
The execution of the panel processing steps takes place counter to the Z ordinate.

Command	Parameter	Description
PAF	[e [, i [, T]]]	e: Reference plane {2} i: Trimming according to the rules of the machine (0), No trimming (1), Trimming (2) {0} T: Tool number {0} Up to and including interface version 3.3, the machine's control system determined whether the material was trimmed depending on the contour surface. There was no trimming with complex contours. Complex contours are those with which the surface cannot be calculated directly. From interface version 3.4, the polygon trimming (PAF) control code controls whether trimming takes place.
PSG	[e [, T]]	Start of a sawing polygon, subsequent polygon points of the type "PP" e: Reference plane {2} T: Tool number {0}
NR	xa, ya, xe, ye, a, i	Nail line xa, ya: Position of first nail point xe, ye: Position of the last nail point a: Nail distance i: Control code for the nailing/ bracket unit The optional subsequent keyword NBR can specify a nail line in more detail.
NBR	x, y, i	Nail pattern, relative x, y: Nail point-based, relative coordinates i: Control code for the nailing /bracket unit NBR can only be used in conjunction with NR.
PSF		Start of a blocked surface, subsequent polygon points. The polygon must be closed. There is no nailing or stapling within the defined range. → Only the combinations "PP-PP ..." or "MP" are permitted. The control code controls the scope of application.

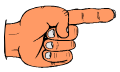


Command	Parameter	Description
PSZ		Start of a protected zone, subsequent polygon points. No processing takes place in this area. The machine does not cross the specified surface (e.g. flush boxes). The polygon must be closed. → Only the combinations "PP-PP ..." or "MP" are permitted.
PML		Marking line, subsequent polygon points
KN	x, txt, y, z, i	Identification x, y, z: Position txt: Identification (max. 40 characters) *All readable characters from the* ASCII *character set are allowed.* *Exceptions:* , < > : # $ % = ; ! \ | i: Control code {0}

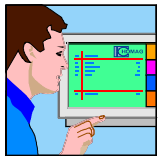
Processing steps no longer supported

Command	Parameter	Description
BOZ	x, y, d, t	Drilling in the Z direction x, y: Drill position d: Drilling diameter t: Borehole depth

All data types, with the exception of "e", "i" and "txt": Floating point number.
Data types of e and i: Natural number.
Data type of txt: Character string.



Notes:
The tool number T = 0 causes the machine to determine the tool.



3.4.3 Units

Logical processing consisting of one or more individual processing steps.

Command	Parameter	Description
UNIT	name	Processing group, followed by individual processing steps. The order of the specified processing steps does not necessarily determine the processing sequence. name: Designation. The "@" character is reserved for internal use.
ENDUNIT		End of the processing group.

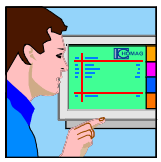
3.4.4 External NC programs

The use of external NC programs is possible with NC. NC is being withdrawn.

NC	prog-name [param]*	Call up NC program for special processes. The first parameter determines the program name. All other parameters go directly to the NC program. param: Parameter (:string)

3.4.5 Assignment of signs for trimming and drilling

The depth for eroding processing is specified with positive numbers. Exception: withdrawn processing steps.
Processing is then counter to the Z axis of the respective plane coordinate system.



3.5 Attributes, properties

Attributes and properties of individual structural elements are indicated by the keyword PROPERTY. PROPERTY can be used several times. PROPERTY follows directly behind the structural element that should be given a property.

Structural elements that can be provided with a PROPERTY: all components from 3.2.1 and 3.2.2 and all processing steps from 3.4.1 and 3.4.2.

Command	Parameter	Description
PROPERTY	n, w;	Property of a structural element n: Name of the property w: Value

Data type of 'n': Character string.
Data type of 'w': Either numerical value or character string in double quotation marks.

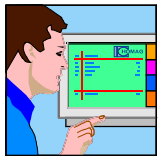
A wood processing machine can use PROPERTY to control and optimize processing sequences. Ask the machine manufacturer which type of machine processes which attributes. Improper utilization of reserved property names may lead to a machine malfunction.

3.6 Polygon paths

You can use polygon definitions to specify some processing steps or components in more detail.
Unless specified otherwise, the following combinations are permitted:

- PP, followed by at least one element PP or KB
- KB, with at least one preceding element PP or KB
- MP and/or TA as a single element

Command	Parameter	Description
PP	x, y, t, i, α, z	Polygon point of a polygon path or the start point x, y: Position t: Depth, counter to the Z axis of the reference plane at the point (x,y,z) i: Control code α: Tilt angle of the trimming or sawing line z: Position {0} Note: If PP is used in the context of a panel outline or of a blocked surface, the specification of x and y is sufficient.
KB	x, y, r, type, t, i, α, z	Target point of the arc x, y: Position of the target point r: Radius type: Type of the arc Acw: Clockwise arc (<= 180°) Acc: Counterclockwise arc (<= 180°) ACW: Clockwise arc

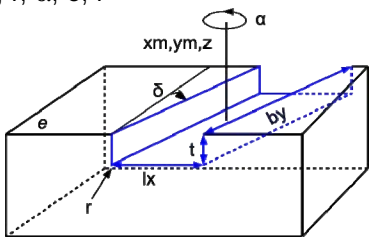


(> 180°)
ACC: Counterclockwise arc (> 180°)
t: Depth, counter to the Z axis of the reference plane at the point (x,y,z)
i: Control code
α: Tilt angle of the trimming line
z: Position {0}

MP xm, ym, r, t, i, zm

Center point
xm, ym Position of the center point
r Radius
>0 = clockwise circle
<0 = counterclockwise circle
t: Depth, counter to the Z axis of the reference plane at the point (x,y,z)
i Control code
zm Position {0}

TA lx, by, xm, ym, z, t, r, α, δ, i

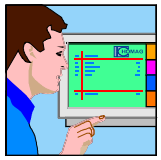


Pocket. Defines internal trimming.
lx, by: Edge lengths of the pocket
xm, ym, z: Center point or pivot of the pocket
t: processing depth
r: Corner radius {0}
α: Angle of rotation. value range: +/- 360° { 0 }
δ: Shear angle. Values: -90° < δ < +90° { 0 }
i: Control code

All data types, with the exception of "type" and "i": Floating point number
Data types of i: Natural number.
Data type of type: Character string.

Notes:

- A polygon definition does not have to be closed.
- Polygon points have been available since interface version 3.2. From interface version 3.4, the Z ordinates are no longer optional
  Exception: PP in the context of a panel outline or of a blocked surface.
- For attributes of dual polygon points that cannot be interpolated, the attribute of the end point of a line or an arc applies
- The elements PP, KB, MP can be used for processing PAF, PZF, and PSF. They can also be used for the components PLI-x, PLA-x and BTn.
- The element TA can only be used for PAF processing
- PROPERTY keywords must be inserted between the component/processing keyword and PP/KB/MP/TA.



4 Material index, installation position

4.1 Installation position of UG, OG, LS, QS, EBT

The identification of the installation position via the material index is used in conjunction with automatic storage. It can be used to control the material flow through the machine.

The ones position in the material index defines the installation position.

0: Normal

1: Flat and flush to the external side
2: Flat and flush to the internal side
3: flat in the center of the wall

The definition of the Z position takes precedence over the installation position.
The evaluation of the ones position is being withdrawn.

The tens position in the material index defines the rotation around the longitudinal axis of the component.

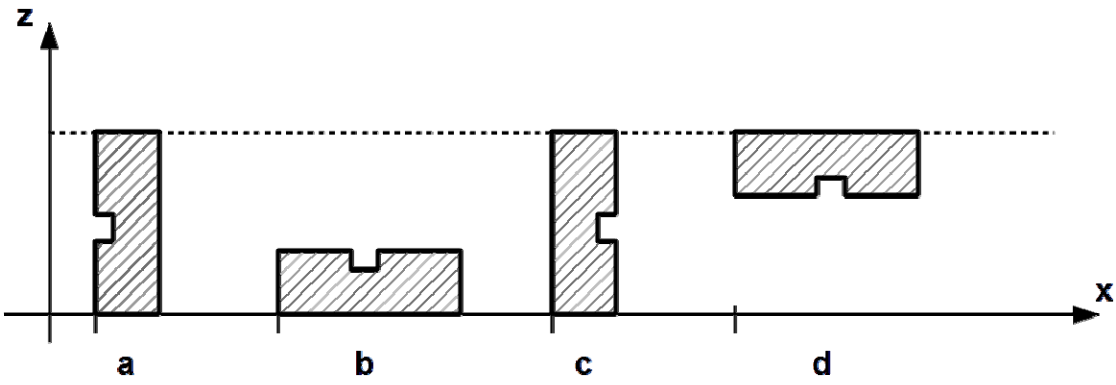
0: Not rotated

1: rotated by 90°
2: rotated by 180°
3: rotated by 270°

If the rotation and alignment are specified, the rotation takes effect before the alignment.

Different materials have different values in the hundreds position of the material index.

For example: Traverse studs, INNEN view



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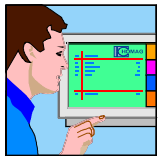
Definition	i = 11	i = 20	i = 32

4.2 Material indices for components

Different materials have different values in the hundreds position of the material index. The numerical values 0 …9900 can be used as required. The numerical values 10000...29900 and from 32700 are reserved for internal purposes.



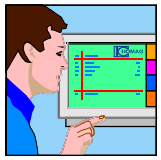
4.3 Material indices for panels and shuttering

The material index identifies the type of panel.

Material	Index
Wood component	01-09
Fermacell	10-19
Soft fiber panel (Gutex,...)	20-29
OSB	30-39
chip board	40-49
Plaster-base sheeting	50-59
Plaster	60-69
Gypsum plasterboard	70-79
Plastic panel	80-89
Plywood panel	90-99
Plaster	100-109
Shuttering	110-119
Three-layer panel	120-129
Glue	130-139
Insulating plate (Diffutherm)	140-149
Insulating plate (Heraklith)	150-159
Floorboards	160-169
Adhesive tape	170-179
Film/vapor block	180-189*
Plywood panel	190-199
Hardboard	200-209
Profiled panel [1)]	210-219
Porous concrete	220-229
Cavity insulation: cellulose	230-239
Cavity insulation: soft wood fiber	240-249
Cavity insulation: mineral wool	250-259

*Components in this index range have no influence on the offset and length calculation. The same applies for panels and shuttering with a thickness of 1 mm or less.

[1)] For example, trapezoidal or sinusoidal sheets



5 Control codes for processing steps

5.1 Sawing and polygon trimming

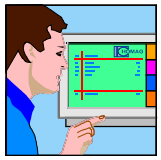
The following control codes are used to control the saw or trimming unit.

Control code	PAF meaning	PSG meaning
1	Cylindrical trimmer	Standard saw blade
2	Trimmer with chamfer	Fine-toothed saw blade
3	Trimmer for horizontal groove	Chainsaw
4	Vertical marking trimmer	
5...9	*Not used*	*Not used*
10	Overcutting trimming line	Overcutting cut
20	Undercutting trimming line	Undercutting cut
30...90	*Blocked*	
100	Tool radius correction "left" Workpiece is located to the right of the processing line	
200	Tool radius correction "right" Workpiece is located to the left of the processing line	
300	No tool radius offset	
400...900	*Blocked*	
1000	Synchronous rotation	*Not used*
2000...9000	*Blocked*	

Note:
The ones and thousands position of the control code cannot be interpolated. The reference point is therefore always the end point of a partial section of a polygon path.

5.1.1 Tool category

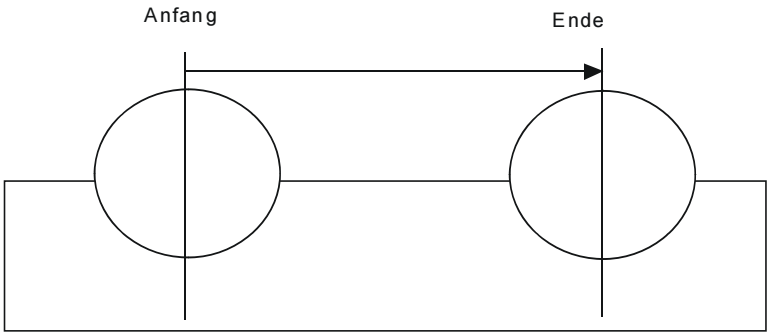
The ones position in the control code determines the tool category. See the table under 5.1.



5.1.2 Undercut and overcut

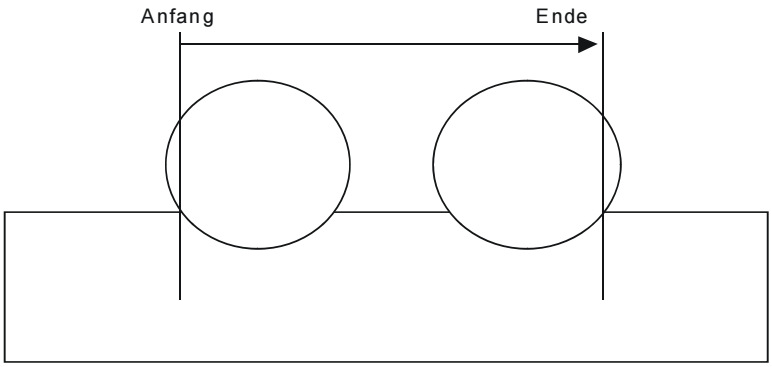
The tens position in the control code determines the overcut and undercut.

Overcut: Control code: xx1x

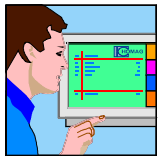


T:\\8482\\472050\\DEU011TD.wmf

Undercut: Control code xx2x



T:\\8482\\472050\\DEU012TD.wmf

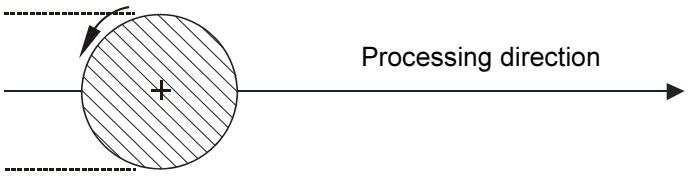


5.1.3 Tool radius correction

The hundreds position in the control code determines the tool radius correction.

Note: The reference for the tool radius correction is the processing direction.

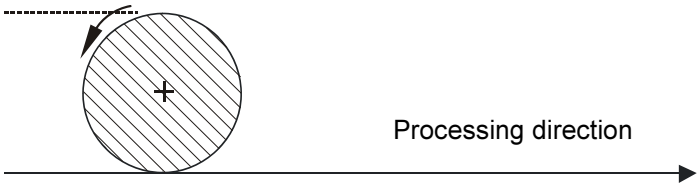
No tool radius correction (control code 300)



T:\\8482\\472051\\X00013TD.wmf

With control code 300, no differentiation between material waste and a required part is possible.

Tool radius correction in the processing direction to the left (control code 100)



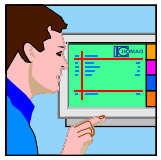
T:\\8482\\472051\\X00014TD.wmf

The material waste is located on the side of the chipping processing unit.

Tool radius correction in the processing direction to the right (control code 200)

T:\\8482\\472051\\X00015TD.wmf

The material waste is located on the side of the chipping processing unit.

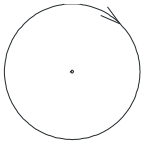


5.1.4 Synchronous and reverse rotation

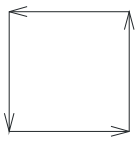
The thousands position of the control code specifies synchronous or reverse rotation for the processing steps. See the table under 5.1.

5.1.5 Examples

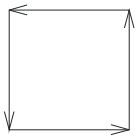
Circular notch in a clockwise direction
PAF
MP 3382,40,34,18,211;


T:\\8482\\472050\\X00018TD.wmf

Closed, rectangular notch
PAF
PP 65,2201,34,121,0;
PP 133,2201,34,121,0;
PP 133,2269,34,121,0;
PP 65,2269,34,121,0;
PP 65,2201,34,121,0;


T:\\8482\\472050\\X00019TD.wmf

Notch with arc
PAF
PP 2000,0,16,211,0;
PP 2000,1800,16,211,0;
KB 3000,1800,800,Acw,16,211,0;
PP 3000,0,16,211,0;

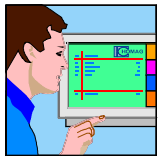

T:\\8482\\472050\\X00019TD.wmf

5.2 Pocket routing

The trimming unit is activated via control codes.

Control code	Meaning
0	Overcut/undercut according to the machine rules
1	Overcut
2	Undercut

Note:
The specification for overcut or undercut refers to all four corners of a pocket.



5.3 Highlight

The activation of the marking unit for MPL and PML processing is via control codes.

Control code	Meaning
1	Inkjet printer
2	Ballpoint pen
3	Marking awl
10	Marking on the opposite plane
20	Marking on the definition plane/layer
100	Line color: black
200	Line color: blue
300	Line color: green

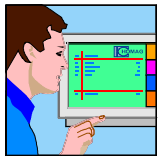
Note:
The control codes cannot be interpolated. They are therefore always based on the end point of a partial section of a polygon path.

<u>Example</u>:
Black line with ballpoint pen on panel: 122

5.4 Polygon blocked surfaces

The control code of a blocked surface qualifies the blocked surface for …

Control code	Processing class
0	Attachments
1	Glueing
2	Cleaning



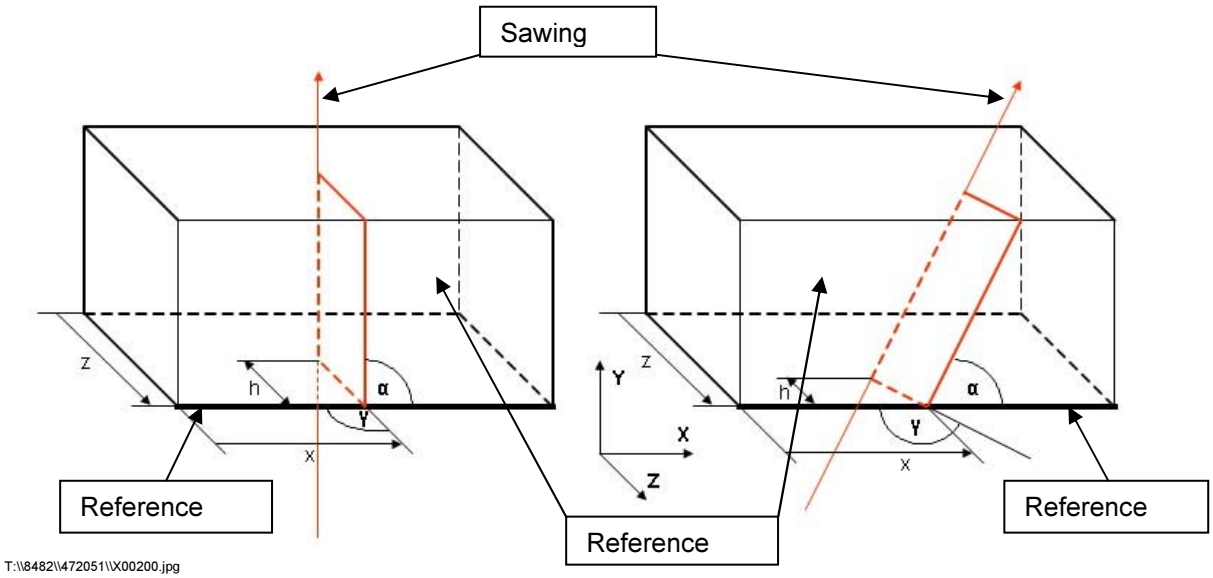
6 Angles and radii

6.1 Rotation and tilt angle of spatial processing plane RBE2

Starting from the image under 1.3.5, the transformation from Figure a.) to Figure b.) arises through the positive angle α. The transformation from b.) to c.) arises through the positive angle γ. A positive angle δ would rotate the plane from Figure c.) around the already transformed Z" axis again.

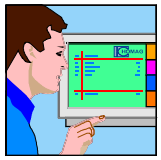
6.2 Rotation, tilt, and gradient angle of the saw cut SG

6.2.1 Saw cut without gradient angle

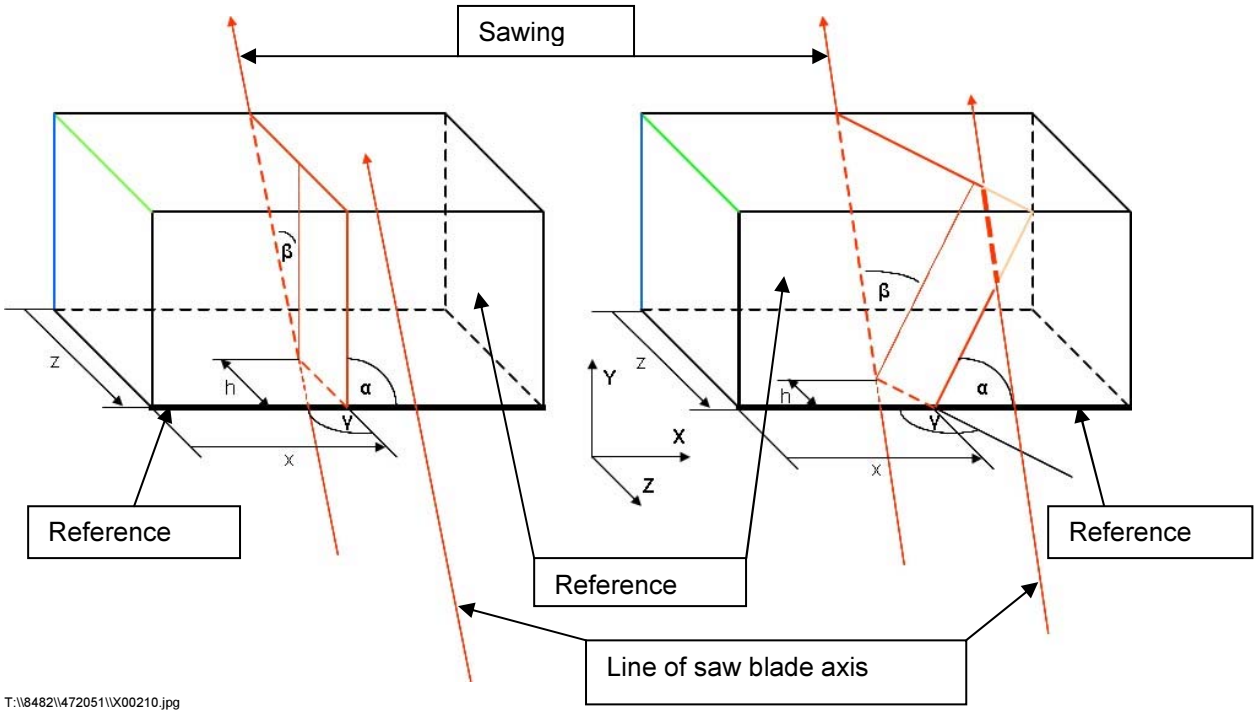


T:\\8482\\472051\\X00200.jpg

Please note:
The tilt angle γ relates to edges or surfaces depending on the value of the s-bit. See definition of the saw cut.

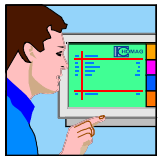


6.2.2 Saw cut with gradient angle



Please note:
In the reference drawing, the gradient angle β has a positive numerical value.

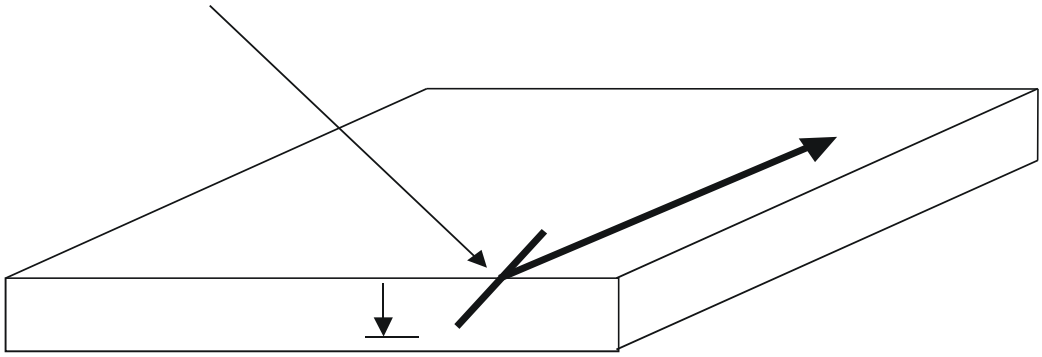
```
LS 4519.4,100,200,0,0,10000,valley jack rafter left,0;
SG 500,0,200,90.000,90.000,100,2,2,40.000,1;
```



6.3 Tilt angle for polygon points PP, KB, and MP

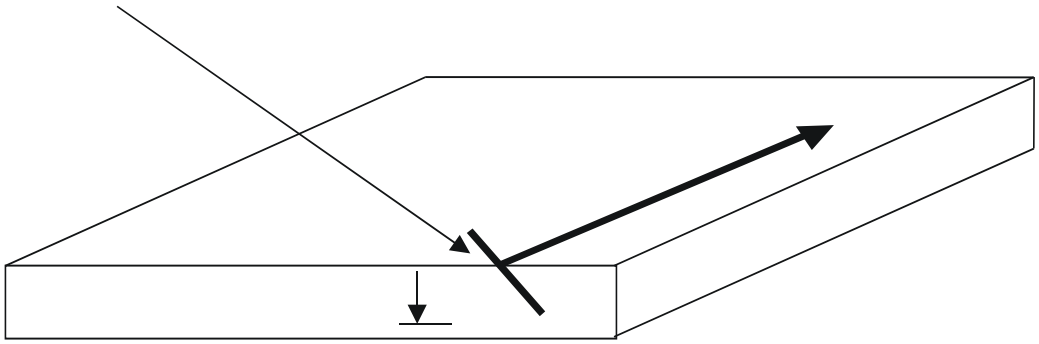
The tilt angle of a polygon point always references to the tangent of the processing line in the processing direction at this point.
If two sequential polygon points have different tilt angles, the tilt angle between the two points is interpolated linearly.

Positive tilt angle: clockwise in the direction of the processing line

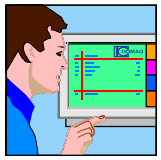


T:\8482\472050\X00016TD

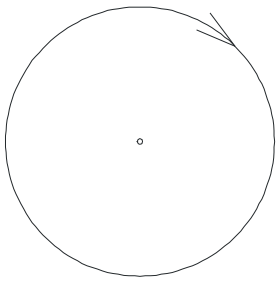
Negative tilt angle: counter-clockwise in the direction of the processing line



T:\8482\472050\X00017TD



6.4 Radius for polygon point MP



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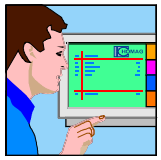
If the radius is specified as a positive value, an arc is processed in a clockwise direction.
If the radius is specified as a negative value, an arc is processed in a counter-clockwise direction.
The data is based on a consideration counter to the Z axis of the relevant coordinate system.



7 Examples

7.1 Example: file header

```
TXT         Created by the wupEditor;
VERSION     3.4;
ANR         Order 1834;
ELB         GABLE;
ELN         gi003686;
ZNR         4921;
SERIES      1;
ELA         INSIDE;
ELM         8144, 2852, 192, 1;
CAD
CADRELEASE
```

7.2 Example: components

Upper beam
```
OG          8932,80,80,0,2520,0,top plate,0;
```

Bottom plate (threshold)
```
UG          8932,80,80,0,0,0,bottom plate,0;
```

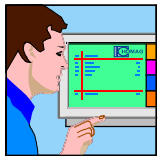
Transverse stud
```
QS          2440,80,80,0,80,0,stud-W,0;
```

Horizontal beam
```
LS          890,60,80,4210,2100,0,head,0;
```

Component with 4 corner points
```
BT4         2440,165,80,2375,80,2540,80,2540,2339,2375,2520,0,stud-S,0;
```

Component with 6 corner points
```
BT6         2440,165,80,2375,80,2458,80,2540,80,2540,2339,2459,2520,2375,2520,0,stud-S,0;
```

Built-in part
```
EBT         890,60,80,4210,2100,1,iron girder,0;
```



7.3 Example of panels

Panel, layer 1, inside

PLI1	643,2600,15,6251,0,40,chipboard,0;
PP	6251,0,15,0,0,0;
PP	6894,0,15,0,0,0;
PP	6894,2600,15,0,0,0;
PP	6251,2600,15,0,0,0;
PP	6251,0,15,0,0,0;

Panel, layer 2, inside

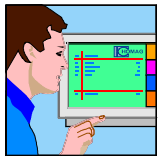
PLI2	643,2600,15,6251,0,40,chipboard,0;
PP	6251,0,15,0,0,0;
PP	6894,0,15,0,0,0;
PP	6894,2600,15,0,0,0;
PP	6251,2600,15,0,0,0;
PP	6251,2600,15,0,0,0;

Panel, layer 1, external side

PLA1	643,2600,15,6251,0,40,chipboard,0;
PP	6251,0,15,0,0,0;
PP	6894,0,15,0,0,0;
PP	6894,2600,15,0,0,0;
PP	6251,2600,15,0,0,0;
PP	6251,0,15,0,0,0;

Panel, layer 2, external side

PLA2	643,2600,15,6251,0,40,chipboard,0;
PP	6251,0,15,0,0,0;
PP	6894,0,15,0,0,0;
PP	6894,2600,15,0,0,0;
PP	6251,2600,15,0,0,0;
PP	6251,0,15,0,0,0;



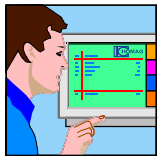
7.4 Example: slats and contra slats

Contra slats

```
PLA1    2579,70,24,58,0,3,PLA #1,0;
PP      58,0,24,0,0,0;
PP      2637,0,24,0,0,0;
PP      2637,70,24,0,0,0;
PP      58,70,24,0,0,0;
PP      58,0,24,0,0,0;
NR      78,48,2617,48,250,10;
PLA1    5625,70,24,58,867,3,PLA #2,0;
PP      58,867,24,0,0,0;
PP      5683,867,24,0,0,0;
PP      58,937,24,0,0,0;
PP      58,867,24,0,0,0;
NR      78,902,4983,902,250,10;
```

Slat

```
PLA2    50,2744,38,319,0,PLA #1,0;
PP      319,0,38,0,0,0;
PP      369,0,38,0,0,0;
PP      369,2744,38,0,0,0;
PP      319,2744,38,0,0,0;
PP      319,0,38,0,0,0;
NR      344,48,344,48,1,10;
NBR     0,0,2;
NR      344,1828,344,1828,1,10;
NBR     10,-5,2;
NBR     -10,5,2;
NR      344,2729,344,2729,1,10;
NBR     10,10,2;
NBR     -10,-10,2;
```



7.5 Polygon paths

Closed polygon path

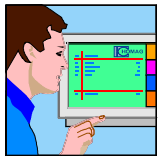
```
PAF;
PP          65,2201,34,121,0,0;
PP          133,2201,34,121,0,0;
PP          133,2269,34,121,0,0;
PP          65,2269,34,121,0,0;
PP          65,2201,34,121,0,0;
```

Open polygon path

```
PAF;
PP          100,0,20,111,0,0;
PP          100,500,20,111,0,0;
PP          200,700,20,111,0,0;
PP          200,1000,20,111,0,0;
PP          500,1000,20,111,0,0;
PP          500,150,20,111,0,0;
```

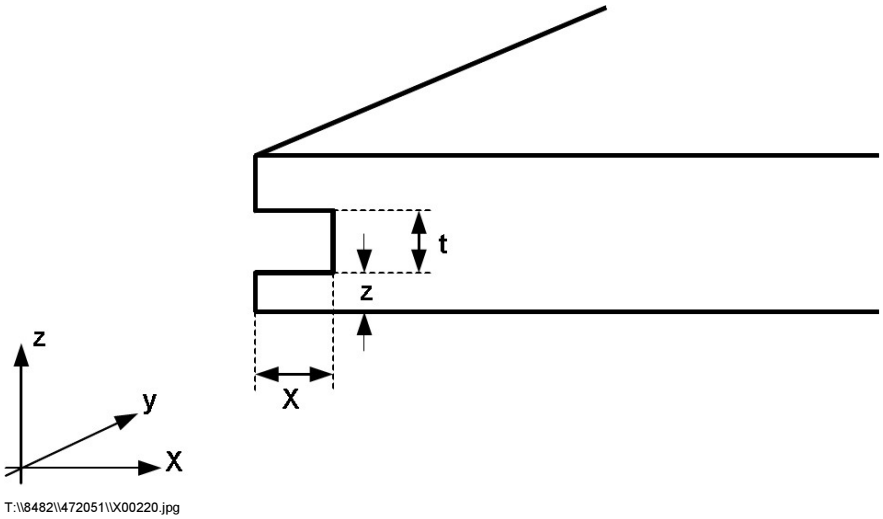
Polygon path with arc

```
PAF;
PP          2000,0,16,211,0,0;
PP          2000,1800,16,211,0,0;
KB          3000,1800,800,Acw,16,211,0,0;
PP          3000,0,16,211,0,0;
```



Polygon path for lateral groove

PAF;
PP 40,0,35,113,0,30;
PP 40,1800,35,113,0,30;



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