



## Spline Standards and Spline Calculator

Software for the design of splines

*pure  
perfection*

**FRENCO**

# General Information

## Spline Standards



Standard-compliant design  
of spline profiles

The right software makes work easier. FRENCO offers two software packages, which assist in handling and designing of splines:

### **Spline Standards and Spline Calculator**

Both programs are briefly introduced here. For further information please contact one of our representatives or Frenco directly:

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**D-90518 Altdorf**

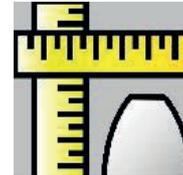
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Please visit our homepage

**[www.frenco.de](http://www.frenco.de)**

where you will find additional information and demo versions on our software packages.

## Spline Calculator



To calculate the spline data and inspection dimensions of spline profiles with involute flanks and serration flanks

## Try the demo version!

**Download unter:**

**<https://www.frenco.de/frenco-software/>**

The number of teeth  $z$  in the demo version can only be prime numbers (3, 7, 11 etc).

# Software Spline Standards

## Design of spline profiles

Data from the following spline standards

**DIN 5480** (Germany)

**ANSI B92.1** (USA)

**ISO 4156** (International)

is included in the Software Spline Standards.

Spline profiles can be designed similar to the standard or manually as required.

## Main menu

Toolbar for a quick access to all functions

Clearly arranged input mask

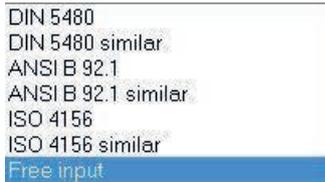
The screenshot shows the 'Spline Standards' software window. The title bar reads 'Spline Standards - [SplineStandards1]'. The menu bar includes 'File', 'Edit', 'View', 'Window', and 'Info'. Below the menu bar is a toolbar with various icons for file operations and settings. The main area is divided into two sections: 'Organizational data' and 'Spline data'. The 'Organizational data' section contains fields for 'Description' (Shaft), 'Design date' (09-04-2013), 'Customer' (XYZ Corp.), 'Drawing number' (12345), 'Source' (ANSI B 92.1), and 'Comment' (External dimensions). The 'Spline data' section includes a 'Kind of spline' dropdown (External spline selected), a 'Standard' dropdown (ANSI B 92.1), and input fields for 'Number of teeth' (14), 'Module' (1.250000), 'Pressure angle' (30), 'Helix angle' (0), and 'Spline length' (25). There are also radio buttons for 'Helix direction' (straight, Left, Right) and buttons for 'Additional data' and 'Create data set'. A status bar at the bottom right shows 'NUM'.

Selection via drop down menu

- DIN 5480
- DIN 5480 similar
- ANSI B 92.1
- ANSI B 92.1 similar
- ISO 4156
- ISO 4156 similar
- Free input

## Manual entry

The manual entry allows for the required spline data to be entered independent of any standard. The tolerances can be in accordance with the standard, as and when required.



A dialog box for manual entry of spline data. It contains the following fields and controls:

- Major diameter DEE:  Tolerance:
- Major form diameter DFE:
- Minor diameter DIE:  Tolerance:
- Calculate... button
- Max effective SV:
- Max actual SMAX:
- Min actual SMIN:
- Calculate... button
- Check button
- Tolerances section:
  - DIN 5480
  - ISO 4156
  - ANSI B 92.1
  - Free input
  - Free Input... button
- Cancel button
- OK button

## Design in accordance with the relevant standard

If a spline is designed in accordance with, e.g. DIN 5480, a simplified dialog box opens.



A simplified dialog box titled 'Pure standard' for design in accordance with the relevant standard. It contains the following fields and controls:

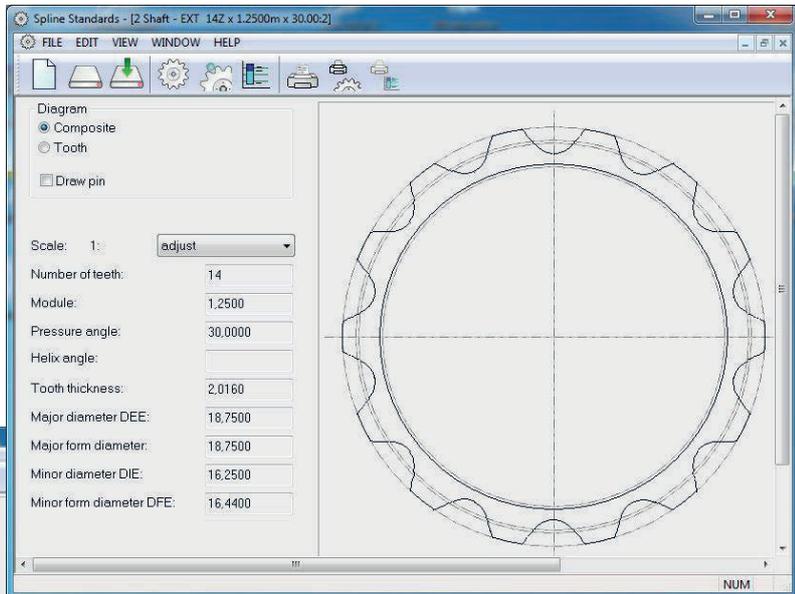
- Tolerance class:
- Tolerance:
- Reference diameter:
- Reference diameter section:
  - 
  -
- Fit section:
  - 
  - 
  -
- Root form section:
  - 
  -
- Cancel button
- OK button

## Generation of data set

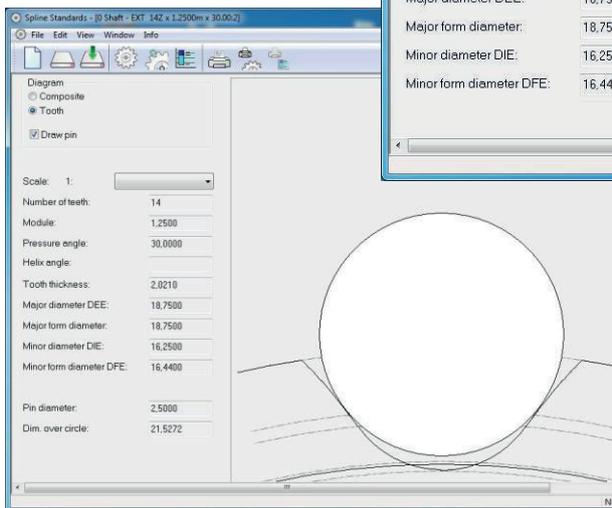
Once the spline data has been entered, a dataset will be created which includes all entered and calculated data.

Spline data			
Kind of spline:	External spline	Major diameter DEE:	18.7500
Number of teeth:	14	Tolerance DEE:	0.0000
Module:	1.250000	Form diameter DFE:	16.4400
Diametral Pitch:	20.320000	Minor diameter DIE:	16.2500
Pressure angle:	30.0000	Tolerance DIE:	0.0000
Pitch circle diameter:	17.5000	Max effective SV:	2.0360
Base circle diameter:	15.1554	Max actual SMAX:	2.0160
Helix angle:	0.0000	Min actual SMIN:	1.9800
Helix direction:	straight	pin/ball DRE:	2.2500
Spline length:	25.0000	theor. MRE EFF:	20.8777
Standard:	DIN 5480 similar	MRE MAX:	20.8479
Reference diameter:	—	MRE MIN:	20.7939
Tolerance class:	9	Tolerance MRE:	0.0540
Tolerance location:	—		
Fit:	Side fit		
Root form:	Flat root		
		Total profile deviation:	19.0
		Lead variation:	13.0
		Runout deviation:	—
		Total pitch deviation:	36.0
		Single index variation:	15.0

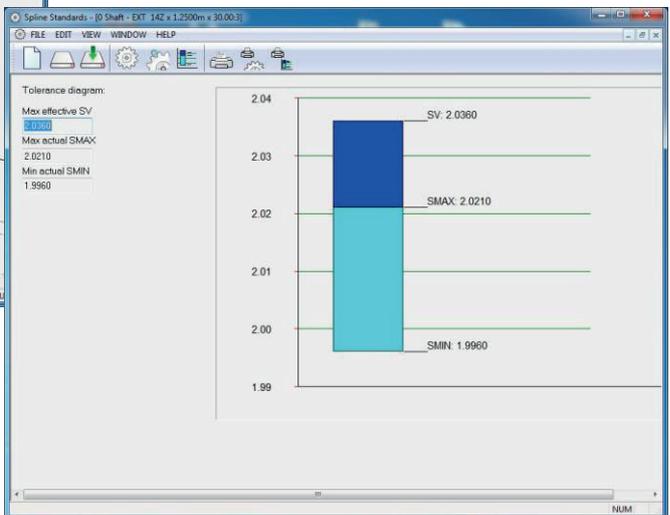
It is also possible to graphically display the entire spline profile...



... the spline shape (with or without measuring circle) ...



... and the tolerance zone.



# Software Spline Calculator

## Calculating the spline data and inspection dimensions

The Spline Calculator software allows for a quick and uncomplicated calculation of the spline data and inspection dimensions of **internal and external...**

### ...cylindrical splines with serrated flanks

The screenshot shows the 'Spline Calculator - [Serration]' window. It features a menu bar (File, Edit, Calculate, View, Window, Info) and a toolbar with various icons. The main area is divided into two columns: 'External spline' and 'Internal spline'. Each column contains a list of parameters with corresponding input fields. The 'External spline' parameters include: Number of teeth, Pitch circle diameter (116.5000), Angle of gap external (67.0000), Angle of gap internal (95.0000), Pin diameter (7.1919), Dim. over ball (127.5069), Tooth thickness (6.2000), Major cross point (128.2399), and Minor cross point (107.2848). The 'Internal spline' parameters include: Number of teeth, Pitch circle diameter, Angle of gap external, Angle of gap internal, Pin diameter, Dim. between balls, Space width, Minor cross point, and Major cross point.

### ...cylindrical splines with involute flanks

The screenshot shows the 'Spline Calculator - [Involute calculation]' window. It features a menu bar (File, Edit, Calculate, View, Window, Info) and a toolbar with various icons. The main area is divided into two columns: 'External spline' and 'Internal spline'. Each column contains a list of parameters with corresponding input fields. The 'External spline' parameters include: Number of teeth (18), Module (1.00000), Pressure angle (30.00000), Helix angle, Tooth thickness (1.5000), Pin diameter (2.0070), Dim. over ball (21.0501), Sugg. number of teeth (2), Span size (4.8576), Profile shift factor x (-0.0613), Profile shift x'm (-0.0613), Pitch circle diameter (18.0000), Base circle dia (15.5885), and Pin contact dia (18.0002). The 'Internal spline' parameters include: Number of teeth (24), Module (1.50000), Pressure angle (20.00000), Helix angle, Space width (4.0000), Pin diameter (8.0700), Dim. between balls (30.6397), Sugg. number of teeth (5), Span size (21.9758), Profile shift factor x (-1.5054), Profile shift x'm (2.2582), Pitch circle diameter (36.0000), Base circle dia (33.8289), and Pin contact dia (26.9972).

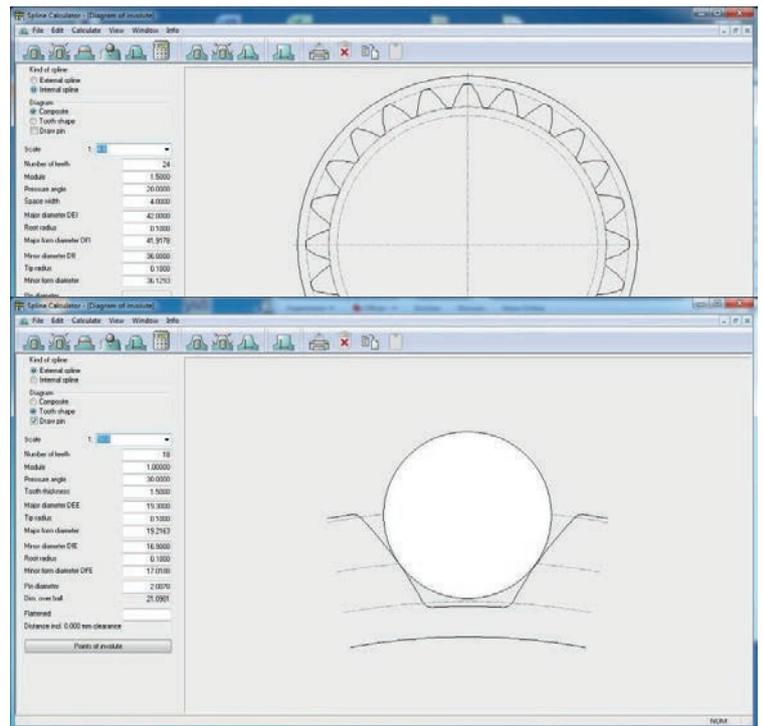
The software can be used to convert inspection dimensions, which may be given in various shapes and forms, into other parameters.

The number of teeth, module, helix and pressure angle parameters are used to automatically calculate all other parameters, which can be subsequently modified, such as dimension over measuring circle, tooth thickness etc.

The gear profile can be displayed, as is the case with the Spline Standards Software, with or without measuring circle. Any required measuring circle flats are calculated automatically.

The Spline Calculator is a hands-on tool to slowly approach the required tooth shape and the most suitable measuring circle. Any modifications are immediately displayed in the diagram.

No.	Left	Right	Number of points
1	1.9793, 17.9559	-1.9792, 17.9559	5
2	1.7968, 18.5567	-1.7967, 18.5567	
3	1.5585, 19.1591	-1.5584, 19.1591	
4	1.2688, 19.7605	-1.2687, 19.7605	
5	0.9303, 20.3588	-0.9302, 20.3588	
6	0.5448, 20.9518	-0.5447, 20.9518	

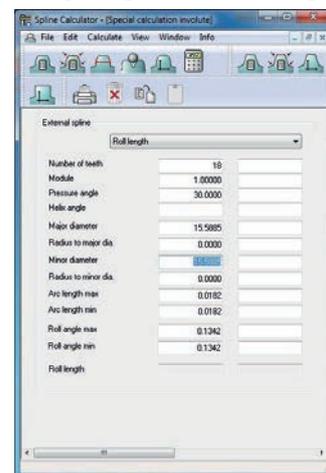
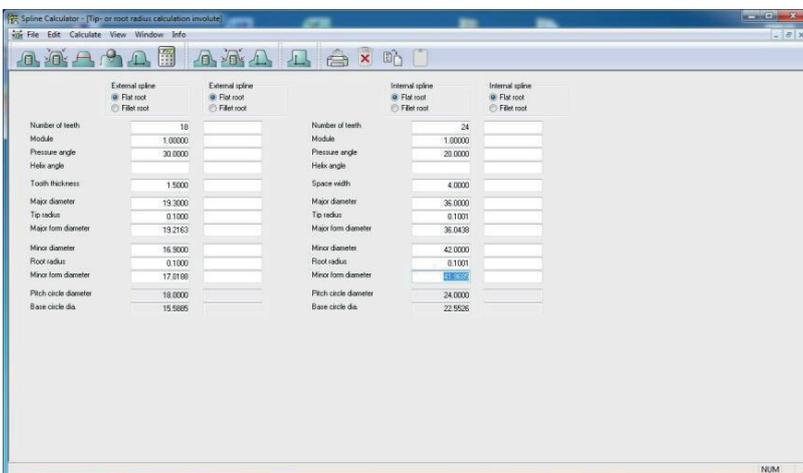


For CAD systems, up to 100 involute points can be calculated for a flank and saved as a text file. This makes it easier to draw up gearing profiles in CAD.

### The Spline Calculator also includes calculation bases ...

... for fillet radii and full fillets

... and special calculations such as rolling lengths and rolling angle.





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