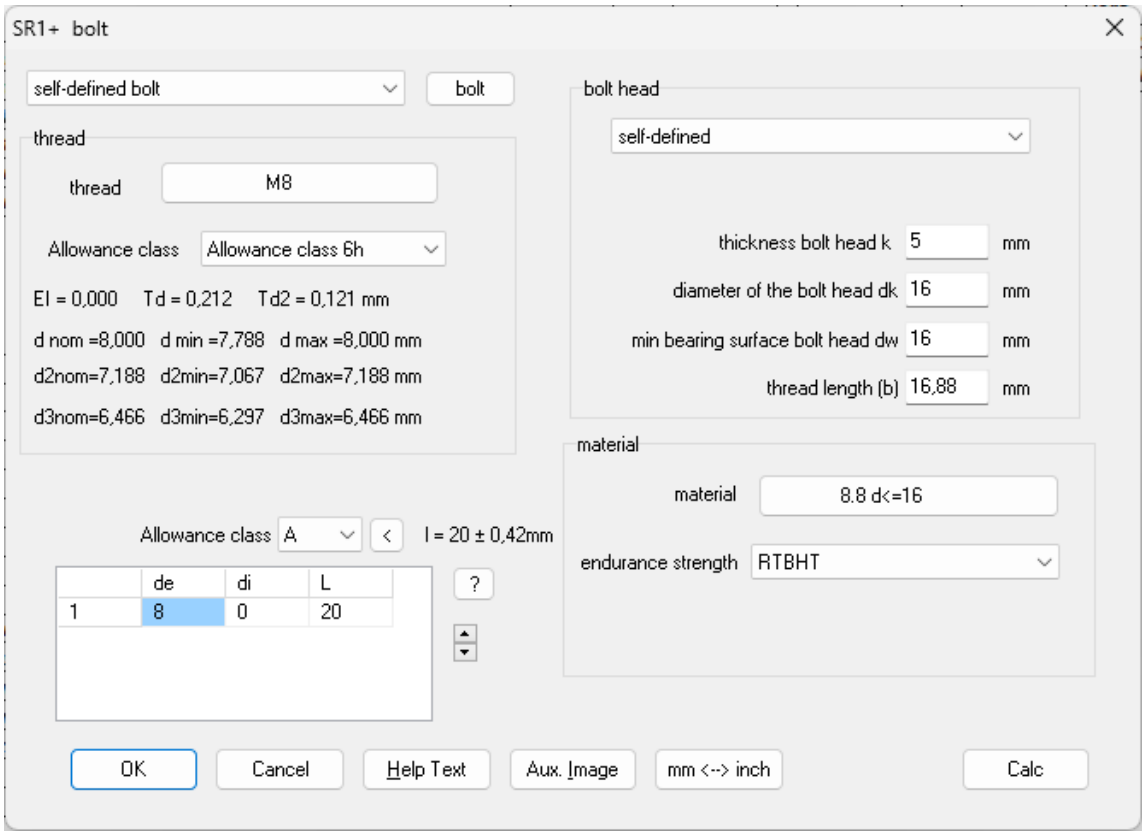
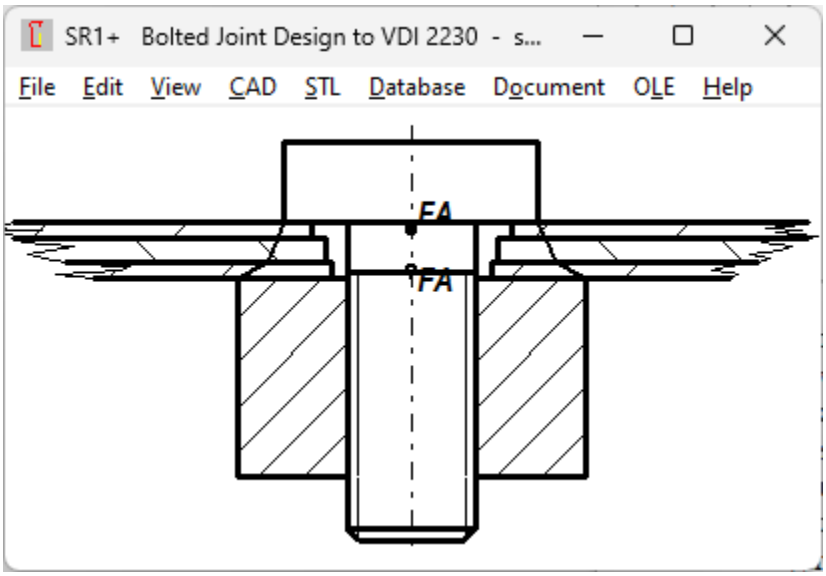
by Fritz Ruoss

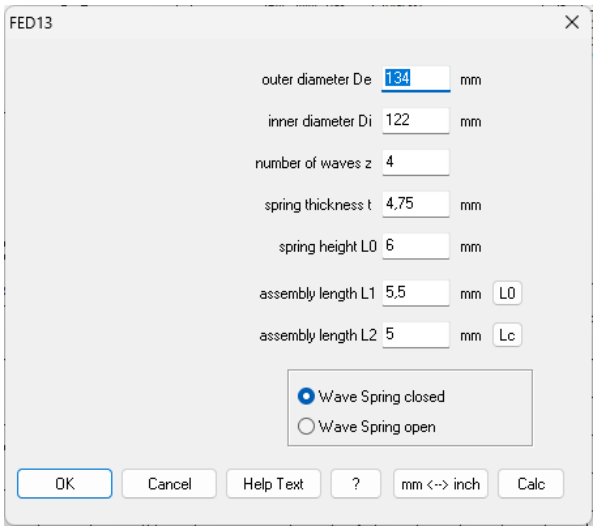
SR1, SR1+: Input self-defined screw head without sondkopf database

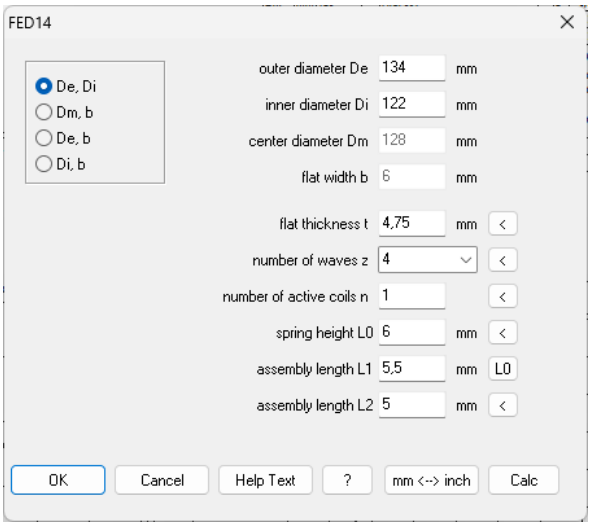


For screws with a special head with a larger head diameter dK or head support diameter dw, the new screw head had to be added to the database file SONDKOPF.DBF. This can be quite cumbersome, for example with a network version if you do not have authorization to change databases. Therefore, there is now a new, simple round screw head "self-defined" with input of head diameter dK, support diameter dw and head height k. Incidentally, the strength of the screw head is not checked by SR1+ and VDI 2230, please note this for special heads with a large diameter and low height.

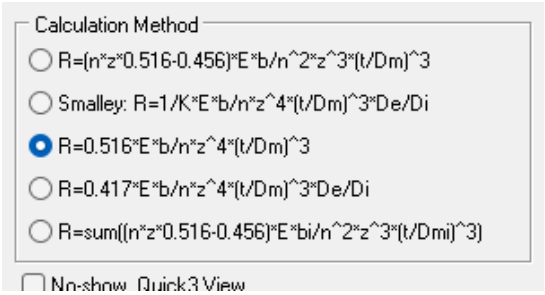


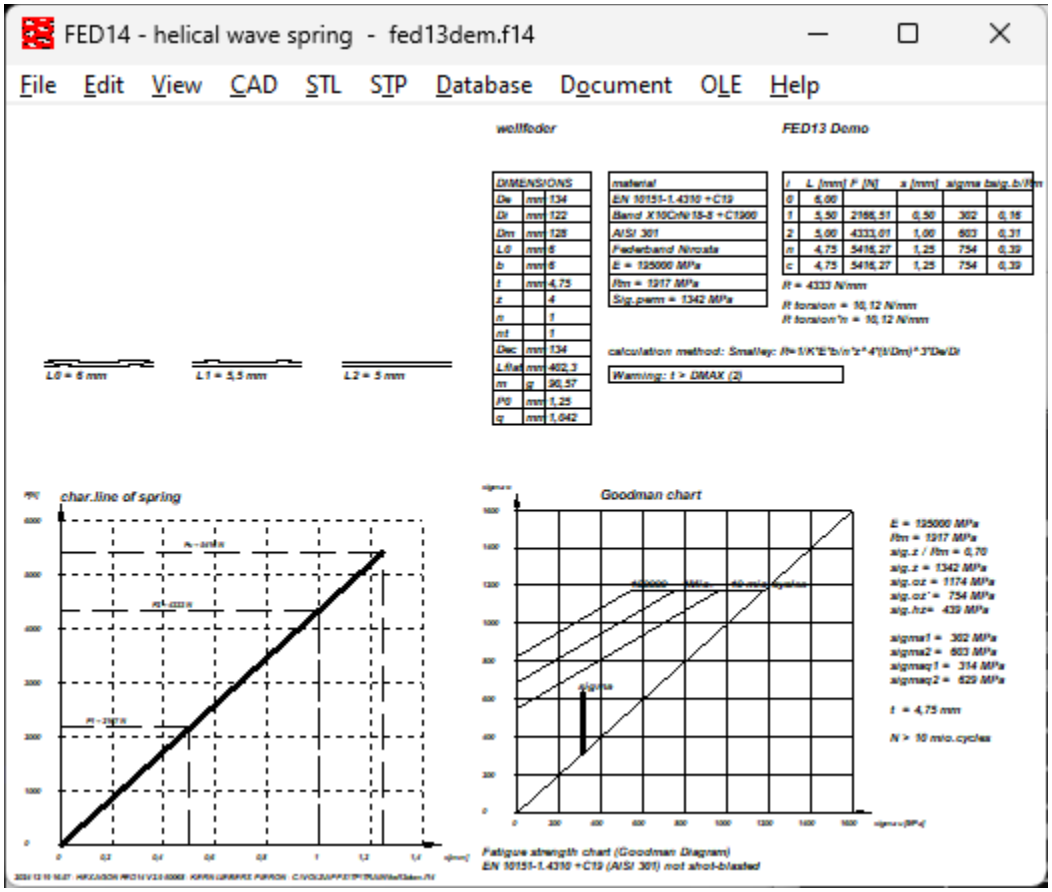
Calculate wave spring washers by means of FED14





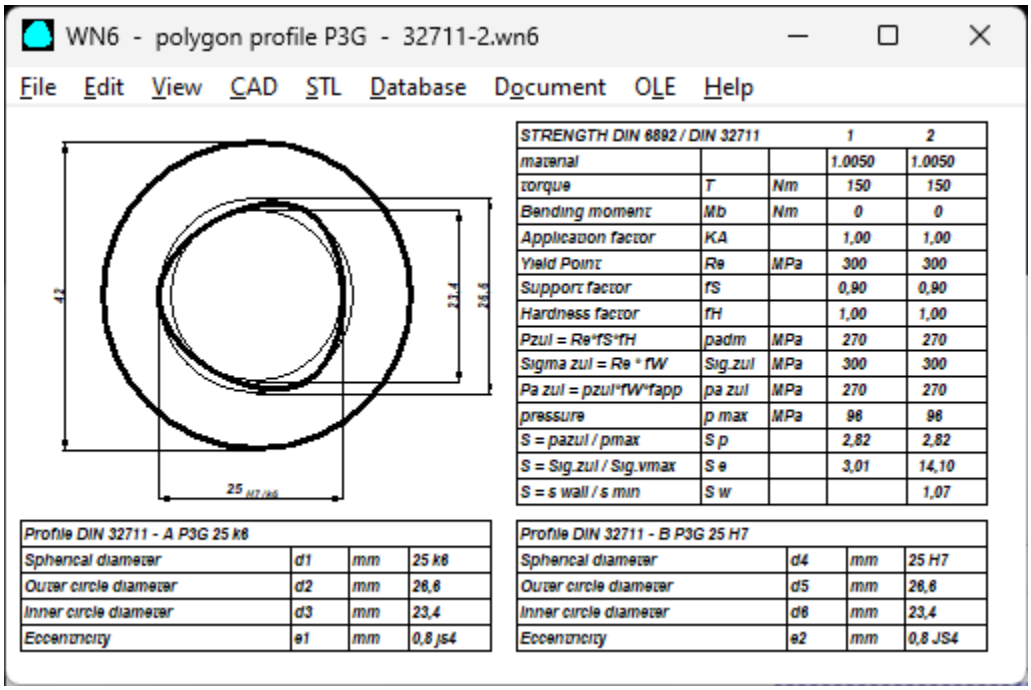
A customer has discovered that he can calculate wave spring washers using FED14 instead of FED13. For open wave spring washers, similar values are obtained using FED14 calculation method 2 (Smalley), and for closed wave spring washers using calculation method 3 (R=0.516 E*b/n…..)





FAQ: WN6 or WN13, WN7 or WN14?

WN6 and WN7 have been available since 2002. WN6 is used to calculate P3G polygon profiles according to DIN 32711. WN7 calculates P4C polygon profiles according to DIN 32712.

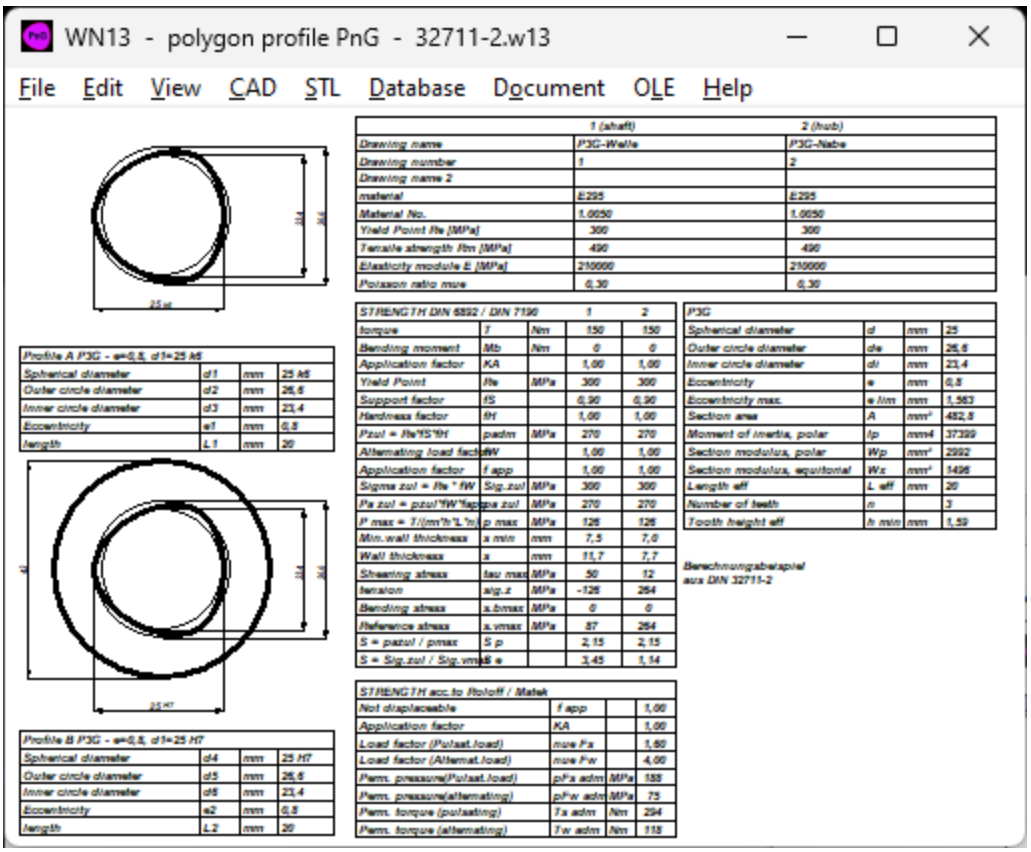


STRENGTH DIN 6892 / DIN 32711			1	2
material			1.0050	1.0050
torque	T	Nm	150	150
Bending moment	Mb	Nm	0	0
Application factor	KA		1,00	1,00
Yield Point	Re	MPa	300	300
Support factor	fS		0,90	0,90
Hardness factor	fH		1,00	1,00
Pzul = Re*fS*fH	padm	MPa	270	270
Sigma zul = Re * fW	Sig.zul	MPa	300	300
Pa zul = pzul*fW*fapp	pa zul	MPa	270	270
pressure	p max	MPa	96	96
S = pazul / pmax	S p		2,82	2,82
S = Sig.zul / Sig.vmax	S e		3,01	14,10
S = s wall / s min	S w			1,07

Profile DIN 32711 - A P3G 25 k8			
Spherical diameter	d1	mm	25 k6
Outer circle diameter	d2	mm	26,6
Inner circle diameter	d3	mm	23,4
Eccentricity	e1	mm	0,8 js4

Profile DIN 32711 - B P3G 25 H7			
Spherical diameter	d4	mm	25 H7
Outer circle diameter	d5	mm	26,6
Inner circle diameter	d6	mm	23,4
Eccentricity	e2	mm	0,8 JS4

WN13 and WN14 have been available since 2020. WN13 is used to calculate PnG polygon profiles. This also includes P3G profiles according to DIN 32711, WN13 also calculates polygons with 2,4,5,n corners.



	1 (shaft)	2 (hub)
Drawing name	P3G-Welle	P3G-Nabe
Drawing number	1	2
Drawing name 2		
material	E295	E295
Material No.	1.0050	1.0050
Yield Point Re [MPa]	300	300
Tensile strength Rm [MPa]	490	490
Elasticity module E [MPa]	210000	210000
Poisson ratio mue	0,30	0,30

STRENGTH DIN 6892 / DIN 7190			1	2
torque	T	Nm	150	150
Bending moment	Mb	Nm	0	0
Application factor	KA		1,00	1,00
Yield Point	Re	MPa	300	300
Support factor	fS		0,90	0,90
Hardness factor	fH		1,00	1,00
Pzul = Re*fS*fH	padm	MPa	270	270
Alternating load factor	fW		1,00	1,00
Application factor	f app		1,00	1,00
Sigma zul = Re * fW	Sig.zul	MPa	300	300
Pa zul = pzul*fW*fapp	pa zul	MPa	270	270
P max = T/(m*h*L*n)	p max	MPa	126	126
Min.wall thickness	s min	mm	7,5	7,0
Wall thickness	s	mm	11,7	7,7
Shearing stress	tau max	MPa	50	12
tension	sig.z	MPa	-126	264
Bending stress	s.bmax	MPa	0	0
Reference stress	s.vmax	MPa	87	264
S = pazul / pmax	S p		2,15	2,15
S = Sig.zul / Sig.vmax	S e		3,45	1,14

P3G			
Spherical diameter	d	mm	25
Outer circle diameter	da	mm	26,6
Inner circle diameter	di	mm	23,4
Eccentricity	e	mm	0,8
Eccentricity max.	e lim	mm	1,563
Section area	A	mm²	482,8
Moment of inertia, polar	Ip	mm4	37399
Section modulus, polar	Wp	mm³	2992
Section modulus, equitorial	Wx	mm³	1496
Length eff	L eff	mm	20
Number of teeth	n		3
Tooth height eff	h min	mm	1,59

Berechnungsbeispiel aus DIN 32711-2

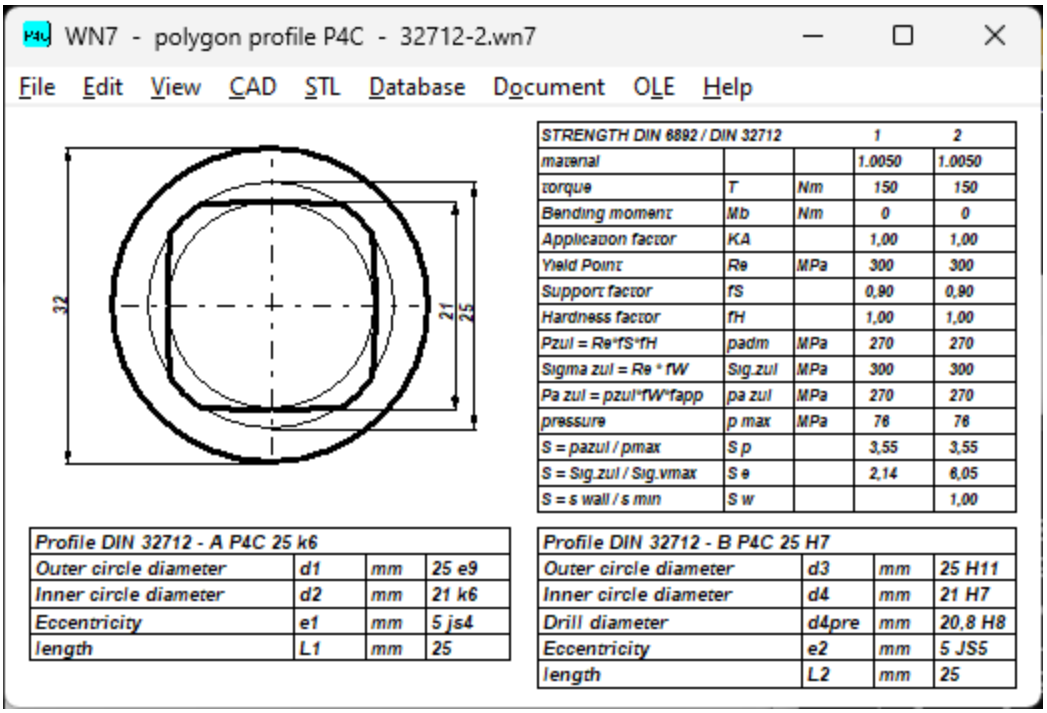
STRENGTH acc.to Roloff / Matek			
Not displaceable	f app		1,00
Application factor	KA		1,00
Load factor (Pulsat.load)	mue Fs		1,50
Load factor (Alternat.load)	mue Fw		4,00
Perm. pressure(Pulsat.load)	pFs adm	MPa	155
Perm. pressure(alternating)	pFw adm	MPa	75
Perm. torque (pulsating)	Ts adm	Nm	294
Perm. torque (alternating)	Tw adm	Nm	118

Profile A P3G - e=0,8, d1=25 k6			
Spherical diameter	d1	mm	25 k6
Outer circle diameter	d2	mm	26,6
Inner circle diameter	d3	mm	23,4
Eccentricity	e1	mm	0,8
length	L1	mm	20

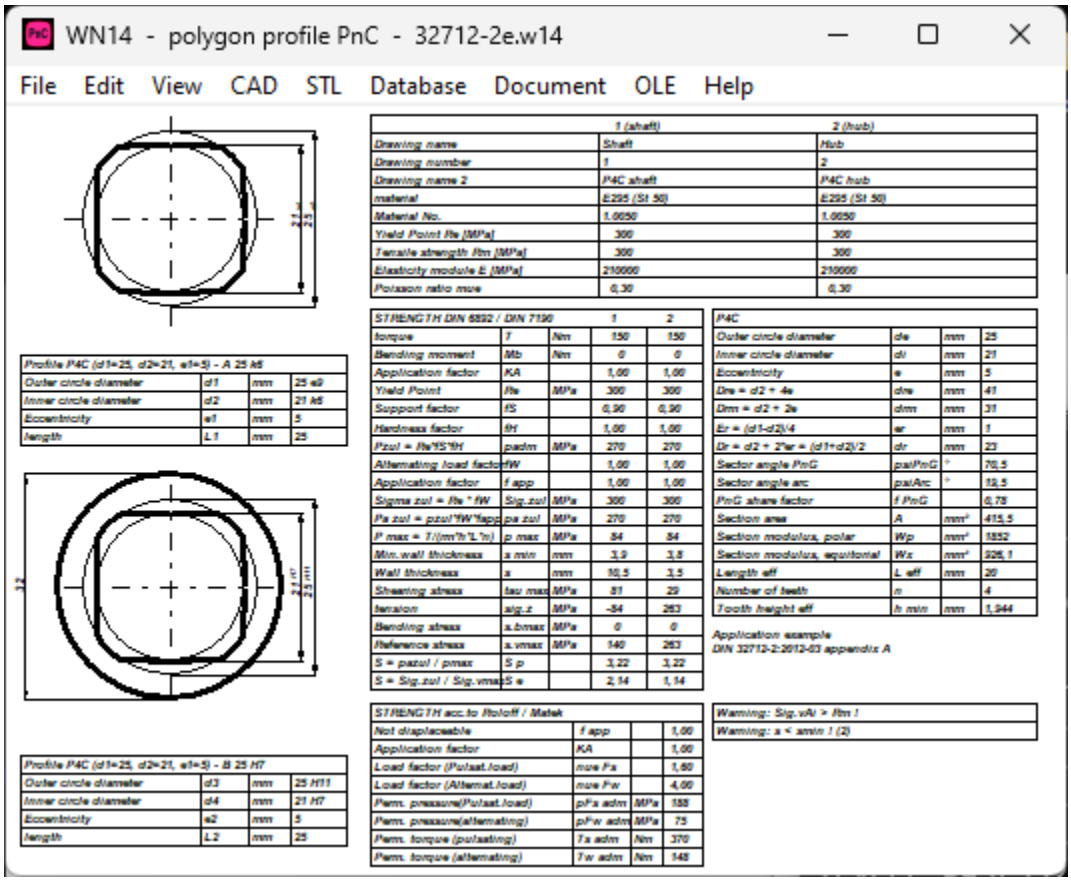
Profile B P3G - e=0,8, d1=25 H7			
Spherical diameter	d4	mm	25 H7
Outer circle diameter	d5	mm	26,6
Inner circle diameter	d6	mm	23,4
Eccentricity	e2	mm	0,8
length	L2	mm	20

WN14 calculates PnC polygon profiles, which also includes P4C profiles according to DIN 32712. Therefore, you do not necessarily need WN6 and WN7 if you have WN13 and WN14.

However, in WN13 and WN14 the strength is not calculated according to DIN 32711 or DIN 32712, but according to DIN 7190 for interference fits and general formulas of strength of materials.



In WN6 and WN7, a minimum wall thickness of the hub is calculated in accordance with DIN 32711 and 32712, in WN13 and WN14 a tensile stress is calculated instead and, together with torsional stress and bending stress, a comparative stress. These formulas apply not only to P3G and P4C, but to any number of teeth, see Info Letter 183.
https://www.hexagon.de/info183/index_d.htm



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