G E O 3

Hertzian Pressure
Calculation Software

for Windows

www.hexagon.de

Hertzian Pressure
If two bodies touch with a point-shaped or line-shaped contact area, deformations and tensions appear according to Hertz's theory because of pressures. Hertz's solutions are based on Boussinesq's expressions. A homogenous, isotropic material and the validity of Hook's law is presumed as well as the results of axial forces on the touching area only. Moreover, the deformation w0 (panel raising cut) must be small compared to the dimensions of the body.

Calculation
The GEO3 software calculates Hertzian pressure and deformation of two bodies whose common area is point-shaped or line-shaped. Pressure tensions, deformation, length and width of the pressure ellipse and the spring rate are calculated.
For calculation of the deformation in case of contact pair cylinder-cylinder there is no Hertiuan formula available. For this combination, you can configure different calculation methods in GEO3: calculation according to Arnell, Lundberg, Kunert, Palmgren, or Ina-Schaeffler.

Body Shapes
GEO3 can calulate following body combinations: Ball-ball, ball-plane, cylinder-cylinder. The touching contour can be concave or convex. Bodies with a different radius (e. g. rolling bearing rings) are input as special bodies with radius Rx and Ry.

Geometry Input
Balls are defined by their diameter d, cylinders by diameter d and length L. Cambered planes are fixed by their radiuses rx and ry.
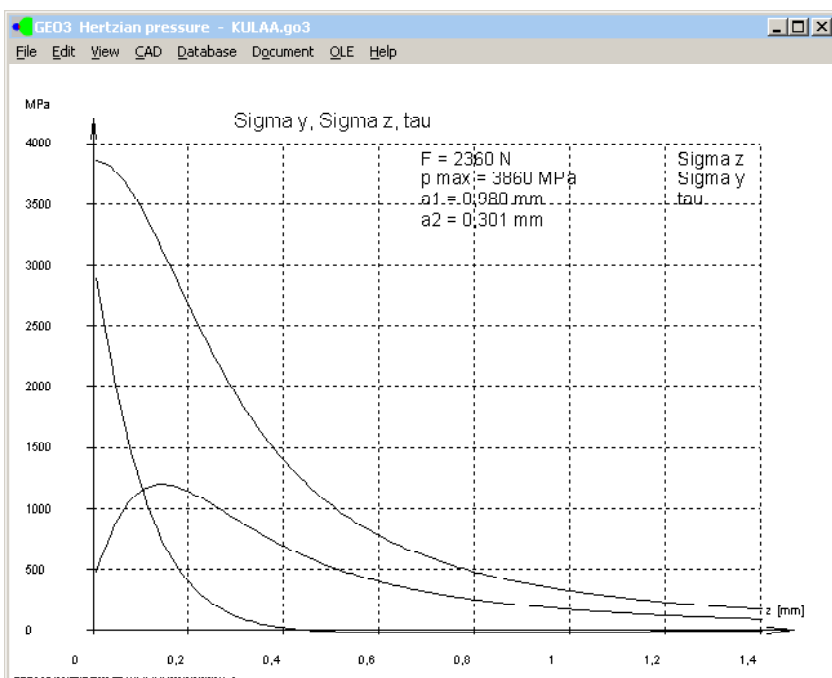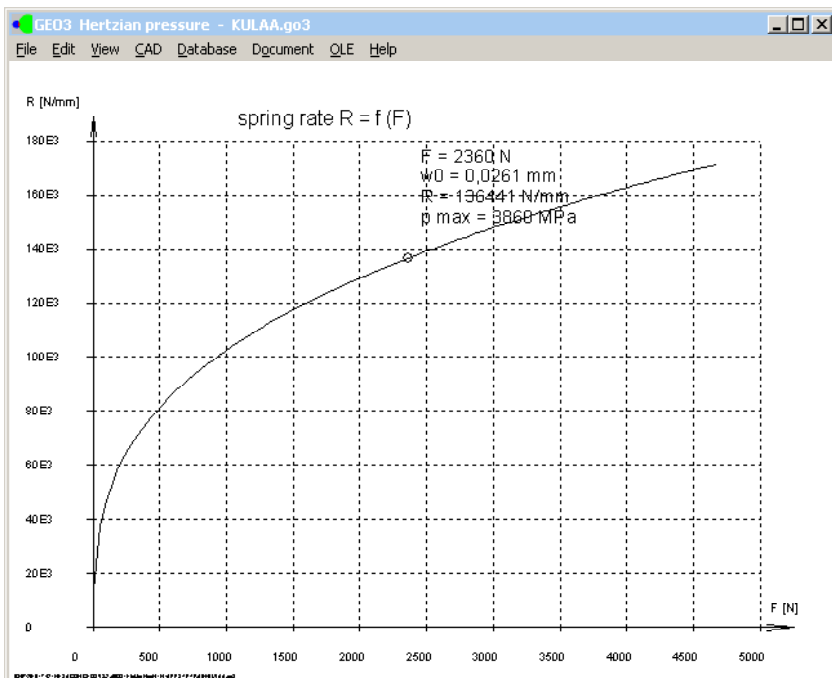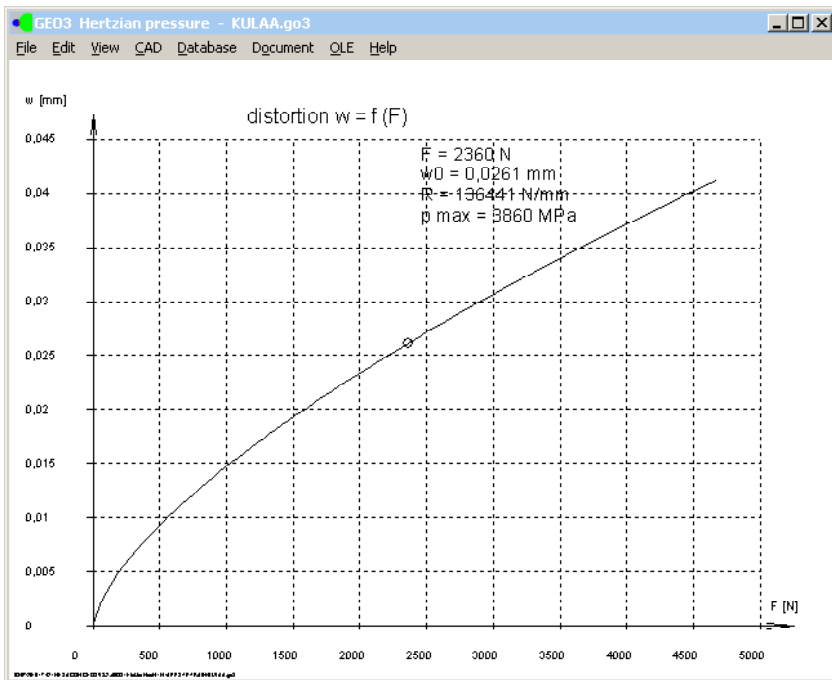
Input Material - Material Database
To calculate deformation and Hertz's pressing, elastic modulus and poisson ratio are needed. The values can be directly input, or you can choose a material from the database.

GEO3 Hertzian pressure			
1. ball d=7			
2. special rx=-4, ry=-13,5			
compressive load	F	N	2360
material coefficient	E*	MPa	210000
half length contact axis 1	a	mm	0,9796
half length contact axis 2	b	mm	0,3010
distortion (approach)	w0	mm	0,0261
spring rate	R	N/mm	136441
max. pressure	p max	MPa	3860

GEO3 Hertzian pressure - KULAA.go3

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distortion w = f (F)

F = 2360 N
w0 = 0,0261 mm
R = 136441 N/mm
p max = 3860 MPa

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spring rate R = f (F)

F = 2360 N
w0 = 0,0261 mm
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Sigma y, Sigma z, tau

F = 2360 N
p max = 3860 MPa
a1 = 0,980 mm
a2 = 0,301 mm

Sigma z
Sigma y
tau

Diagrams
The curves for deformation, tensile stress and spring rate as function of the pressure F, and also pressure stress and shear stress under the surface can be displayed as diagrams.

Table Drawing
Drawing of the contact bodies and table with calculation results are provided as table drawing with ISO 7200 data field. Drawing data can be entered in GEO3. Table drawing can be printed on any Windows printer,
or exported to CAD.

Text Output
nput data and calculation results may be printed, saved as text or HTML file, or exported to MS Excel via OLE interface.

HEXAGON Help System
For each input there is a help text and auxiliary picture of the utilized denominations available in the HEXAGON Help System. GEO3 displays warnings and error messages when exceeding a limit. For every error message you can have a description and remedy suggestion.

Units
Units can be switched between metric (mm) and imperial (inches).

Interfaces
All drawings and diagrams can be saved as DXF or IGES file to be loaded with CAD programs. To adapt to the utilized CAD system, text style and width factor can be configured in GEO3. Layers and colours can also be redefined.
The OLE interface lets you import/export data from/ to Excel.

Export Formats
DXF, IGES, HTML, TXT, DBF, Excel, GO3.

Import Formats
TXT, DBF, Excel, GO3.

System Requirements
GEO3 is available as 32-bit app or as 64-bit app for Windows 7, Windows 8, Windows 10.

Scope of Delivery
Program with example applications and help images, user manual (pdf), license agreement for an indefinite period of time

Software Maintenance
GEO3 is constantly being improved and updated. Registered users will be informed about news, and can get new versions at a reasonable update price.

Guarantee
HEXAGON gives a 24 month guarantee on full functionality of the software. We provide help and support by email and hotline without extra charge.