

WN14



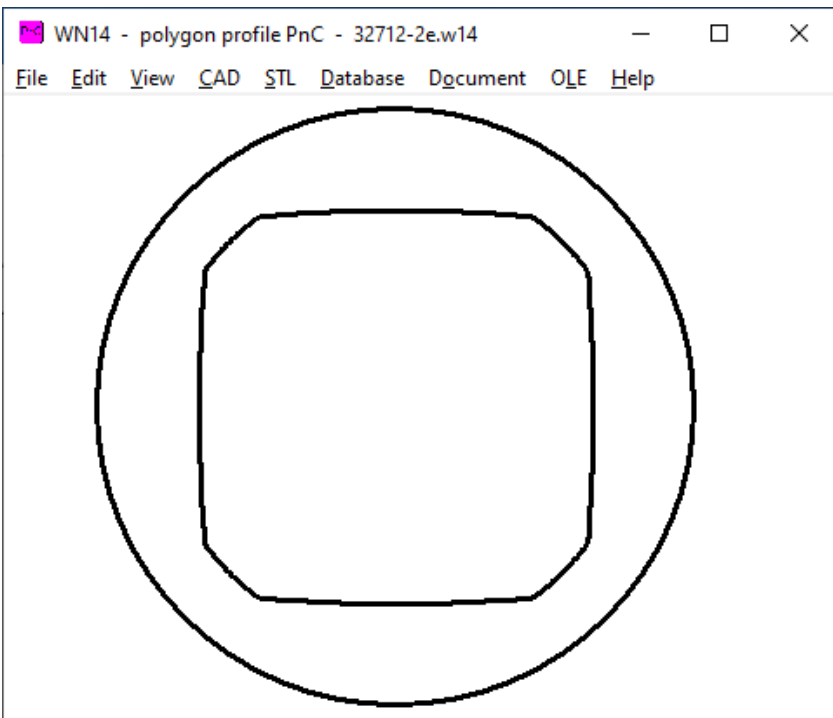
www.hexagon.de

Software for Polygon Profiles

PnC (incl. P4C)

for Windows

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WN14 - polygon profile PnC - 32712-2e.w14

File Edit View CAD STL Database Document OLE Help

1 (shaft)		2 (hub)	
Drawing name	Shaft	Hub	
Drawing number	1	2	
Drawing name 2	P4C shaft	P4C hub	
material	6295 (St 30)	6295 (St 30)	
material No.	1.0050	1.0050	
Yield Point Re (MPa)	300	300	
Tensile strength Rm (MPa)	300	300	
Elasticity module E (MPa)	210000	210000	
Poisson ratio nu	0.30	0.30	

STRENGTH DIN 8582 / DIN 32712		1		2		P4C	
torque	T	Nm	150	150	outer circle diameter	d1e	mm 25
bending moment	Mb	Nm	0	0	inner circle diameter	d1i	mm 21
application factor	KA		1,00	1,00	eccentricity	e	mm 5
Yield Point	Re	MPa	300	300	d1e = d2 + 4e	d1e	mm 41
support factor	KS		0,30	0,30	d1e = d2 + 2e	d1e	mm 37
Hardness factor	HR		1,00	1,00	er = (d1-d2)/4	er	mm 1
p = 7/(mm ^{3/2} ·h)	p	max	84	84	dr = d2 + 2·er = (d1+d2)/2	dr	mm 23
alternating load factor	kAW		1,00	1,00	sector angle PnG	prvPnG	° 70,5
application factor	f app		1,00	1,00	sector angle arc	prvArc	° 13,5
Sigma zul = Re * fAW	Sig.zul	MPa	300	300	PnG share factor	f PnG	6,78
pa zul = p·zul·Yw	pa zul	MPa	270	270	section area	A	mm ² 415,5
Min. wall thickness	s min	mm	3,9	3,9	section modulus, polar	Wp	mm ³ 1852
wall thickness	s	mm	10,5	10,5	section modulus, equiform	Ws	mm ³ 326,1
shearing stress	tau max	MPa	21	29	length eff	L eff	mm 26
bending stress	sigma 2	MPa	-34	283	number of teeth	z	4
bending stress	sigma max	MPa	0	0	tooth height eff	h min	mm 1,944
reference stress	s.vmax	MPa	140	283	Application example DIN 32712-2:2012-03 appendix A		
S = pa zul / pmax	S p		3,22	3,22	Warning: Sig.zul > Re /		
S = Sig.zul / Sig.vmax	S v		2,14	1,14	Warning: s < smin / 2		

STRENGTH acc.to ASME / ASAS		1 / app <th colspan="2">2 / app </th>		2 / app	
not displacable	f app		1,00	1,00	
application factor	KA		1,00	1,00	
load factor (Point load)	kv		1,00	1,00	
load factor (Alternat. load)	kv		1,00	1,00	
Perm. pressure(Point load)	pPv adm	MPa	135	135	
Perm. pressure(alternating)	pPv adm	MPa	75	75	
Perm. torque (point load)	Tv adm	Nm	370	370	
Perm. torque (alternating)	Tv adm	Nm	145	145	

PnC Calculation

WN14 calculates dimensions, tolerances, stress and safety factors for PnC polygon profiles, inclusive P4C according to DIN 32712. Polygon trochoide profiles with other number of teeth (P2C, P3C, P5C, P6C) can also be calculated.

P4C sizes according to DIN 32712 (size 14 mm to 180 mm) can be selected from database. The database may be extended by the user.

WN14 Dimensions

P4C

Database DIN 32712

self-defined

Dimensions PnC

number of teeth n 4

outer circle diameter (d1,d3) 25 mm

inner circle diameter (d2,d4) 21 mm

eccentricity (e1,e2) 5 mm

ISO tolerance d1 e9

ISO tolerance d2 k6

ISO tolerance d3 H11

ISO tolerance d4 H7

Seam length l 20 mm

length shaft l1 25 mm

length hub l2 25 mm

Borehole shaft dB1 0 mm

Outer diameter hub dB2 32 mm

OK Cancel ? mm <-> inch Calc

Pre-Dimensioning

Enter torque, select material and application: WN14 calculates minimum size required for a PnC shaft-hub joint.

WN14

torque T 150 Nm

bending moment Mb 0 Nm

application coefficient KA 1 KA ?

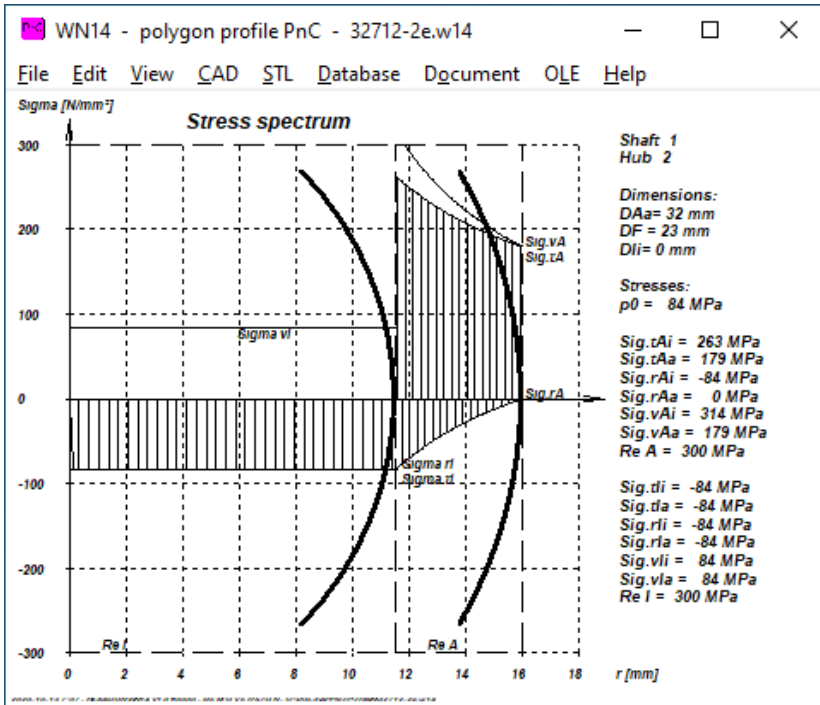
load alternating coeff. fW 1 fW ?

application

shaft-hub joint not displaceable

unloaded displaceable hub

OK Cancel ? Nm <-> lbf·in Calc



Strength Calculation

WN14 calculates pressure, tension, torsional stress, bending stress, and equivalent stress according to DIN 6892 (pressure) and DIN 7190 (stress spectrum).

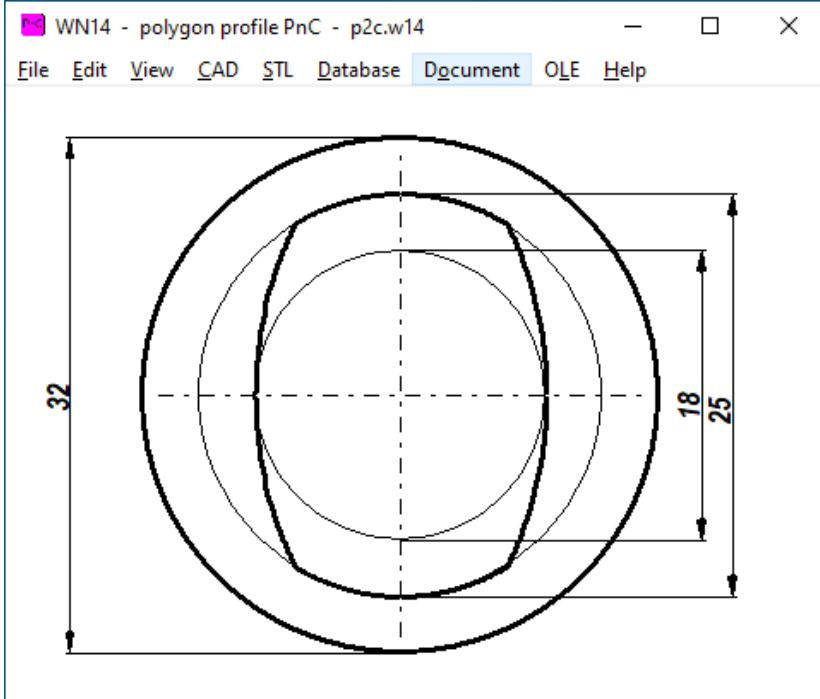
Material Database

Materials for shaft and hub can be selected from the integrated material database with 900 steel and non-iron materials.

material shaft

File View Help

IDENT	MATERIAL	MAT_NR	NR	RM	RE	E_MODUL	AS
1.0050	E295 (St 50)	1.0050	1	490	295	210000	
1.0060	E335 (St 60)	1.0060	1	590	335	210000	
1.0070	E360 (St 70)	1.0070	1	690	360	210000	
1.0112	P235S	1.0112	1	360	235	210000	
1.0114	S235J0	1.0114	1	360	235	210000	
1.0116	S235J2G3	1.0116	1	360	235	210000	
1.0117	S235J2	1.0117	1	360	235	210000	
1.0130	P265S	1.0130	1	400	265	210000	
1.0143	S275J0	1.0143	1	430	275	210000	
1.0144	S275J2G3 (St 44-3)	1.0144	1	430	275	210000	
1.0145	Fe 430 D 2	1.0145	1	430	275	210000	
1.0149	S275J0H (ReSt44-3)	1.0149	1	430	275	210000	
1.0226	IX 51 D (St 02 Z)	1.0226	1	300	150	210000	
1.0301	C10	1.0301	7	650	390	210000	
1.0305	P235G1TH (St 35.8)	1.0305	3	350	230	210000	
1.0312	DC05	1.0312	1	300	160	210000	
1.0330	DC01 (St 2; St 12)	1.0330	1	330	280	210000	



Production Drawing

PnC dimension table together with PnC profile in an ISO 7200 drawing header may be printed directly, or exported to CAD via DXF-/IGES interface. Drawing name, date, users and modifications are described in WN14.

CAD Interface

WN14 generates a true scale PnC profile as DXF or IGES file to be used in CAD or CNC system. Resolution and tolerances can be configured.

STL Interface

WN14 generates a true scale 3D model of shaft and hub, ready to be produced by means of any 3D printer.

User Interface

The dialogue windows of WN14 allow even the less experienced PC user to find his way around the program quickly. WN14 provides users with a help text. When the demo mode is selected, WN14 runs through a demo program in which an example calculation is performed. WN14 contains auxiliary pictures with geometrical signs and formulas used by the program.

System Requirements

WN14 is available as 32-bit app or as 64-bit app for Windows 7, 8, Windows 10.

Scope of Delivery

WN14 Software with user manual (pdf), example applications and help images, non-expiring license for unlimited time use with update rights.

Software Maintenance

HEXAGON Software is continuously improved and updated. Registered users are regularly kept informed of updates and new editions.

Guarantee

HEXAGON gives a 24 month guarantee on full functionality of the software.

