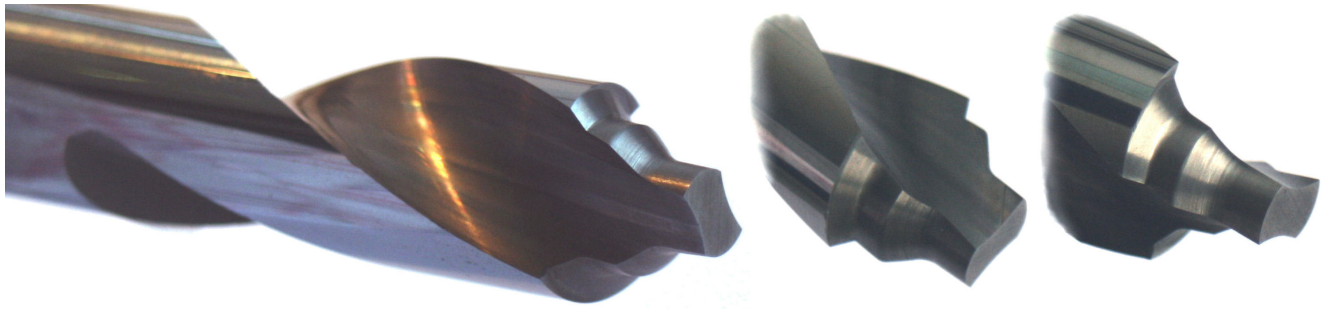


innovation
meets
experience

LCL Software



LCL Contour (P32) News March 2012

The number of elements for each contour has been increased up to maximum 400 elements. Of course you can import them with a dxf-File.

Now it is possible to grind complex contours in one movement.

Version: 1.TP32.NT12 7.3.0.0

Quick Menu Contour Geometry - End Face Flute OD Operations Measuring Data Administration Wheels ?

Contour: Elements 341 - 350 flat Clearance Horizontal

Starting D: Elements 321 - 330
Elements 331 - 340
Elements 341 - 350
Elements 351 - 360
Elements 361 - 370
Elements 371 - 380
Elements 381 - 390
Elements 391 - 400

Angle: 70

Actual Contour: Endpoint in X: 426.621
Diameter: 14.131

Start Position in X: 419.900 Grinding Point: 0.000

| Last Element | Radius | End Tangent | |
|--------------|--------|-------------|----------------|
| | | Angle | Length |
| 341 | 0.100 | 90.000 | Length Y 1.100 |
| 342 | 0.100 | 0.000 | Length X 1.000 |
| 343 | 0.100 | 270.000 | Length Y 1.000 |
| 344 | 0.100 | 0.000 | Length X 1.000 |
| 345 | 0.000 | 0.000 | Length X 0.000 |
| 346 | 0.000 | 0.000 | Length X 0.000 |
| 347 | 0.000 | 0.000 | Length X 0.000 |
| 348 | 0.000 | 0.000 | Length X 0.000 |
| 349 | 0.000 | 0.000 | Length X 0.000 |
| 350 | 0.000 | 0.000 | Length X 0.000 |

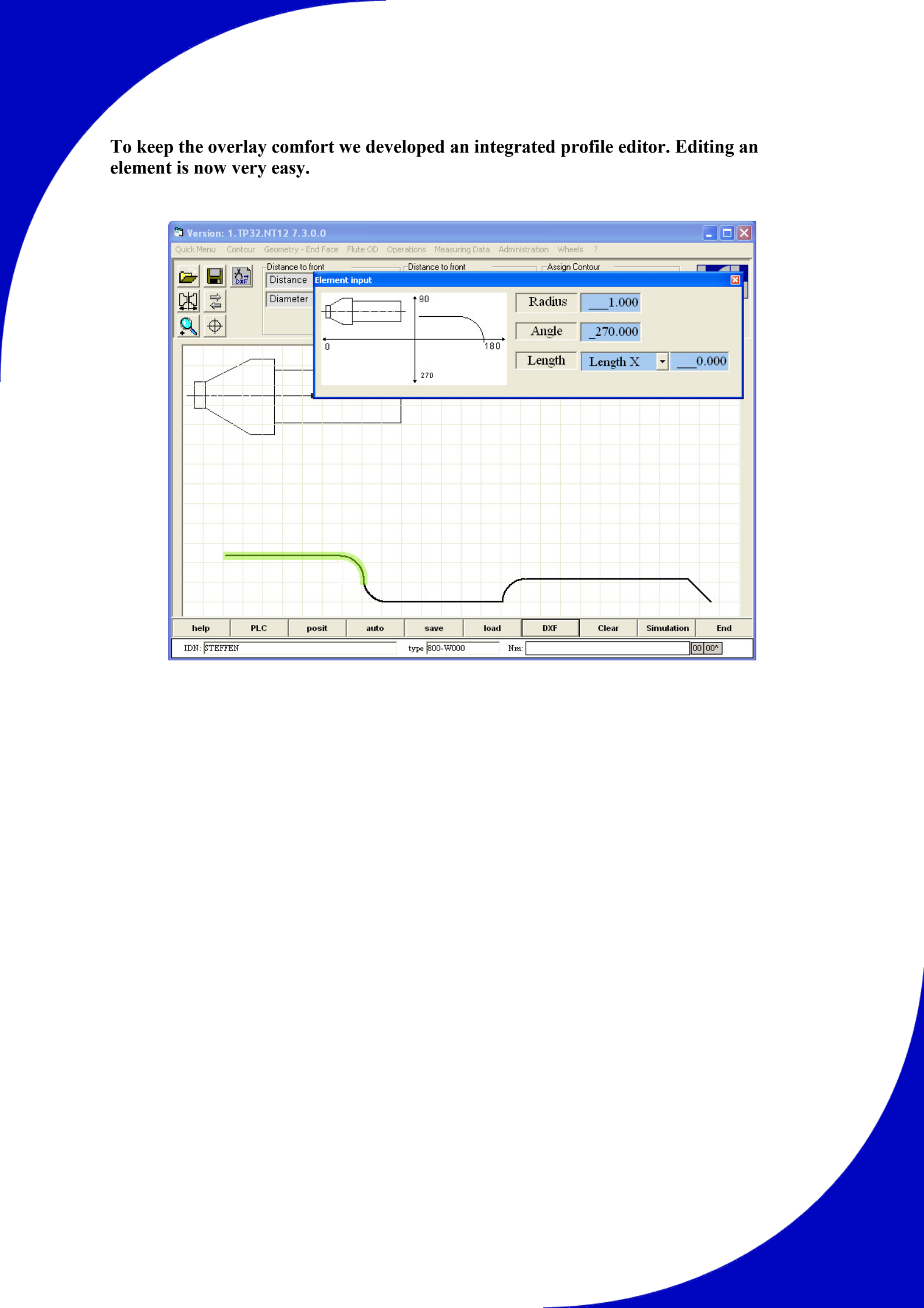
Plunging in Start Tangent: 0.000 Lift Off in End Tangent: 0.000

☐ Mirror Data from Contour 2 ☐ Connect End with Contour 2

help PLC posit auto save load DXF Clear Simulation End

IDN: JBO type: 800-W000 Nm: 00.00°

To keep the overlay comfort we developed an integrated profile editor. Editing an element is now very easy.



Contours per cutting edge

Contour Elements 1 - 10 flat Clearance Horizontal

Contour 1 flat Clearance C-axis limits

Starting Diameter 5.000 Start Position in X 0.000 Grinding Point 0.000 °

| Start Tangent | | Last Element | Radius | End Tangent | |
|----------------------------|----------------|---|--------|---------------------------------------|----------------|
| Angle | Length | | | Angle | Length |
| 90.000 | Length X 0.000 | 1 | 0.000 | 0.000 | Length X 9.000 |
| Actual Contour | | 2 | 1.000 | 140.000 | Length X 0.000 |
| Endpoint in X 7.122 | | 3 | 0.000 | 141.000 | Length X 2.520 |
| Diameter 12.613 | | 4 | 0.000 | 0.000 | Length X 0.000 |
| | | 5 | 0.000 | 0.000 | Length X 0.000 |
| | | 6 | 0.000 | 0.000 | Length X 0.000 |
| | | 7 | 0.000 | 0.000 | Length X 0.000 |
| | | 8 | 0.000 | 0.000 | Length X 0.000 |
| | | 9 | 0.000 | 0.000 | Length X 0.000 |
| | | 10 | 0.000 | 0.000 | Length X 0.000 |
| | | Plunging in Start Tangent 0.000 | | Contour is on every even Cutting Edge | |
| | | Lift Off in End Tangent 0.000 | | Contour is on all Cutting Edges | |
| Mirror Data from Contour 2 | | Contour is on every even Cutting Edge | | | |
| | | Contour is on every odd Cutting Edge | | | |
| | | Contour is on Cutting Edges as listed below | | | |
| help PLC posit auto save | | | | | |

This is the input mask where you can choose on witch cutting edge youn grind the

Contour Elements 1 - 10 flat Clearance Horizontal WALTER

Contour 1 flat Clearance C-axis limits

Starting Diameter 5.000

| Start Tangent | | Last Element | Radius | End Tangent | |
|--|----------------|---------------------------------|--------|---|----------------|
| Angle | Length | | | Angle | Length |
| 90.000 | Length X 0.000 | 1 | 0.000 | 0.000 | Length X 9.000 |
| Actual Contour | | 2 | 1.000 | 140.000 | Length X 0.000 |
| Endpoint in X 7.122 | | 3 | 0.000 | 141.000 | Length X 2.520 |
| Diameter 12.613 | | 4 | 0.000 | 0.000 | Length X 0.000 |
| | | 5 | 0.000 | 0.000 | Length X 0.000 |
| | | 6 | 0.000 | 0.000 | Length X 0.000 |
| | | 7 | 0.000 | 0.000 | Length X 0.000 |
| | | 8 | 0.000 | 0.000 | Length X 0.000 |
| | | 9 | 0.000 | 0.000 | Length X 0.000 |
| | | 10 | 0.000 | 0.000 | Length X 0.000 |
| | | Plunging in Start Tangent 0.000 | | Contour is on Cutting Edges as listed below | |
| | | Lift Off in End Tangent 0.000 | | ... | |
| Mirror Data from Contour 2 | | Connect End with Contour 2 | | | |
| help PLC posit auto save load DXF Clear Simulation End | | | | | |

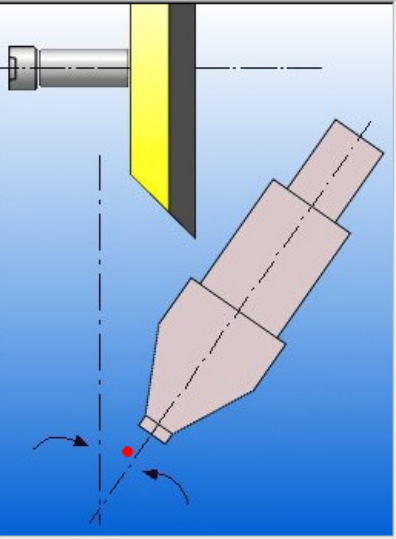
Assignment of contour No. 1 to which cutting edges?

1 2 3 4 5 6

Innovations from version 5 to version 7

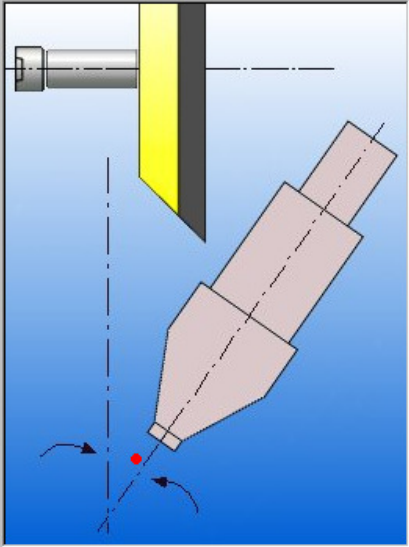
New grinding method cam relief - alternatively with bond front (the clearance of the grinding wheel is presettable) or horizontal

| | | | |
|---------------------------------------|--------------|-----------------|------------|
| Contour 1 | | Cam relief | bond front |
| Contour 1 | | Cam relief | |
| Input of clearance angle | | | |
| radial clearance | __ 0.000 ° | axial clearance | __ 0.000 ° |
| radial reduction | __ 0.000 | axial reduction | __ 0.000 |
| definition-diameter | __ 0.000 | | |
| radial,axial turnangle | __ 0.000 ° | | |
| overflow angle A (plunging for teeth) | __ 0.000 ° | | |
| increment finishing | __ 0.000 | | |
| increment roughing | __ 0.000 | | |
| Clearance C-Axis | __ 0.000 ° | | |
| Distance Ahead of Center | __ 3.000 | | |
| | Definition 1 | Definition 2 | |
| Diameter | __ 24.000 | __ 0.000 | |
| cyl.land width | __ 0.000 | __ 0.000 | |
| turnangle | __ 0.000 ° | __ 0.000 ° | |



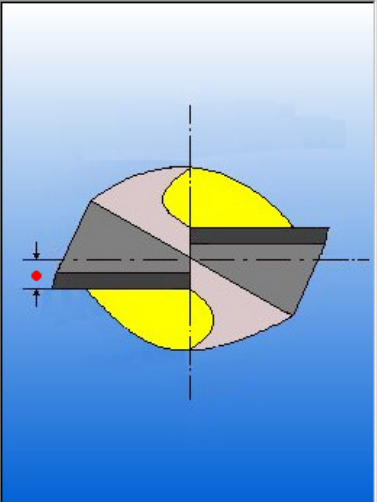
New grinding method „flat clearance“ – the clearances are not grinded with hollow grind. They are grinded with the front bond of the wheel.

| | | |
|--------------------------|----------------|--------------|
| Contour 1 | flat Clearance | bond front |
| Contour 1 | flat Clearance | |
| Clearance | | |
| | Definition 1 | Definition 2 |
| Diameter | __ 24.000 | __ 0.000 |
| 1st clearance radial | __ 20.000 ° | __ 0.000 ° |
| 2nd clearance radial | __ 30.000 ° | __ 0.000 ° |
| 1st clearance axial | __ 5.000 ° | __ 0.000 ° |
| 2nd clearance axial | __ 10.000 ° | __ 0.000 ° |
| Land Width | __ 1.500 | __ 0.000 |
| cyl.land width | __ 0.000 | __ 0.000 |
| Clearance C-Axis | __ 5.000 ° | |
| Distance Ahead of Center | | __ 0.000 |



Front teeth can be probed „ahead of center“. It can be grinded with all grinding methods.

| | | |
|--------------------------|----------------|--------------|
| Contour 1 | flat Clearance | bond front |
| Contour 1 | flat Clearance | |
| Clearance | | |
| | Definition 1 | Definition 2 |
| Diameter | __ 24.000 | __ 0.000 |
| 1st clearance radial | __ 20.000 ° | __ 0.000 ° |
| 2nd clearance radial | __ 30.000 ° | __ 0.000 ° |
| 1st clearance axial | __ 5.000 ° | __ 0.000 ° |
| 2nd clearance axial | __ 10.000 ° | __ 0.000 ° |
| Land Width | __ 1.500 | __ 0.000 |
| cyl.land width | __ 0.000 | __ 0.000 |
| Clearance C-Axis | __ 5.000 ° | |
| Distance Ahead of Center | | __ 3.000 |



New grinding method „front teeth ahead of center with negative chamfer“
 The 1. clearance will be grinded negative. The cutting edge will be generated at the transition of 1. and 2. clearance.

| | | |
|-----------|----------------|------------|
| Contour 1 | flat Clearance | bond front |
| Contour 1 | flat Clearance | |

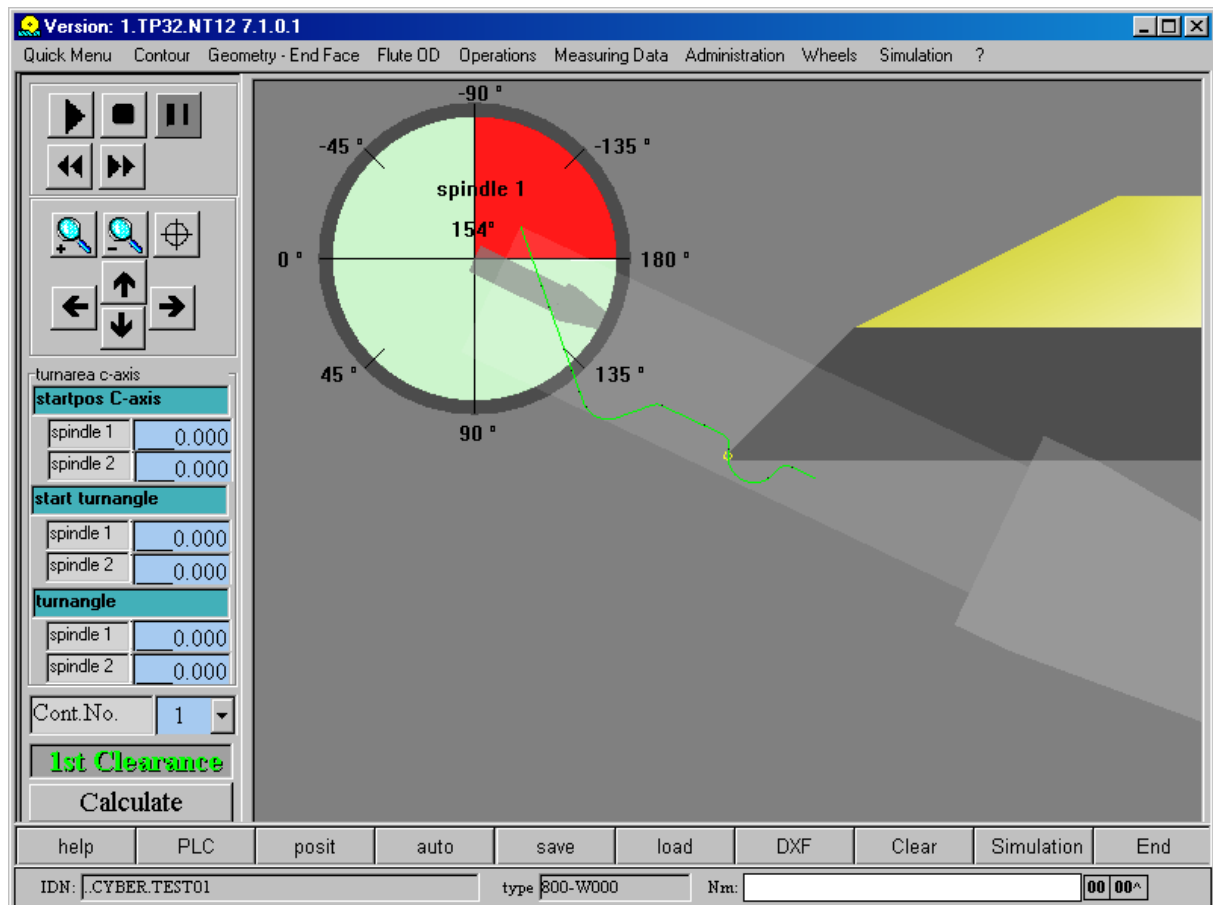
| Clearance | | |
|---|--------------|--------------|
| | Definition 1 | Definition 2 |
| Diameter | __24.000 | __0.000 |
| 1st clearance radial | __20.000 ° | __0.000 ° |
| 2nd clearance radial | __30.000 ° | __0.000 ° |
| 1st clearance axial | __5.000 ° | __0.000 ° |
| 2nd clearance axial | __10.000 ° | __0.000 ° |
| Land Width | __1.500 | __0.000 |
| cyl.land width | __0.000 | __0.000 |
| Clearance C-Axis | __5.000 ° | |
| Teeth Ahead of Center/negative chamfer | | __3.000 |

Revision of the overlay :

- grinding method and cutting edge geometrie for each contour
- generation of clearance angle with cylindrical land width
- c-axis limits with graphic on the contour page

| | | |
|--|----------------|---------------|
| Contour 1 | flat Clearance | Horizontal |
| Contour 1 | flat Clearance | C-axis limits |
| Clearance | | |
| | Definition 1 | Definition 2 |
| Diameter | __ 24.000 | __ 0.000 |
| 1st clearance radial | __ 20.000 ° | __ 0.000 ° |
| 2nd clearance radial | __ 30.000 ° | __ 0.000 ° |
| 1st clearance axial | __ 5.000 ° | __ 0.000 ° |
| 2nd clearance axial | __ 10.000 ° | __ 0.000 ° |
| Land Width | __ 1.500 | __ 0.000 |
| cyl.land width | __ 0.000 | __ 0.000 |
| Clearance C-Axis | __ 5.000 ° | |
| Teeth Ahead of Center/negative chamfer | | __ 3.000 |

| | | |
|-----------------------|----------------|---------------|
| Contour 1 | flat Clearance | Horizontal |
| Contour 1 | flat Clearance | C-axis limits |
| Clearance | | |
| definition of Contour | shank -> front | |
| constant grind.P. | Yes | |
| | spindle 1 | spindle 2 |
| startpos C-axis | __ 15.000 ° | __ 0.000 ° |
| start turnangle | __ 15.000 ° | __ 0.000 ° |
| turnangle | __ 110.000 ° | __ 0.000 ° |



Improvement of the 2-D simulation for a better display of the wheel setup

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