



geared for the future

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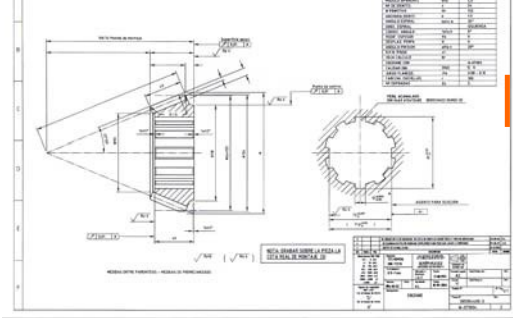
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Engranatges cònic-espivals i Hipoides de gran precisió – procediment de fabricació

Requeriments del client



La optimització sempre és possible!

Sumari ideal de fabricació

Desenvolupament tècnic mitjançant software KIMOS v5

3D graphic

Results: stresses and noise excitation

Drive: $M_t = 117.8 \text{ Nm}$

Ampl. spectrum of transm. error (mm/s)

Excitation level of transm. error (dB)

Max pressure: 715 MPa

Max. pressure: 80 MPa

900 MPa

13.06.05-08.13

Confirmació de potència i capacitat de transmissió

Desenvolupament d'empremta de contacte

Anàlisi de pressió sobre el flanc

Test de rodadura

Dentat en tou

Rectificat en dur

Medició



Màquina Klingelberg KNC



Màquina Klingelberg G



Màquina Klingelberg P

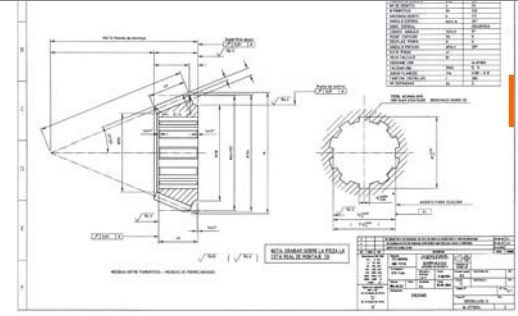


Single Flank Rolling Tester Klingelberg



Engranajes Cónico-Espirales e Hipoides de gran precisión – procedimiento de fabricación

Requisitos de Cliente



La optimización siempre es posible!

Sumario ideal de fabricación

Desarrollo técnico mediante software KIMOS v5

The screenshot displays the KIMOS v5 software interface. It features a 3D graphic window showing a gear model. To the right, there are several analysis windows:

- Results: stresses and noise excitation:** Shows drive torque $M_t = 117.8 \text{ Nm}$, contact pattern at a pinion torque of 118 Nm, and graphs for 'Ampl. spectrum of trans. error (mm/s)' and 'Excitation level of trans. error (dB)'. The dB graph shows a peak of 114 dB at 3000 1/min.
- Contact pattern:** Shows a contact pattern for $M_t = 100 \text{ Nm}$ with a color-coded pressure distribution on the gear tooth flank.
- Modify Design:** A detailed parameter table for gear design.

Parameter	Value
Helix angle (Deg.)	-0.0100
Pressure angle (Deg.)	-0.1218
Lengthwise Crowning (mm)	0.5
Profile Crowning (mm)	0.8
Longitudinal Twist (Deg.)	-0.0227
Helix angle (Deg.)	-0.0273
Pressure angle (Deg.)	-0.1402
Lengthwise Crowning (mm)	0.1
Profile Crowning (mm)	0.4
Longitudinal Twist (Deg.)	0.1407

Confirmación de potencia y capacidad de transmisión

Desarrollo de huella de contacto

Análisis de presión sobre el flanco

Test de rodadura

Dentado en blando



Máquina Klingelberg KNC

Rectificado en duro



Máquina Klingelberg G

Medición



Máquina Klingelberg P

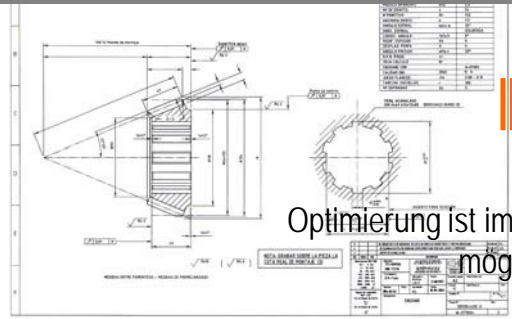


Single Flank Rolling Tester Klingelberg



Fertigungsprozess für Spiral- und Kegelzahnräder mit hoher Präzision

Kundenanforderungen



Technische Entwicklung anhand der Software KIMOS V.5 Software

Druckanalyse auf der Flanke

Ideale Zusammensetzung der Fertigung

Bestätigung der Leistungs- und Übertragungskapazität

3D graphic

Results: stresses and noise excitation

Drive: $M_t = 117.8 \text{ Nm}$

Amplitude spectrum of trans. error (mm/s)

Excitation level of trans. error (dB)

Harmonic

Max. pressure: 715 MPa

0 MPa

30 MPa

90 MPa

Klingenberg GmbH
US, Febrica

Theurer Systems 17/21
13.05.05 08:15

Entwicklung der Verzahnung

Weiche Verzahnung



Maschine Klingenberg KNC

Hartschleifen



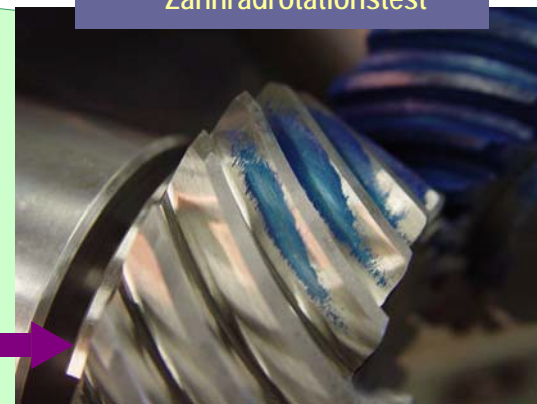
Maschine Klingenberg G

Zahnradmessung



Maschine Klingenberg P

Zahnradrotationstest



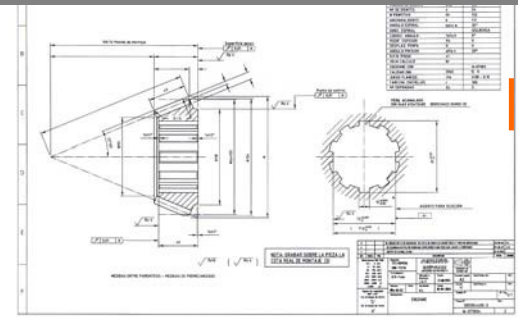
Klingenberg Einfankenwälzprüfung

Kundenzufriedenheit



High precision Bevel and Hypoid gears manufacturing procedure

Customer requirements



Optimizing is always possible!

Ideal manufacturing summary

Technical development by KIMOS v5 software

3D graphic

Results: stresses and noise excitation

Drive: $M_t = 117.8 \text{ Nm}$

Ampl. spectrum of transm. error (mm/s)

Excitation level of transm. error (dB)

Contact pattern: $M_t = 100 \text{ Nm}$

Flank stress analysis

Max pressure: 715 MPa

Power and Torque capacity confirmation

Contact pattern development

Flank stress analysis

Gear testing

Gear cutting - soft



Klingelnberg KNC machine

Gear grinding - hard



Klingelnberg G machine

Gear measuring



Klingelnberg P machine



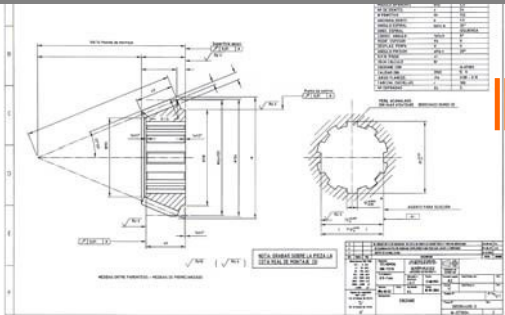
Klingelnberg Single Flank Rolling Tester



Customer satisfaction

Engrenages spiro-coniques et hypoides à haute précision – processus de fabrication

Besoins du client



Optimiser est toujours possible!

Sommaire idéal de fabrication

Développement technique grâce au software KIMOS v5

3D graphic

Results: stresses and noise excitation

Drive: $M_t = 117.8 \text{ Nm}$

Ampl. spectrum of trans. error (mm/s)

Excitation level of trans. error (dB)

Max. 114.48 at 3000 1/min

Detail

Contact pattern: $M_t = 100 \text{ Nm}$

Max pressure: 715 MPa

0 MPa

60 MPa

800 MPa

Toe

Root

Heel

Thruer Systems 17/21

13.06.05 08:13

Développement de l'empreinte de contact

Analyse de pression sur le flanc

Confirmation de puissance et capacité de transmission

Taillage de la denture



Machine Klingelberg KNC

Rectification de la denture dure tendre



Machine Klingelberg G

Mensuration



Machine Klingelberg P

Test de rodage



Single Flank Rolling Tester Klingelberg



Satisfaction du Client