

# **SINUMERIK live:** DXF application

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Quicker from drawing to component Possibilities and limits

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siemens.com/cnc4you

# **SINUMERIK live** Application technology explained in an easily understandable way



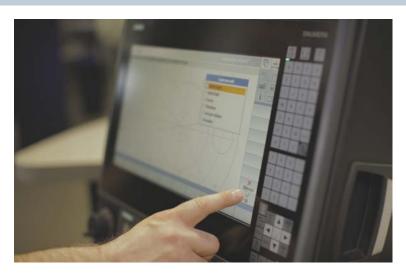


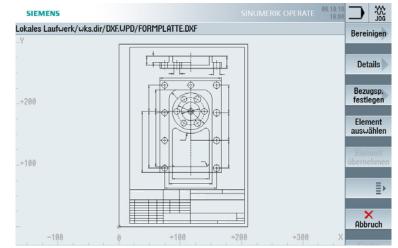
Series of videos with the aim of presenting individual topics on the practical use of SINUMERIK within a short time!

Consists of short slide presentations and practical application!

# DXF application

Quicker from drawing to component – Possibilities and limits





#### **DXF** application SIEMENS Quicker from drawing to component - Possibilities and limits What is DXF? Data format 1.1 Create DXF data 1.2 Readable DXF formats in CNCs 1.3 Why have a DXF reader on the CNC? 2 How does the DXF reader work on SINUMERIK? 3 Practical example 3.1 Functions of the DXF reader on SINUMERIK 3.2 3.3 Application at a glance Possibilities and limits of the SINUMERIK DXF reader 4 4.1 Possibilities 4.2 Limits Summary 5

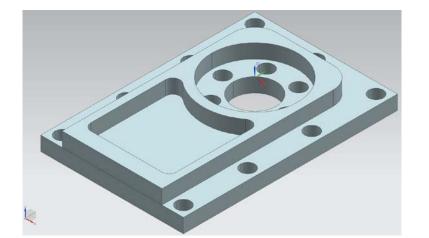
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# 1 What is DXF? Data format

Drawing Interchange File Format <b>(DXF):</b> <b>DXF</b> is a <b>file format</b> specified by Autodesk for <b>CAD data exchange</b> which has been integrated in the <b>CAD</b> program AutoCAD.	Drawing Interchange File Format (DXF): The derivation of the designation DXF from "Data eXchange Format" is admittedly obvious and customary - but incorrect.
<b>DXF as a standard format</b>	<b>DXF as a standard format</b>
This interface has established itself in the <b>CAD</b> market as a	The DXF format was described and openly documented by
quasi data exchange standard, although it was not developed	Autodesk. This documentation was then taken over by other
by Autodesk with that intention.	<b>CAD/CNC/CAM</b> manufacturers as an interface.
<b>DXF as a standard format</b> Each <b>CAD</b> and <b>CAM</b> program manages the import and export of <b>DXF</b> , whereby <b>DXF</b> as an industry standard forms the lowest common denominator of all <b>CAD</b> systems.	<b>DXF as a standard format</b> The <b>DXF</b> format is almost exclusively used for inter-program data exchange - and also between different operating systems.
<b>DXF data:</b>	<b>DXF data:</b>
<b>DXF</b> files are fundamentally dimensionless, so that the user of	All elements that are useful and implementable for technical
an external <b>DX</b> file must know the unit used in the drawing.	drawings are supported in <b>DXF</b> .

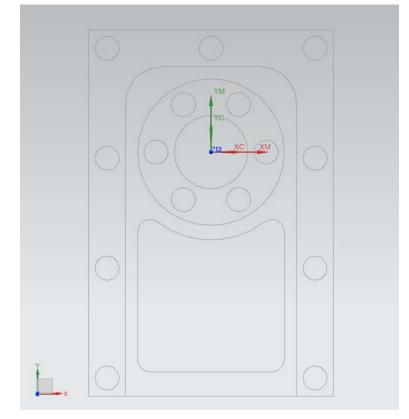
# 1 What is DXF? Creating DXF data





#### Volume model

Converting in DXF



2D model consisting of lines and curves

# **1 What is DXF?** Readable formats of DXF readers in CNCs

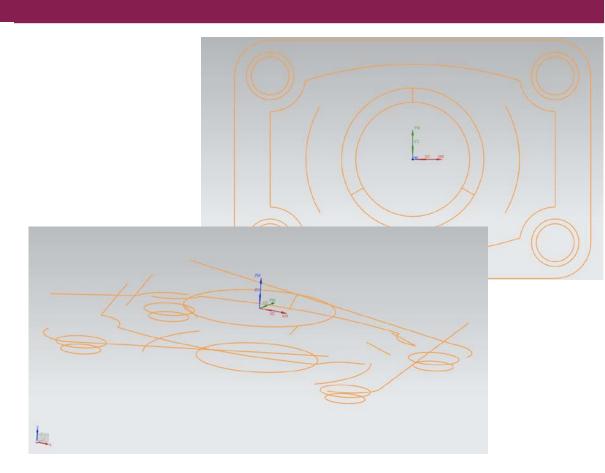
As a rule, DXF readers can read in all 2D geometry elements (points, lines, curves).

#### **Typical limits of DXF readers:**

Not all functions are fully supported by all manufacturers  $\rightarrow$  Data loss during exchange via DXF

#### Examples of non-readable data

- Splines implemented in DXF
- 3D DXF
- DWG
- Diametric and isometric views of DXF



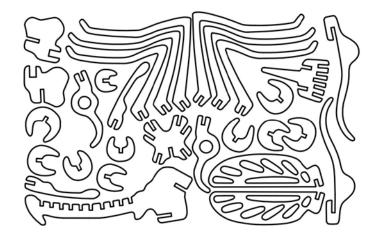
## **SIEMENS**

## 2 Why have a DXF reader on the CNC?

In SINUMERIK/SinuTrain, DXF data is loaded **directly into the control**, so that the turning and milling contours can be created **more quickly and be programmed natively.** 

This new function as from software version 4.7 enables the contour to be generated directly from the DXF data or the G code to be created.

- Complicated calculations of intersections, angles, radius and circle center points are completely eliminated
- DXF data can be used both in ShopMill/ShopTurn as well as in the G code/programGuide
- The time required to read in simple and complex contours is equally short





## **3 How does the DXF reader work on SINUMERIK?** Practical example



DXF reader integrated as a new function as from SW 4.7 - simple (and) practical

# **3 How does the DXF reader work on SINUMERIK?** Functions of the DXF reader on SINUMERIK

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#### **Functions:**

- Checking the drawing
- Checking the component
- Managing layers
- Managing geometric elements
- Reading geometric elements
- Generating a contour
- Transformation into movement commands

# 3 How does the DXF reader work on SINUMERIK?

## Overview of application



#### Contour milling $\rightarrow$ New contour

#### Select "Import from DXF"

#### Select DXF file in the program manager

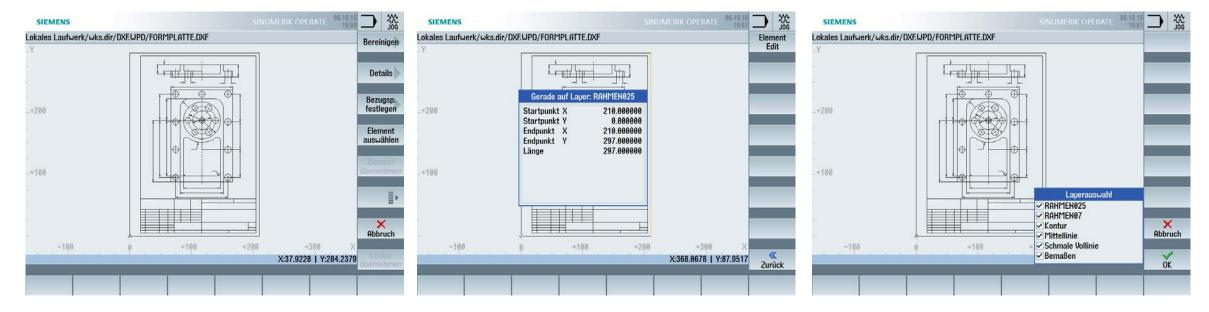
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## **3 How does the DXF reader work on SINUMERIK?** Overview of application

## **SIEMENS**

#### The DXF file is displayed

Checking the layers and geometric properties and completeness of the contour



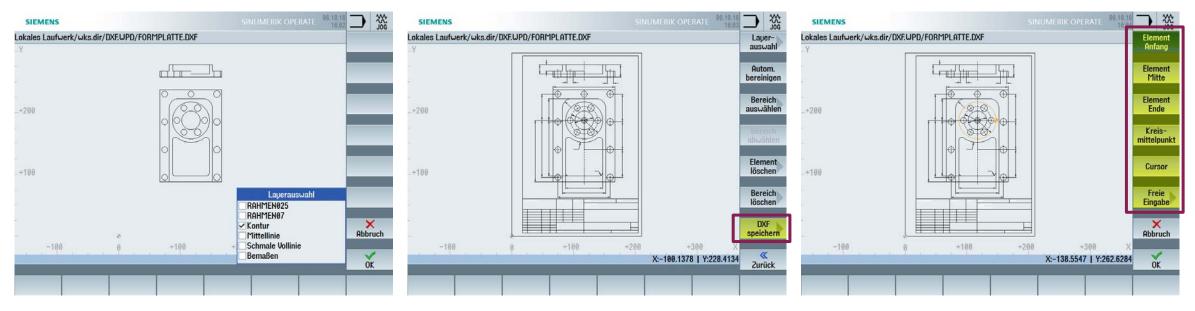
## **3 How does the DXF reader work on SINUMERIK?** Overview of application



Layer: Unnecessary elements can be hidden

If required: The DXF data from the control can be saved

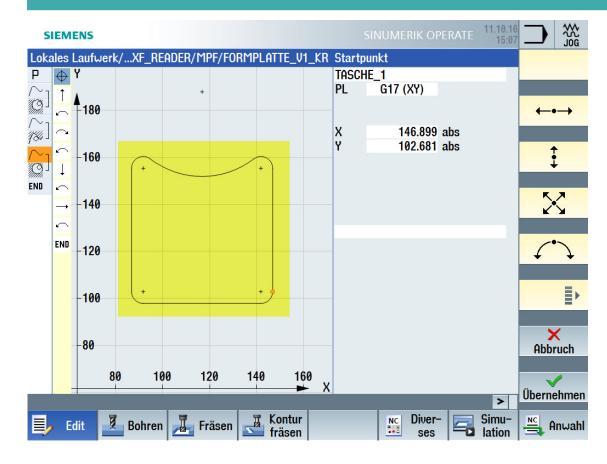
#### If necessary: Specify the zero point



# **4 Possibilities and limits of the SINUMERIK DXF reader** Possibilities

## **SIEMENS**

With ShopMill/ShopTurn, SINUMERIK Operate can output the movement commands to create the contour directly from the DXF data as a programmed contour.



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# **4 Possibilities and limits of the SINUMERIK DXF reader** Possibilities

## **SIEMENS**

With the programGuide, SINUMERIK Operate can output the movement commands to create the contour directly from the DXF data as a G code.

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## **4 Possibilities and limits of the SINUMERIK DXF reader** Limits

Strong dependence on the quality of the DXF file and the design!

"Quick and dirty" conversion to DXF leads to imperfections

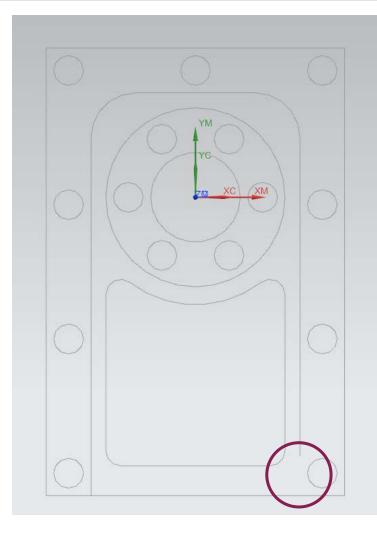
Design-related contour errors

Imperfect designs (contour open/lines do not end at intersections)

Layer not logically assigned (e.g.: dimension lines as contour)

Operating the control directly on the machine

As a rule, there are no input devices directly on the control, such as a PC mouse



### Advantages of the DXF application on SINUMERIK:

- Time saving and process reliability when creating contours
- Job planning on SinuTrain offers the best process reliability and maximum efficiency
- Use is easy (and) practical
- DXF data can be directly (re)worked on the control
- DXF is adequate as a CAD interface, only the really relevant information is read in

#### What have we learned?

- What is DXF?
- What is DXF used for on the CNC?
- How is DXF processed on SINUMERIK?
- What functions does SINUMERIK offer for DXF?

- What limits are set?
- What advantages does the integrated DXF reader offer?

## Thank you for your attention!





**Technology and Application Center Erlangen** 

Video in YouTube: https://www.youtube.com/watch?v=XGXqqJtFYNs&index=2&li st=PL45872A31E6FECBD0

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