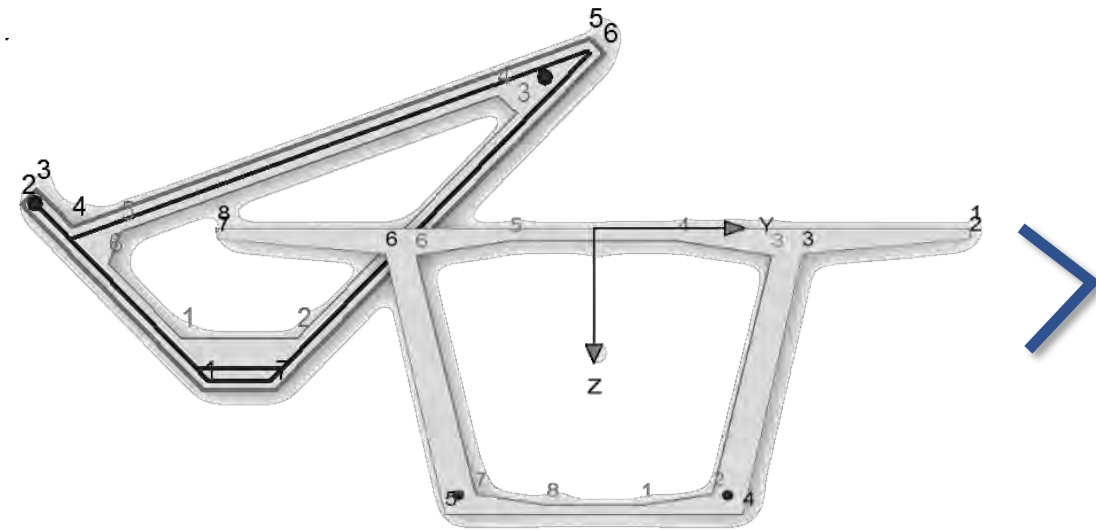


- Design according to EN 1992-1-1 taking into account the national annexes for DE, UK, CZ/SK, AT
- Arbitrary polygonal reinforced concrete and prestressed concrete cross-sections with recesses
- User-defined arrangement of reinforcement as individual bars or at the corners of the cross-section
- Design of composite cross-sections from different cross-sections
- Specification of different material characteristics for concrete, reinforcing steel and prestressing steel



Graphic-interactive work environment

Setting

- Design acc. to DIN 1045-1:2008
- Design acc. to EN 1992-1-1
- Design acc. to ÖNORM EN 1992-1-1
- Design acc. to CSN EN 1992-1-1
- Design acc. to BS EN 1992-1-1
- Design acc. to DIN EN 1992-1-1
- Design acc. to DIN 1045:1988

Different standards

RIB ZWAX - Biaxial bending with normal force for arbitrary reinforced concrete sections

Structural member Statics Setting Options ?

Component: Precast Concrete Beam
 Range: Pos.D14 -C35/45 Normal Concrete
 Cross-section: Prefabricated Section with 17 Single-S
 Partial cross-section: TQ-1
 Section: Midspan (Fd=1.35G+1.5Q+1.0P)

Range/Material Cross-section Reinforcement Actions Output

Design regions

1	Pos.D14 -C35/45 Normal	New
2	Pos.D14 -LC35/38 Light	Copy
3	Pos.D14 -C55/67 High-pe	Delete
4	Pos.D14 - Arbitrary Par	

Material

1:Concrete	C35/45	Selection...
2:Reinforcement	B500M	Selection...
3:Prestressing steel	ST1570/1770	Selection...
4-9: Additional material curves		Modifu...

Safety coefficients ...

Reinforcement

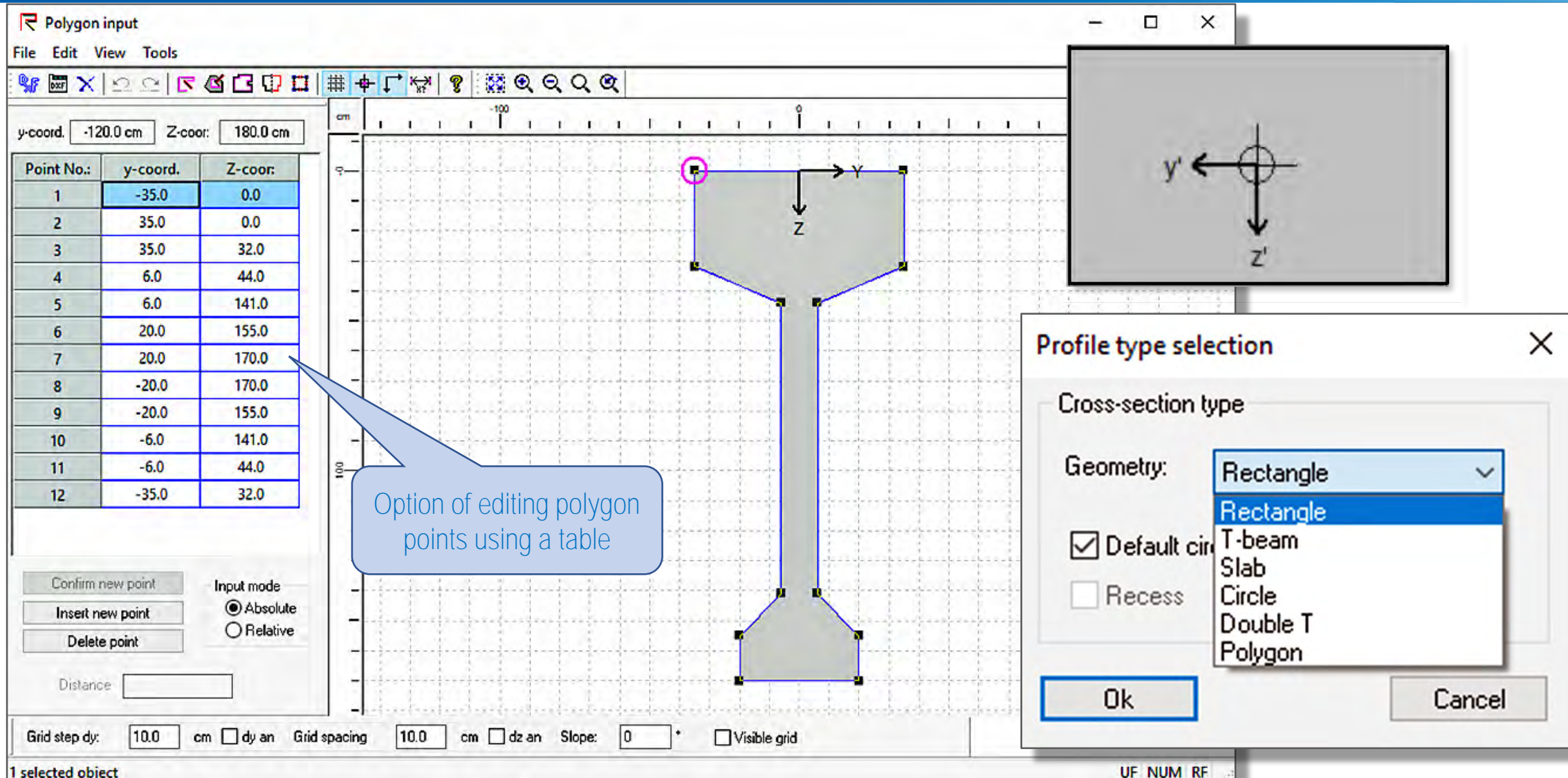
min eps,Concrete	min eps,B =	-3.500	0/00
min eps,Concrete centric	min eps,B-m =	-2.000	0/00
max eps,Steel	max eps,S =	10.000	0/00
max eps,Steel centric	max eps,S-m =	2.174	0/00
Distance rc-steel center to edge	d1 =	3.0	cm
<input type="checkbox"/> Design as compression memb	min As =	0.01	%
<input checked="" type="checkbox"/> Prestressing			

170.0
70.0
3.0

C35/45 Normal Concrete, Querschnitt: Prefabricated Section wi

Additional user-defined material curves

RTzwax – Efficient Input of Cross Sections



The screenshot displays the 'Polygon input' software interface. On the left, a table lists 12 points for a cross-section. The main window shows a 2D grid with a cross-section of a beam. A callout box points to the table with the text 'Option of editing polygon points using a table'. On the right, a 'Profile type selection' dialog box is open, showing a list of cross-section types with 'Rectangle' selected. A coordinate system diagram is also visible in the top right corner.

Point No.:	y-coord.	Z-coor.:
1	-35.0	0.0
2	35.0	0.0
3	35.0	32.0
4	6.0	44.0
5	6.0	141.0
6	20.0	155.0
7	20.0	170.0
8	-20.0	170.0
9	-20.0	155.0
10	-6.0	141.0
11	-6.0	44.0
12	-35.0	32.0

Option of editing polygon points using a table

Profile type selection

Cross-section type

Geometry: Rectangle

- Rectangle
- T-beam
- Slab
- Circle
- Double T
- Polygon

Default circ

Recess

Ok Cancel

Reinforcement data

Single reinforcement Reflection at y-axis
 Distributed reinforcement Reflection at z-axis
 Circular reinforcement

Material name:

Set (Priority) (1..9):

Coordinates: ya = za = cm
 ye = ze =

Radius of circular reinforcement: R =

Initial strain: eps0 =

Reinforcement: bars in cm2: min As =

Line or circular reinforcement in cm2/m: max As =

Internal forces input dialog

Action	Nz	NEdx	MEdy/M1	MEdz/M2
1		462.0	3794.0	0.0
2		0.0	958.0	0.0
3		0.0	0.0	0.0

Buttons: New, Delete

Stress resultants

Normal force: NEdx = kN

Bending moment: MEdy/M1 = kNm

Bending moment: MEdz/M2 = kNm

Strain in compression corner: eps1 = o/oo

Strain in tension corner: eps2 = o/oo

Direction of neutral axis: beta = Deg.

Bending moments: ME_{dy}/ME_{dz} M1/M2

Control of verifications

Determine bearing capacity and design

Perform strain analysis for load factor gamma

Strain analysis for service load with elastic E-concrete under compression and zero tension strength

Compute stress resultants due to prescribed state of strain

For the strain analysis with load factor gamma, rc steel is assumed to be elastic

Use the gross cross-section in the compression zone of the concrete (reinforcement area is not subtracted)

Print stresses and stress differences together with strain analysis

Print stress resultants in tension and compression

Neutral axis parallel to y-direction (Enforced bending about y, Mz ignored)

Strains and stresses of bar and line reinforcements with strain analysis

Strains and stresses of prestressed bar and line reinforcements with strain analysis

Strains and stresses of all bar and line reinforcements with bearing capacity analysis

Different options of verifications available

Different options of reinforcement arrangements

Printout [X]

In list of results

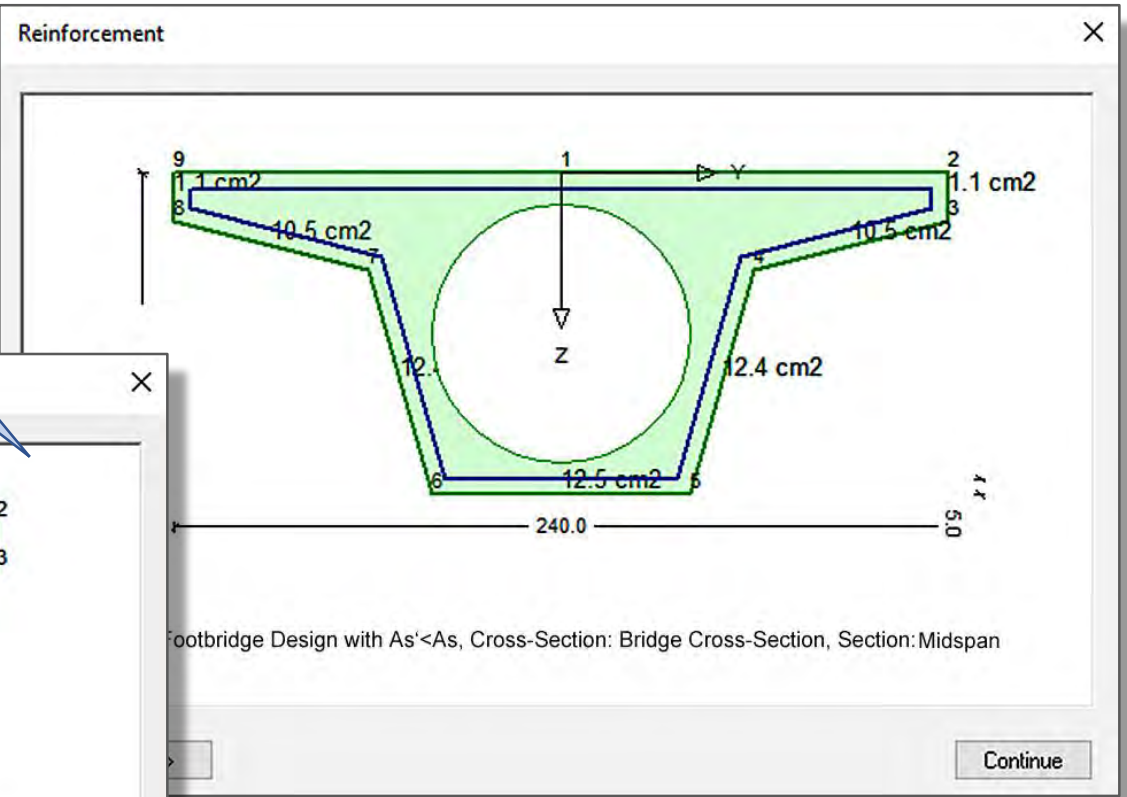
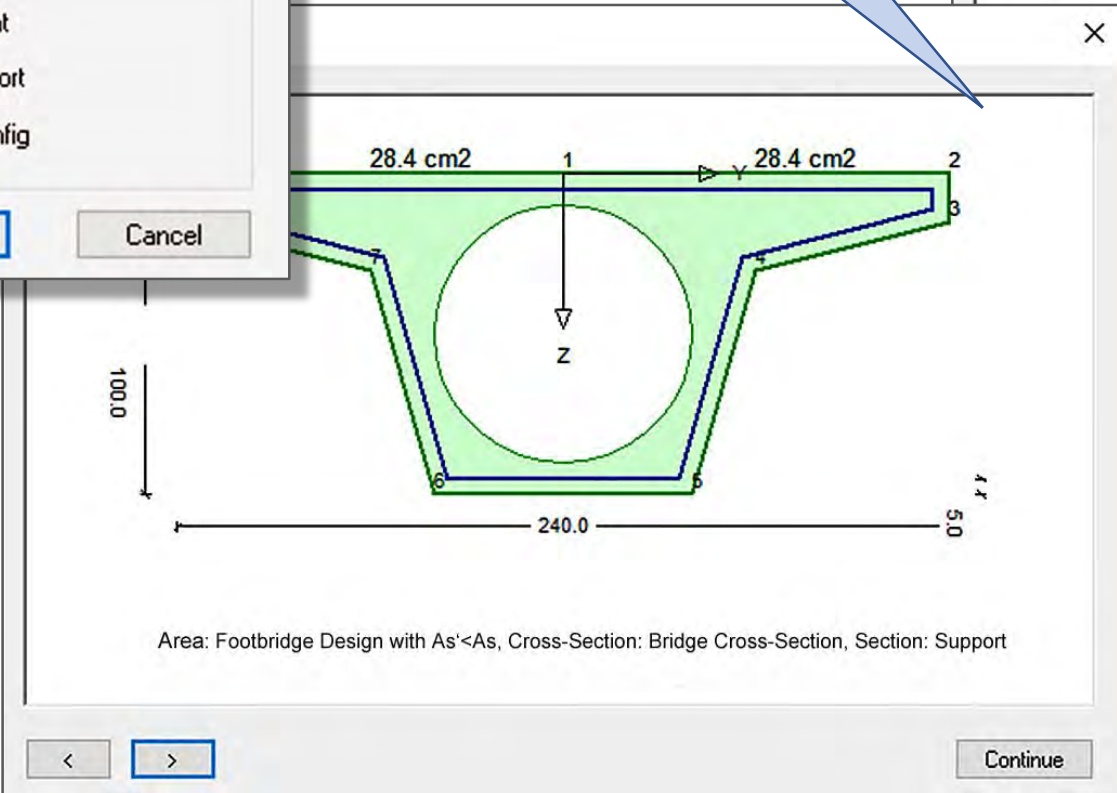
- Output of system graphics
- Output of result graphics

Imaging program

- RTprint
- RTreport
- RTconfig

OK **Cancel**

Sketches of reinforced concrete cross-sections



RIB Engineering GmbH
Software for Structural Engineers - Member Design, CAD, FEM for Building & Bridges
statik-hotline@rib-software.com
Telefon: +49(0)711 7873-41

Vaihingerstraße 151 D-70567 Stuttgart
www.rib-software.com
Telefax: +49(0)711 7873-8941

RIB SWAX © 2018 RIB Software SE

Precast Concrete Beam

File: Fertigteil Dachbinder.svw

Bereich: Pos.D14 -C35/45 Normalbeton, Querschnitt: FT-Träger mit 17 Erzellitzen

RIB SWAX 18.0 Biaxial bending with normal force
Pos.D14 -C35/45 Normalbeton

Record of the input

- * Ultimate limit state for bending and longitudinal force DIN EN 1992-1-1
- * The Net - section of compression zone will be used

Material - No.	Strength (N/mm2)	E-Modulus (N/mm2)	Strain Limits (o/oo)
Concrete 1	$f_{c,d} = 19.8$	$E_c = 34100$	Compress -9.50 -2.00
Reinf.Steel 2	$f_{y,d} = 434.8$	$E_s = 200000$	Tension 10.00 2.17
Prest.Steel 3	$f_{p,d} = 1304.3$	$E_p = 195000$	

Additional stress-strain diagrams

Material	Part	Strain (o/oo)	Stress (N/mm2)
4	1	0.000	6.756
	2	6.756	30.000
4	1	0.000	1385.00
	2	6.756	1462.00

Cross-section: FT-Träger mit 17

Calculation for non-compressive section
Distance between edge and outer tension reinforcement will be calculated

Polygonal Cross-Section 1
Concrete (#Material 1)

Coordinates	y (m)	z (m)	Point
1	0.000	0.000	1
2	1.200	0.000	2
3	1.200	0.150	3
4	0.600	0.300	4
5	0.400	1.000	5
6	-0.400	1.000	6
7	-0.600	0.300	7
8	-1.200	0.150	8
9	-1.200	0.000	9

Seite: 1

Design results for a Prefabricated Beam

RIB RTPlot Projekt: C:\Users\rbt\LocalTemp\Fertigteildachbinder.tmp File: - [ZWAX.106]

File Edit Setting Zoom area Company heading Window ?

RIB RTZWX 18.0 2-axial bending with normal force

Pos.D14 -C55/67 High-performance Concrete | =0.1(m)

Clear and comprehensible output of results

oca\Temp\Shedträger.tmp File: - [ZWAX.101]

heading Window ?

2-axial bending with normal force

Pos.D14 -C55/67 High-performance Concrete | =0.1(m)

Biaxial bending with longitudinal force

Seite: 1

RIB Engineering GmbH
Software for Structural Engineers - Member Design, CAD, FEM for Building & Bridges
statik-hotline@rib-software.com
Telefon: +49(0)711 7873-41

Vaihingerstraße 151 D-70567 Stuttgart
www.rib-software.com
Telefax: +49(0)711 7873-8941

RIB SWAX © 2018 RIB Software SE

Footbridge

File: Fußgängersteg.svw

Bereich: Footbridge Design mit As<As, Querschnitt: Stegquerschnitt

RIB SWAX 18.0 Biaxial bending with normal force
Footbridge Design mit As<As

Record of the input

- * Ultimate limit state for bending and longitudinal force DIN EN 1992-1-1
- * The Net - section of compression zone will be used

Material - No.	Strength (N/mm2)	E-Modulus (N/mm2)	Strain Limits (o/oo)
Concrete 1	$f_{c,d} = 19.8$	$E_c = 34100$	Compress -9.50 -2.00
Reinf.Steel 2	$f_{y,d} = 434.8$	$E_s = 200000$	Tension 10.00 2.17
Prest.Steel 3	$f_{p,d} = 1304.3$	$E_p = 195000$	

Cross-section: Stegquerschnitt

Calculation for non-compressive section
Distance between edge and outer tension reinforcement will be calculated

Polygonal Cross-Section 1
Concrete (#Material 1)

Coordinates	y (m)	z (m)	Point
1	0.000	0.000	1
2	1.200	0.000	2
3	1.200	0.150	3
4	0.600	0.300	4
5	0.400	1.000	5
6	-0.400	1.000	6
7	-0.600	0.300	7
8	-1.200	0.150	8
9	-1.200	0.000	9

Seite: 1