



Software

Spline Standards and Spline Calculation

Straight Involute

Internal: Circle contact diameter
Internal: Circle contact diameter
Span size out of tooth thickness
Tooth thickness out of span size
T.thickness and space width out of profile shift X*M
Profile shift X*M out of t.thickness or space width
Tooth thickness on different diameter
Roll-length of involute

Pin- or ball-diameter

Pitch circle diameter

Base circle diameter

Pin or ball contactdm

External: Dimension over circle

Teeth		45
Module		2.000000
Pressure angle		20.00000
T. thickness		3.12300
Pin- or ball-diameter		3.50000
Pitch circle diameter		90.00000
Base circle diameter		84.57234
Dimension over circle (pin or ball)		94.90971

Tip or root radius

Main menu

Working is much easier by using good software. Frenco supplies 2 software packages:

1. Software Spline Standards

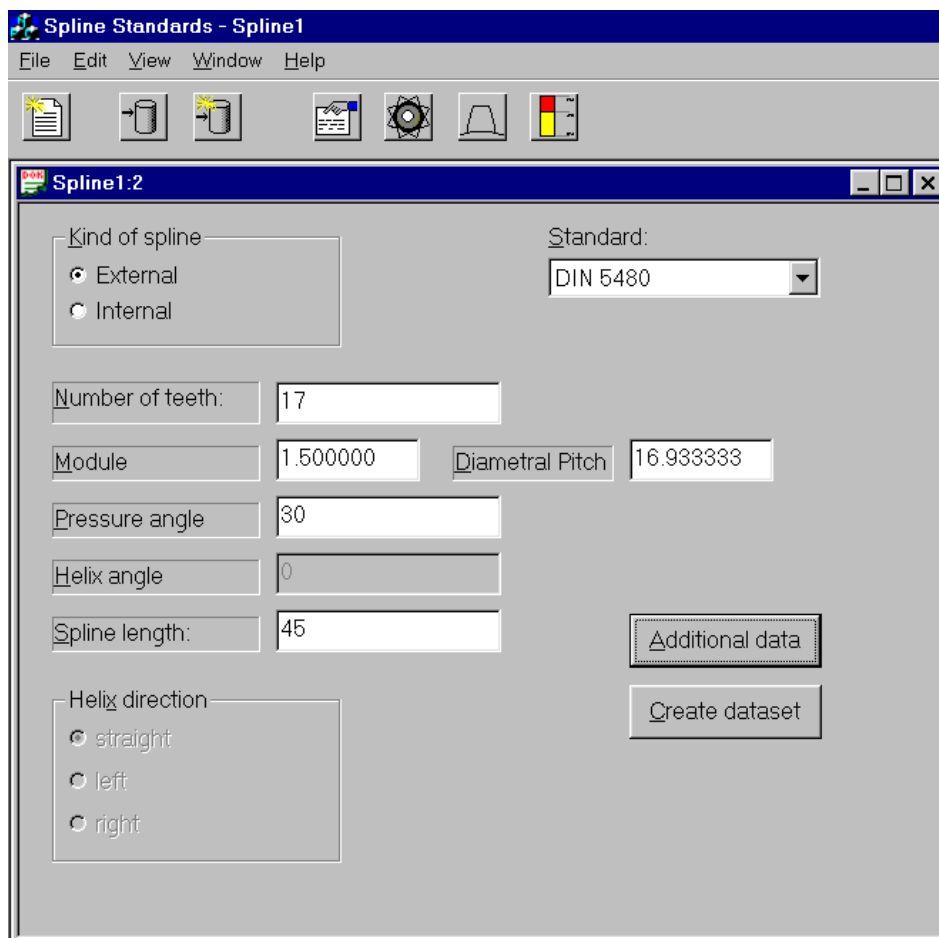
The software „Spline standards“ creates all data of involute splines strictly to standards or similar to standards:

Germany:	DIN 5480
USA:	ANSI B92.1 ans ANS B 92.2
International:	ISO 4156

More informations and a demonstration version for numbers of teeth being a prime number are found in our internet informations www.frenco.de or www.frenco.com. Please follow this direction starting in the homepage:

- Products
- Know How Transfer
- PC-Software

Main menue:



The screenshot shows the 'Spline Standards - Spline1' application window. The menu bar includes 'File', 'Edit', 'View', 'Window', and 'Help'. Below the menu bar is a toolbar with icons for file operations and spline generation. The main window, titled 'Spline1:2', contains the following fields and controls:

- Kind of spline:** Radio buttons for 'External' (selected) and 'Internal'.
- Standard:** A dropdown menu currently set to 'DIN 5480'.
- Number of teeth:** A text input field containing '17'.
- Module:** A text input field containing '1.500000'.
- Diametral Pitch:** A text input field containing '16.933333'.
- Pressure angle:** A text input field containing '30'.
- Helix angle:** A text input field containing '0'.
- Spline length:** A text input field containing '45'.
- Helix direction:** Radio buttons for 'straight' (selected), 'left', and 'right'.
- Buttons:** 'Additional data' and 'Create dataset'.

Input of standard data:

Spline Standards - Spline1
File Edit View Window Help

Kind of spline:
 External
 Internal

Standard: DIN 5480

Number of teeth: 17
 Module: 1.500000
 Pressure angle: 30
 Helix angle: 0
 Spline length: 45

Helix direction:
 straight
 left
 right

Pure standard

Tolerance: g
 Tolerance location: h
 Reference diameter: 28

Reference diameter:

Fit:
 Side fit
 External fit
 Internal fit

Root form:
 Flat root
 Fillet root

OK
Cancel

Calculated spline data of part:

Spline data	
Kind of spline:	External spline
Number of teeth:	17
Module:	1.500000
Diametral Pitch:	16.933333
Pressure angle:	30.0000
Pitch circle diameter:	25.5000
Base circle:	22.0836
Helix angle:	0.0000
Helix direction:	straight
Spline length:	45.0000
Standard:	DIN 5480
Reference diameter:	28
Tolerance class:	g
Tolerance location:	h
Fit:	side fit
Root form:	flat root
Tip diameter DEE :	27.7000
Tolerance DEE :	-0.1300
Form diameter DFE :	24.9400
Root diameter DIE :	24.7000
Tolerance DIE :	-0.6900
max effective SV :	2.8469
max actual SMAX :	2.8239
min actual SMIN :	2.7839
pin/ball DRE :	3.2500
theor. MRE EFF :	31.4982
MRE MAX :	31.4666
MRE MIN :	31.4115
Tolerance MRE :	0.0550
Tolerance stand. :	
Total involute var. :	21.0
Lead variation:	13.0
Runout:	30.0
Total index variation:	40.0
Single index :	17.0

OK
Print
Pin Diameter

2. Software Spline Calculation

The Software „Spline Calculation“ calculates sizes needed for inspection of serration and involute gears and splines spur and helical. A calculation of different weights of cylinders is included for certain purposes. As the data of gears and splines are always given in different ways, this software is able to transfer them into each other and a lot of other calculations.

Detailed informations and a demonstration version for prime numbers of teeth is available in our internet information www.frenco.de or www.frenco.com. Please follow this direction from our homepage:

- Products
- Know How Transfer
- PC-Software

Main menu:



Serration splines:

Serration			Serration		
<input checked="" type="radio"/> Dimension over circle, out of tooth-thickness <input type="radio"/> Dimension between circle, out of space width <input type="radio"/> Tooth thickness, out of dimension over circle <input type="radio"/> Space width, out of dimension between circle			<input type="radio"/> Dimension over circle, out of tooth-thickness <input type="radio"/> Dimension between circle, out of space width <input checked="" type="radio"/> Tooth thickness, out of dimension over circle <input type="radio"/> Space width, out of dimension between circle		
Teeth	<input type="text"/>	55	Teeth	<input type="text"/>	55
Angel of gap external	<input type="text"/>	60,00000	Angel of gap external	<input type="text"/>	60,00000
T. thickness	<input type="text"/>	0,87500	Angel of gap internal	<input type="text"/>	53,45455
Pitch circle diameter	<input type="text"/>	22,80000	Pin- or ball-diameter	<input type="text"/>	0,65000
Pin- or ball-diameter	<input type="text"/>	0,65	Dimension over circle (pin or ball)	<input type="text"/>	23,99635
Angel of gap internal	<input type="text"/>	53,45455	Pitch circle diameter	<input type="text"/>	22,80000
Major cross point	<input type="text"/>	24,52047	Minor cross point	<input type="text"/>	22,05587
Minor cross point	<input type="text"/>	22,05588	Major cross point	<input type="text"/>	24,52047
Dimension over circle (pin or ball)	<input type="text"/>	23,99635	T. thickness	<input type="text"/>	0,87500
<input type="button" value="Main menu"/>					

Spur gears and involute splines:

Straight Involute			Straight Involute		
Internal: Circle contact diameter Internal: Dimension between circle Internal: Space width Internal: Circle contact diameter Span size out of tooth thickness Tooth thickness out of span size T.thickness and space width out of profile shift X*M Profile shift X*M out of t.thickness or space width Tooth thickness on different diameter Pin- or ball-diameter			External: Dimension over circle Teeth <input type="text"/> 45 Module <input type="text"/> 2,000000 Pressure angle <input type="text"/> 20,00000 T. thickness <input type="text"/> 3,12300 Pin- or ball-diameter <input type="text"/> 3,50000 Pitch circle diameter <input type="text"/> 90,00000 Base circle diameter <input type="text"/> 84,57234 Dimension over circle (pin or ball) <input type="text"/> 94,90971		
Pitch circle diameter	<input type="text"/>		Pitch circle diameter	<input type="text"/>	90,00000
Base circle diameter	<input type="text"/>		Base circle diameter	<input type="text"/>	84,57234
Pin or ball contactdm	<input type="text"/>		Dimension over circle (pin or ball)	<input type="text"/>	94,90971
<input type="button" value="Tip or root radius"/> <input type="button" value="Main menu"/>					

Calculation of radiis at major and minor diameter:

The screenshot shows the 'Tip or root radius' software interface. It is divided into two main sections. The left section has radio buttons for 'Internal' and 'External' (selected), and 'Flat root' and 'Fillet root' (selected). Below these are radio buttons for 'Root-radius and root-diameter out of form-diameter' (selected). The right section has radio buttons for 'Internal' and 'External' (selected), and 'Flat root' and 'Fillet root' (selected). Below these are radio buttons for 'Form-diameter, out of root-radius and root-diameter' (selected). A dropdown menu is open, showing options: 'Form-diameter, out of root-radius and root-diameter', 'Form-diameter, out of tip-radius and tip-diameter', 'Root-radius, out of root-diameter and form-diameter', 'Tip-radius, out of tip-diameter and form-diameter', 'Root-diameter, out of form-diameter and root-radius', and 'Tip-diameter, out of form-diameter and tip-radius'. The left section contains input fields for: Teeth (45), Module (2,000000), Pressure angle (20,00000), T. thickness (3,14700), Form-diameter (85,20000), Root-radius (0,88396), and Root-diameter (83,66430). The right section contains input fields for: T. thickness, Root-radius, Root-diameter, and Form-diameter. A 'Back' button is at the bottom right.

Helical gears and involute splines:

The screenshot shows the 'Helix Involute' software interface. It has two main sections. The left section has a dropdown menu for 'Internal: Dimension between circle' (selected). The right section has a dropdown menu for 'External: Dimension over circle' (selected). A dropdown menu is open, showing options: 'External: Dimension over circle', 'External: Tooth thickness', 'Internal: Dimension between circle', 'Internal: Space width', 'Span size out of tooth thickness', 'Tooth thickness out of span size', 'Tooth thickness and space width out of profilshift X*M', and 'Profilshift X*M out of tooth thickness or space width'. The left section contains input fields for: Teeth (33), Module (1,890000), Pressure angle (15,00000), Helix angle (24,48700), Space width (2,94500), Pin- or ball-diameter (3,00000), Pitch circle diameter (68,53429), Base circle diameter (65,74384), and Dimension between circle (pin or ball) (64,82146). The right section contains input fields for: T. thickness, Pin- or ball-diameter, Pitch circle diameter, Base circle diameter, and Dimension over circle (pin or ball). A 'Main menu' button is at the bottom right.

FRENCO Product Lines



Gear and spline high precision

Spline gages
Master gears, master wheels
Artefacts, masters
Profiled tools
Clamping systems
Gear and spline manufacturing



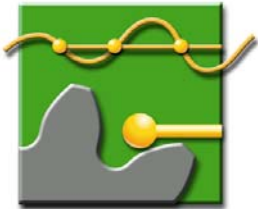
Instruments for size inspection series V

Ball inserts and pins VRK
Instruments for rocking VA
Instruments with face stop VP
Indicating Gages VM
Variable 3-disc gages VD
Customized solutions VS



Rotation measuring systems

URM - K with balls and pins
URM - R with master wheels
EWP Single flank gear rolling
WS Gear rollscan
ZWP Double flank gear rolling



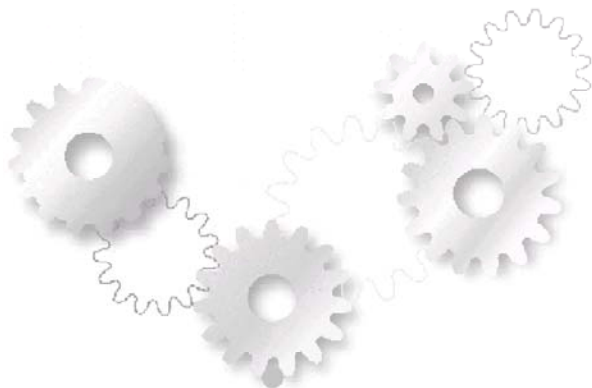
Gear and spline inspection

DKD gear calibration
Gage wear inspection
Part inspections
Deviation analysis



Know-how transfer

Software for gear and spline calculating
Training, seminars and workshops
Consulting and calculations
Literature and documents
National and international standards



pure
perfection

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gear + spline technology

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