

## CNC snowman as tag



*Snowman, milled*

Even if there is no snow, the experienced CNC milling expert can produce his own snowman at any time.

The workpiece is milled from an aluminum disk. The NC program was generated using a CAD/CAM system. Therefore the contour and engraving only consist of G1/G2/G3 sets. The engraving section in the NC program can easily be replaced by individual lettering if the SINUMERIK engraving cycle is used.

All of the information required for production, drawings, tool data and nc-programs are compiled in the following.

[www.siemens.com/cnc4you](http://www.siemens.com/cnc4you)

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### 1. Safety Note

Working with machines is always associated with numerous hazards. It is therefore imperative that the legal and company safety regulations are also observed during the production of the Christmas tree.

### 2. Preliminary remark

The following description is intended for persons acquainted with CNC machines and who have experience with or knowledge of SINUMERIK CNCs. All the technical data listed here corresponds to the machines, tools, materials, machining plans and drawings used to produce the prototype. Because of the widely varying conditions in other workshops, this data is only of exemplary character for a reproduction. Nevertheless, a problem-free reproduction should be possible in most cases.

The programs were created and tested using a CNC milling machine equipped with SINUMERIK Operate V4.5 SP2. It should be possible to easily adapt the program to other SINUMERIK versions (e.g. different SINUMERIK Operate SW versions). The program is a DIN / ISO program without using cycles. A simulation and necessary changes (e.g. zero points) should always be carried out.

You can download all the CAD drawings, programs and machining descriptions for the workpieces free of charge at [www.siemens.com/cnc4you](http://www.siemens.com/cnc4you).

The following files and formats are available there:

**NC programs, 3d data dxf**

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### 3. Workpiece blank

- AlCu4PbMg, round stock Ø 50 mm, approx. 6mm

### 4. Milling machine and machining plan

- CNC milling machine DMG MORI HSC 30 linear, Siemens 840D sl - SINUMERIK Operate V4.7 SP3
- NC programs

NC program	Designation
01_SNOWMAN_FIRST_SIDE.MPF	Milling outer contour
02_SNOWMAN_ENGR_ALL.MPF	Engraving complete including lettering "Merry Christmas Your TAC-Team"
02_SNOWMAN_ENGR_FIGURE.MPF	Engraving only face, hands and buttons
02_SNOWMAN_ENGR_MERRY.MPF	Engraving lettering "Merry Christmas"
03_SNOWMAN_BACK_SIDE.MPF	Face and contour milling backside
04_SNOWMAN_CLAMPING.MPF	Milling snowman contour in soft collet chucks
01_SNOWMAN_FIRST_SID_TMZ.INI	Tool list

The NC programs are available for the software version SINUMERIK Operate V4.7 SP3 as a download.

### 5. Tools used

Drilling and milling tools for machining both sides of the parts.

#### Tools for milling machine

Tool name	Designation
ALU_SCHLICHT_D10	End mill Ø 10 mm, two-side trimmer
SF_D6_3SN	End mill Ø 4 mm, three-side trimmer
ENTGRATER_D08	Chamfer cutter Ø 8mm, 90°
SF_D2	End mill Ø 2 mm
VHM_BOHR_D2	Solid carbide twist drill Ø 2 mm
NC_ANB_D6_90GR	NC spotdrill, ø 8 mm, tip angle 90°, axial
KUGEL_D1	Ball Mill Engraving Ø 1 mm

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## 6. Milling the snowman

The snowman consists of a single part. The front and rear side will be milled.

The blank part is clamped. First the workpiece is face-milled. Then the outer contour is milled, chamfered, and the hole for the suspension is created. If you do not want to anodize the snowman, the face and hands are now engraved. Optionally, you can engrave any Christmas greetings. Various NC programs are available for this purpose. A personal engraving can very easily be created using the engraving cycle. This also provides the option of creating the engraving along a circular path.

The workpiece is re-clamped, the contour is milled on the back, chamfered, and the drill hole is counter-bored. Thus the snowman is finished. To mill the rear side, the snowman should be clamped using soft clamping jaws. To do so, the contour of the snowman has to be milled into the soft jaws. The NC program 04\_SNOWMAN\_CLAMPING.MPF is used for this case. The milling contour in this program is slightly larger to avoid damage to the original contour during clamping. Alternatively, the snowman is fixed on the table using two screws.

Prior to engraving, the snowman can be anodized in any colors. Engraving is then only carried out after completing milling in a new clamping operation. For this reason, the engravings are stored in separate NC programs.

### Note

The values for feeding are entered as R parameters in the NC programs. Therefore you can simply change the value for the R parameters if you want to use different feed values.

```
N0070 R61=1875 ;XY-VORSCHUB
```

```
N0080 R62=938 ;Z-VORSCHUB
```

### Using the DXF reader

With the DXF reader, you can import the contour directly into the contour editor and create the respective programs yourself. The DXF contour is available as a download and is imported into the contour editor (SW4.7 or higher with DXF reader option).

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## Work steps at the milling machine (front page)

1. Approach the reference point of the machine
2. Read-in the NC program 01\_SNOWMAN\_FIRST\_SIDE.MPF
3. Read-in the tool list or zero offsets 01\_SNOWMAN\_FIRST\_SID\_TMZ.INI
4. Measure tools and enter them in the tool list
5. Insert tools in magazine
6. Clamp the workpiece
7. Set tool zero point, by scraping
8. Program of zero offsets
9. Perform simulation
10. Start production, process NC program

## Work steps at the milling machine (engraving front page)

1. Approach the reference point of the machine
2. Read in the NC programs 02\_SNOWMAN\_ENGR\_FIGURE.MPF if only the face, hands and buttons are to be engraved. Alternatively, you can use the two other engravings or a personal engraving.
3. Perform simulation
4. Start production, process NC program

## Work steps at the milling machine (back page)

1. Approach the reference point of the machine
2. Read in the NC program 03\_SNOWMAN\_BACK\_SIDE.MPF
3. Clamp the workpiece
4. Set tool zero point, by scraping
5. Program of zero offsets
6. Perform simulation
7. Start production, process NC program

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## 7. Information on the Internet

### Design of the parts, creation of the drawings, development of the machining plans for machining

TAC Technology and Application Center  
Frauenauracher Str. 80  
91056 Erlangen

### Details of the tool machine and tools to be used

DMG MORI High Speed Cutting precision center  
Internet: [www.dmgmori.com](http://www.dmgmori.com)

### Manuals and information from the Siemens AG

Manuals and detailed information about our products, please visit the following websites:

- DOConWEB ([www.automation.siemens.com/doconweb](http://www.automation.siemens.com/doconweb))
- Service&Support Portal ([www.support.automation.siemens.com](http://www.support.automation.siemens.com))
- SINUMERIK website ([www.siemens.com/sinumerik](http://www.siemens.com/sinumerik))

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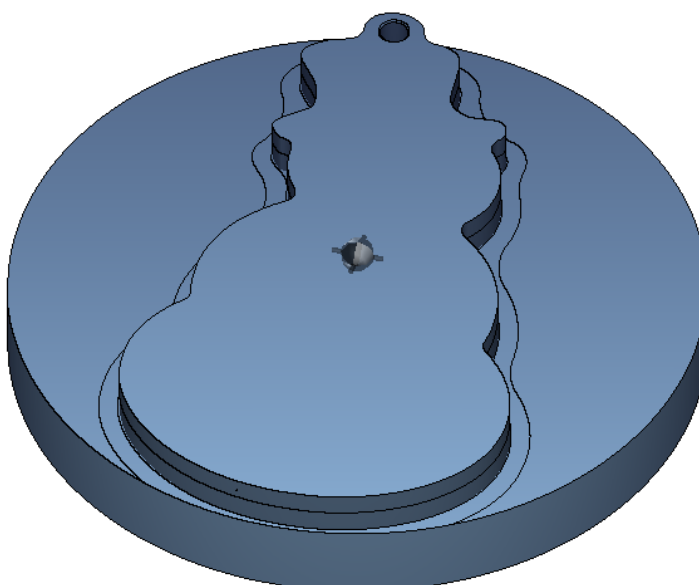
## 8. Pictures


### Simulation front side


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SINUMERIK OPERATE 12/13/16 11:20 AM

NC/WKS/SNOWMAN/01\_SNOWMAN\_FIRST\_SIDE








Top view

3D view


Further views


Details


Program control





X	-3.271	Y	22.392	Z	150.000	A	0.000	T	NC_ANB_D6_90GR	D1
N11000	M30					C	0.000		Rapid trav	100% 00:03:00


 Edit


 Drilling

 Milling

 Cont. mill.

 Vari-ous

 Simu-lation

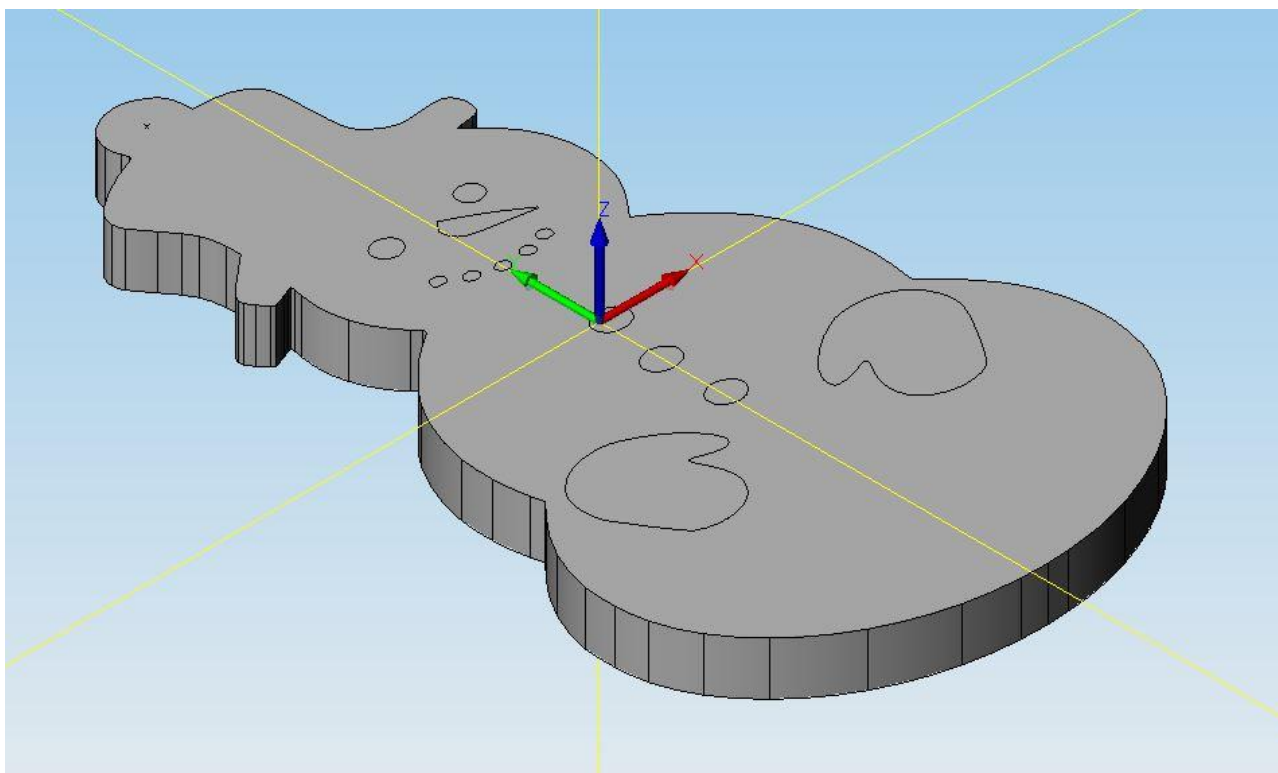
 Ex-ecute

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## Snowman 3D complete with zero point



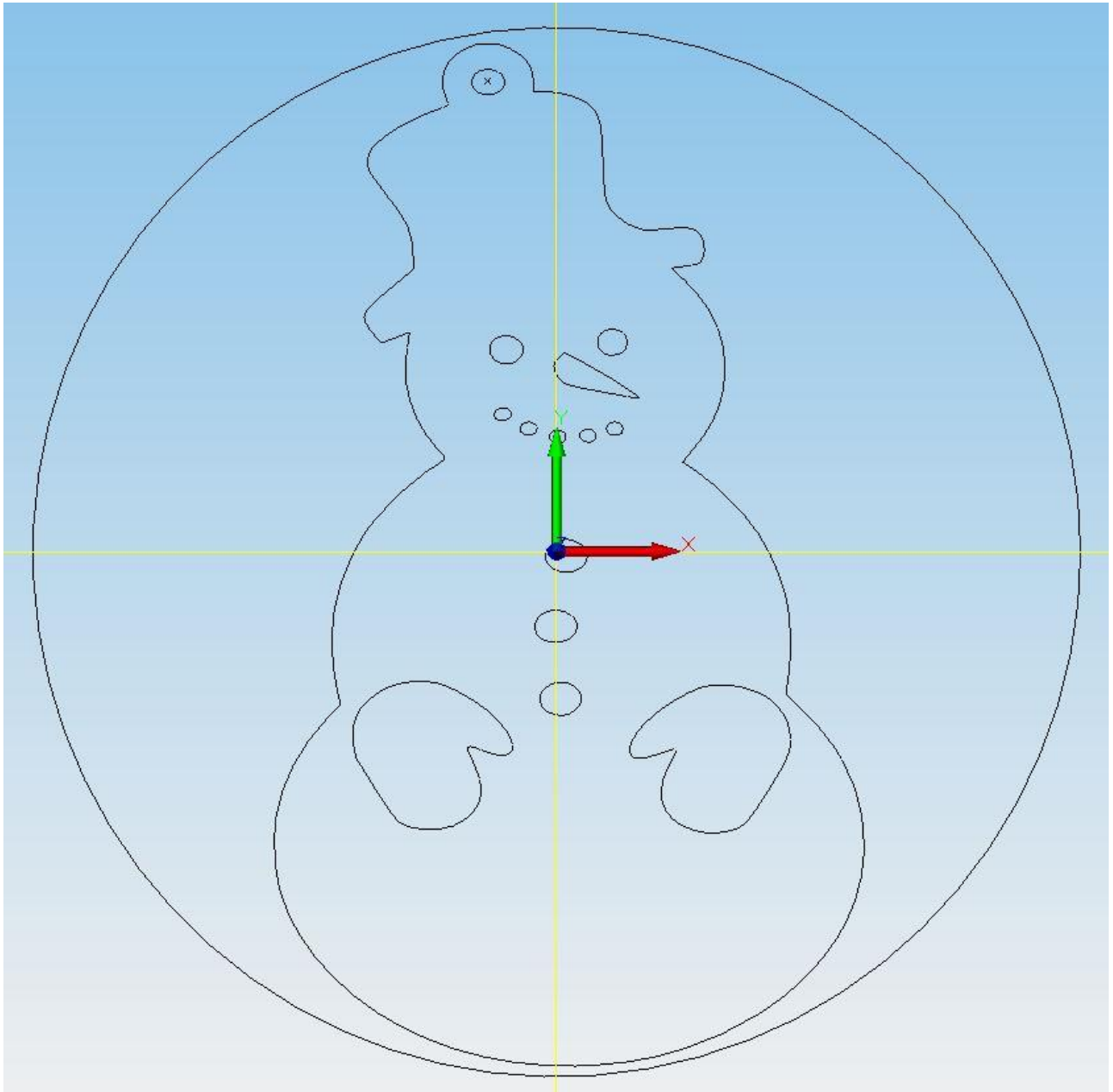
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## Snowman front side with zero point



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## Snowman DXF, contour editor

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NC/WKS/SNOWMAN\_CONT/SNOWMAN\_CONT Starting point

P Y

END

20

10

0

-10

-20

-20 -10 0 10 20 X

SNOW

PL G17 (XY)

Cylinder surf. data No

X 6.437 abs

Y 13.663 abs

Cancel

Accept

Edit Drilling Milling Cont. mill. Various Simulation Execute

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