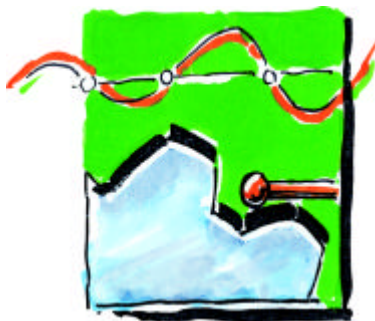


Gear and Spline Technology · Measurement

PRODUCT LINES



The crew:



FRENCO is the specialist for shop floor measurement and clamping systems of gears and splines and for parts with high-precision gear and spline profiles. Special parts of the business are customized solutions for individual gear and spline inspection requirements. Solid solutions of high performance to suit the shop floor conditions are of high importance. FRENCO is prepared for demands like ISO 9000 ff and provides technical help. Please send us your type of problem.

The building:



FRENCO Product Lines



Gear and spline high precision

Spline Gages
Master Gears and master wheels
Setting masters
Punches, dies and electrodes
Gear and spline clamping systems
Gear and spline manufacturing



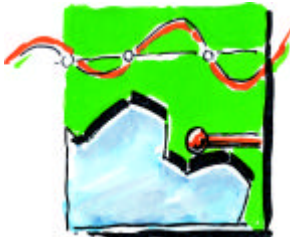
Instruments for size inspection Series V

VK Measuring ball inserts and pins
VA Instruments for rocking
VP Instruments with face stop
VM Indicating Gages with guiding profile
VS Customized solutions
VD Variable 3-Disc Gages



Universal Rotation Measuring Systems URM

URM - K with balls and pins
URM - R with master wheels
URM - WE for single flank gear rolling
URM - WZ for double flank gear rolling
URM - WS Gear Rollscan



Gear and spline inspection

DKD Calibrations of artefacts
Inspection of parts
Analysis of deviations
Wear inspection of gages and masters



Know-how Transfer

Software
Training, seminars and workshops
Consulting and calculations
Literature and documents
National and international standards work



INO - Spline Gages



Spline gages to most modern standard

The INO System raises spline gages to a new technical level. It decreases costs, improves delivery time, increases gage life and speeds up production times. The INO System defines the outer geometry and the associated elements of spline gages while complementing existing standards. Our certificates fit the requirements of ISO 9000 ff.

Involute flanks



Serration flanks



Straight sided flanks



Rush - Express	The special performance. Standard shipment within 6 weeks. The rush - express shortens delivery dramatically down to a few days.
Quantity Discount	If a number of identical gauge are ordered, high quantity discounts are granted..
Wear Resistance	The standard material for gages is gage steel. FRESCO's advanced material technology will dramatically decrease wear and increase gage life up to 4 and 8 times.
Recycling	The concept of the INO System has an ecologically point of view. It saves energy, raw- material and costs. Worn gages can be returned to FRESCO. They are used to produce new gages out of the worn ones.



Master wheels

Master gears

helical



spur



Rolling ball masters

Rolling pin masters to inspect spur profiles



Rolling ball masters to inspect helical toothed profiles and bevel gears



Masters and artefacts

setting master for ball cages



Setting master for ball track



artefact for profile and lead



Setting master for size over balls



Master racks



Setting master for size between balls





Tools

Punches with toothed profiles



Hammer plug

Dies with toothed profile



Punch



Copper and graphite electrodes with toothed profiles





High Precision



Clamping systems to clamp parts in the pitch diameter

If part prints show tolerances of location to other elements of geometry, a solution is clamping the parts in the pitch diameter. For fixing the correctly method of clamping, professional knowledge is necessary. FRENCO helps by selecting the right solution.

One flank taper arbors



Concentricity rings



Bevel gear nests



Hydraulic clamping systems



Mechanic clamping systems



Membrane clamping systems





Instruments for size inspection V



Measurement over / between balls or pins, VRK, VA, VP

The group V provides testing equipment for the measurement of the true size of gears and splines in different applications starting with most simple measuring devices up to fully automatic systems.

Measuring pins made of steel, magnetic steel and tungsten carbide ($\pm 0,0003$ mm for the inspection of gages))

Rocking type VA

IVA

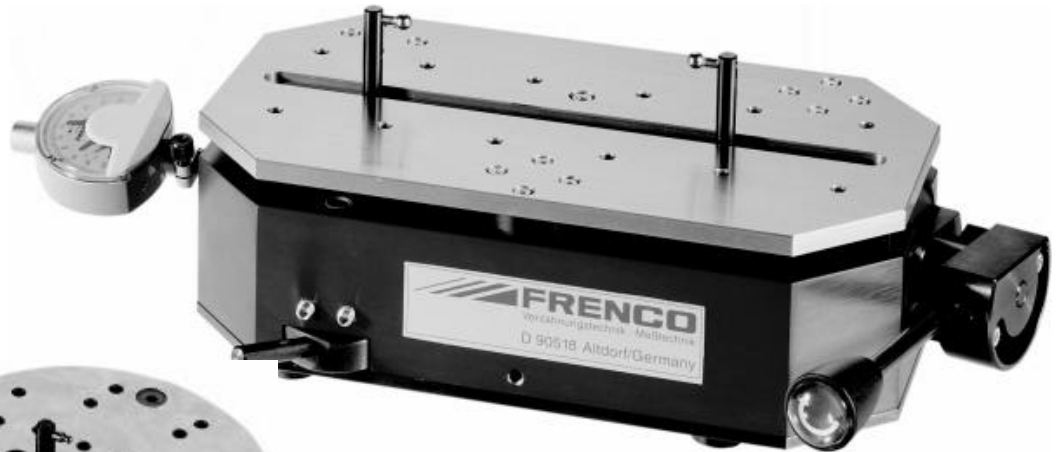


AVA



With face stop VP

fixed plane VPO



with vertical travel VPE



Instruments for size inspection V



Measuring of size over / between balls VM

With profiled guiding body and two measuring points VM 1x1

hand held
IVM 1x1I



hand held
AVM 1x1



table stands
IVM 1x1I



table stands
AVM 1x1

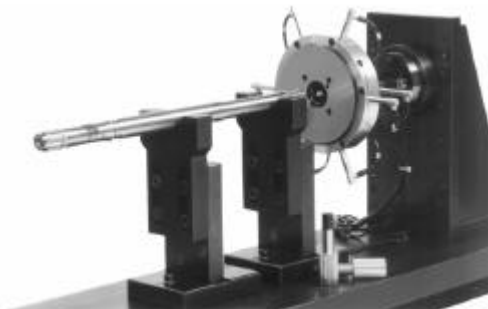


With profiled guiding body and several measuring points Type VM nx2

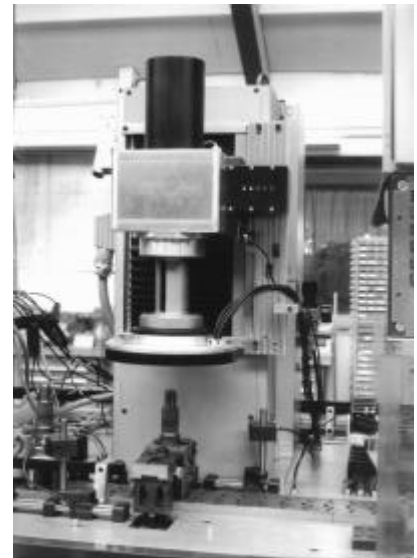
Indicating gage type IVM
3x2 K with dynamic
adapter DAI



Indicating gage type AVM 3x2
RS with dynamic adapter DAA
and horizontal bench



FAPP 6 system integrated in auto-
matic part handling system





Instruments for size inspection V



Special measuring device VS

Customized solutions based on the VM instruments for special purposes like diameters, major or minor diameters, helical splines and gears and straight sided splines.

Hand held indicating ring gage for major diameter



Hand held indicating ring gage for minor diameter



Backlash - Variable 3-disc spline gages VD

Indicating plug gage table stand version



Hand held indicating ring gage for external splines



Hand held indicating plug gage for internal splines





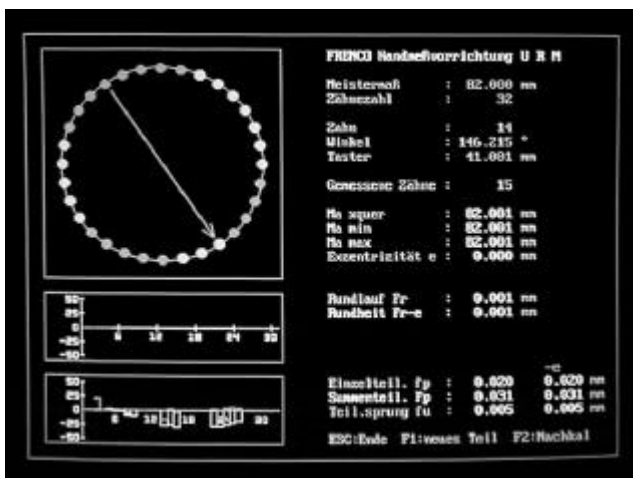
Universal Rotation Measurement URM



With measuring ball URM - K

Universal Rotation Measurement Systems suit an rotationally symmetrical parts. They inspect the size, runout and roundness of diameters, the size over / between balls, runout, roundness, index and lead variation of spines and gears with eccentricity correction and even threads. For the inspection of tolerances of location, the datum is defined and variations are calculated to this. The URM is a modular concept

Results on PC screen



Gear shaft between centers



Internal spline



URMK - vertical





Universal Rotation Measurement

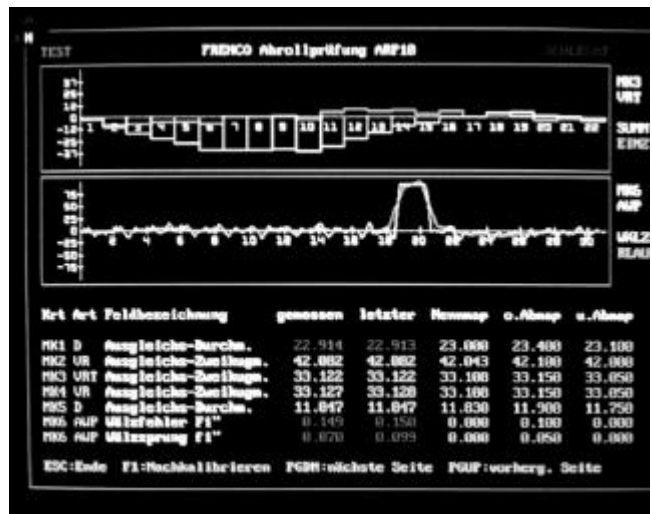
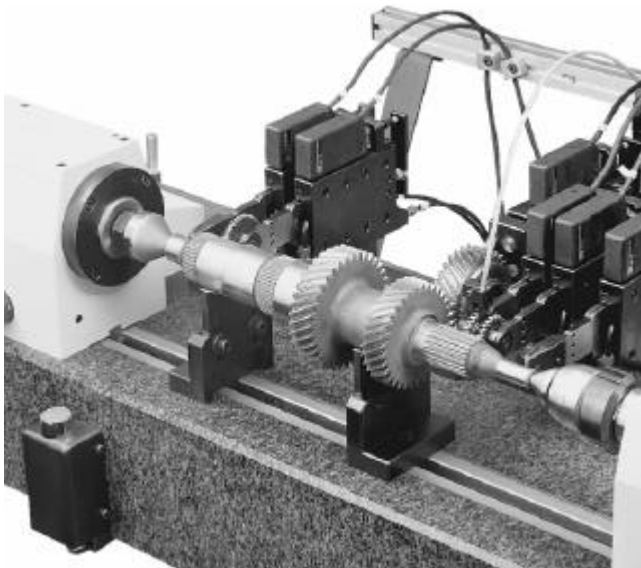


With master wheels URM - R

The URM-R instruments allow the simultaneous inspection of diameters, splines and gears by the use of master gears, ball or pin wheels and diameter slides. High volume batches are the perfect jobs for these ultimate fast instruments.

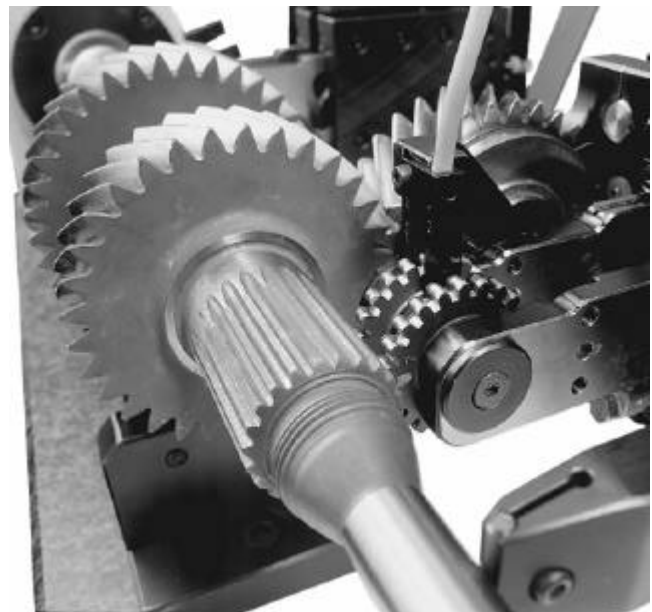
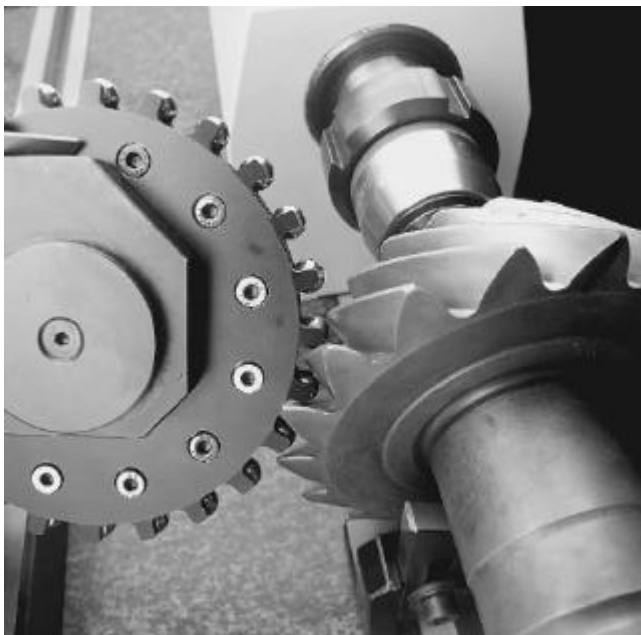
Gear shaft between centers

Results on PC screen



Ball wheel and hypoid bevel gear

Pin wheels and master gear

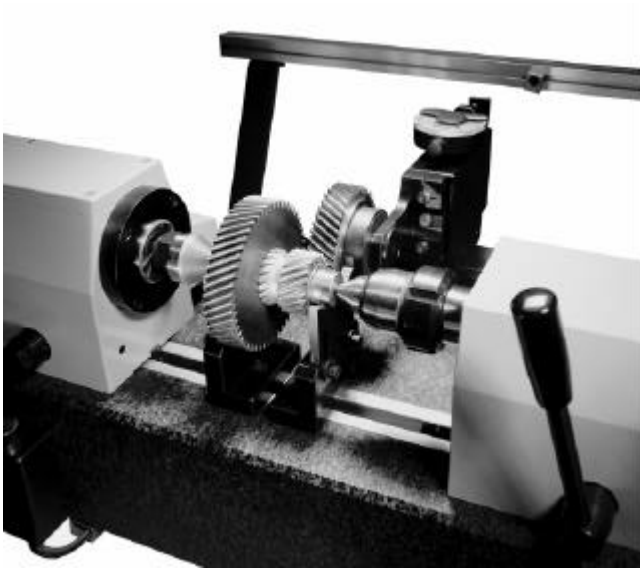




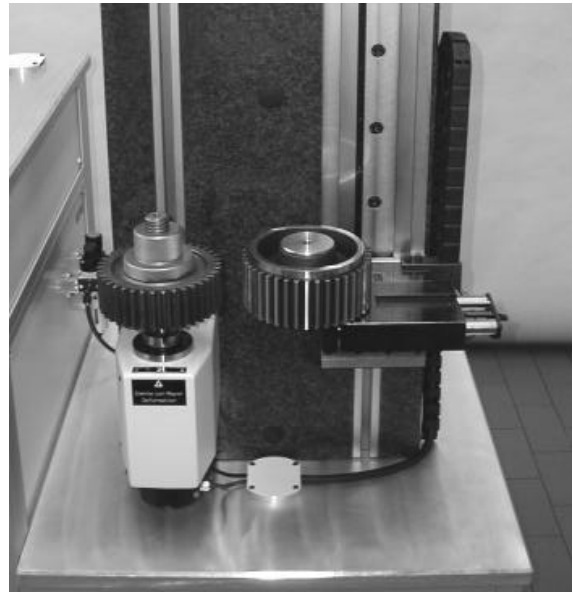
Gear rolling instruments URM - W

Simple instruments made out of the URM modular system elements. The mechanic may be horizontal or vertical for 1 up to 2 master gears. Special versions for rack inspection and single flank testing are available.

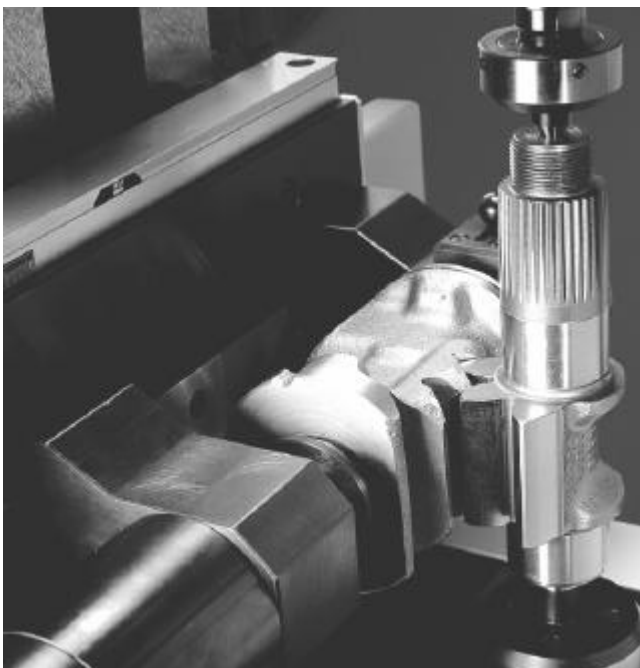
Type A: complete manual



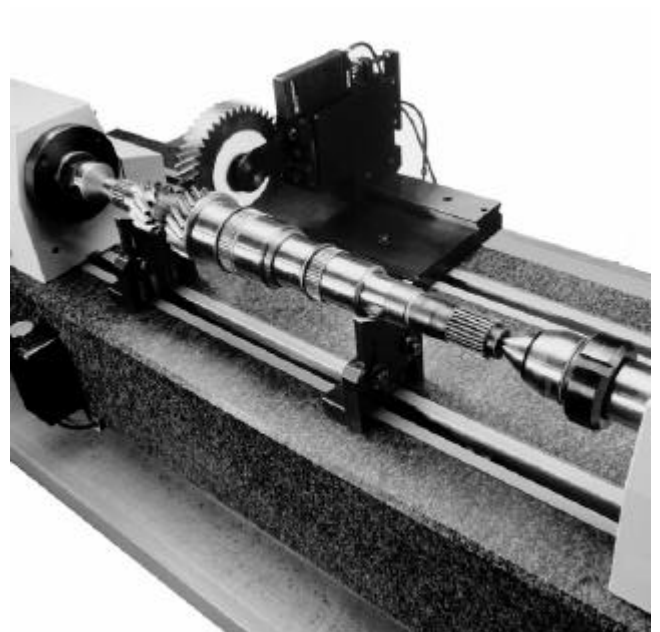
Vertical, unsupported

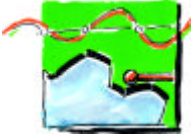


Special solution for racks



Type D: Automatic cycle



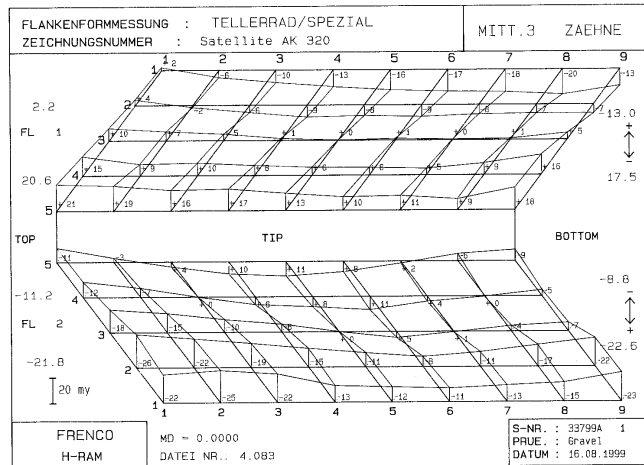


Inspection of splines and gears



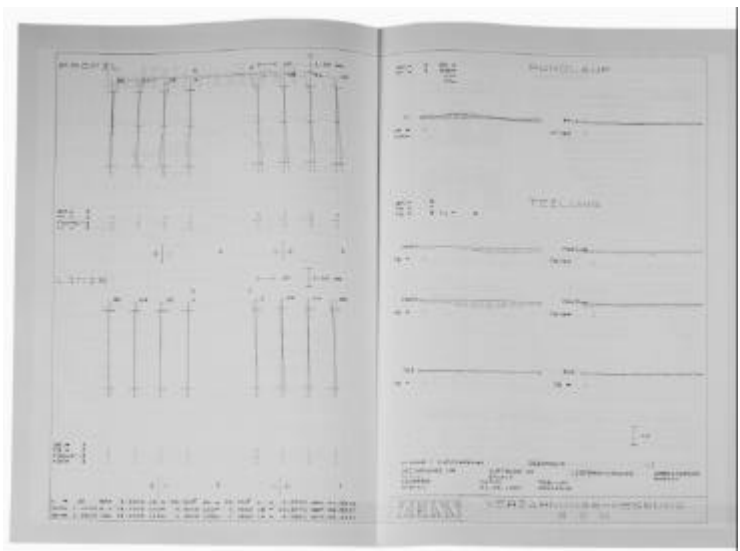
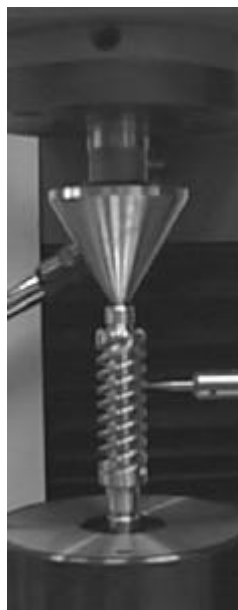
Inspection of parts, certificates and supervision

The very accurate measurement of gear and spline profiles is not possible with standard 3 coordinate measuring machines. A rotary table being axis number 4 is necessary for it. Well trained specialists are performing software for different applications like gears, splines, bevel gears. A wide range of styli is available. The supervision of gage wear is offered with existing inspection rules and know-how.



Inspection of parts

Inspection of gears, splines, bevel gears, worms, ring gears and research of error reasons.



Supervision or inspection equipments

Periodical supervision of spline gages, master gears, indicating gages and clamping systems to wear of size and form variations.





Technical aid for splines and gears

It is quite difficult to have all the knowledge about splines and gears. Even specialists have the know - how for several sections only. FRENCO is engaged in the development of knowledge and offers seminars and training lessons as well as documentation and software for the field of splines and gears. Basic development and improvement work in national and international standard committees provide up to date knowledge.

Service and calculation of splines

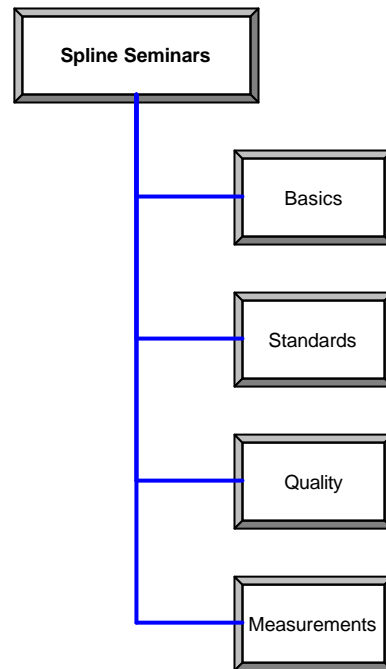
Calculation of spline fits, optimization and research of error reasons

Spline standards

Extension and rework of national and international standards

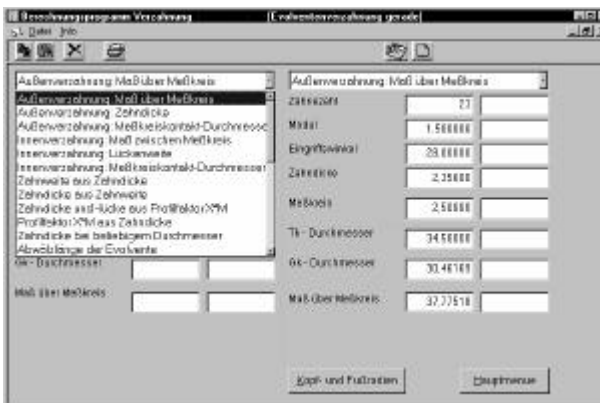
Training and Seminars

Gear and spline seminars in English language



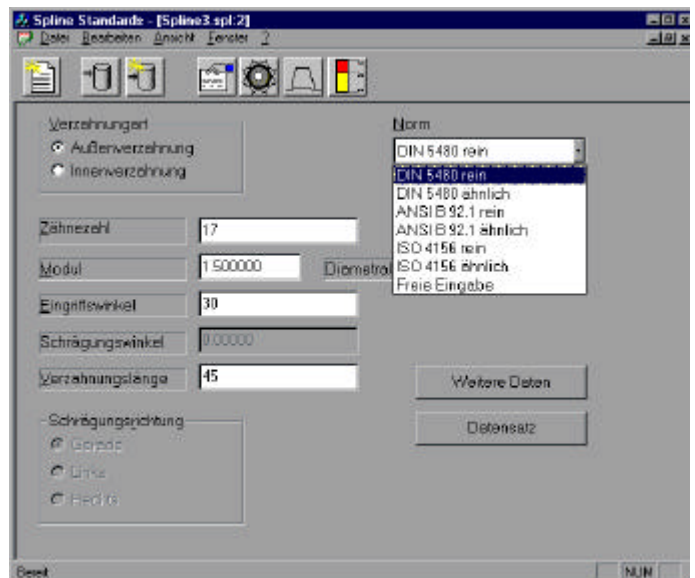
PC-Software Calculator

PC-software for calculation and evaluation of splines and gears



PC-Software Standards

for the calculation of splines according to ANSI B92.1, DIN 5480 and ISO 4156.



Documentations about gears and splines:

70 different brochures with explanations, definitions, tips and helpful regulations.

Please ask for following brochures:

General

A 01 FRENCO Company
A 02 Product Lines

High Precision

HP Gages, Masters and artefacts
HPL-T Spline gages technical information
HPRL-T Master gears technical information
HWS Pitch diameter clamping systems
HWS-1SD-T One flank taper arbors
HH Gear and spline production capabilities

Instruments for size inspection V

V Indicating gages Series V
VK Measuring pins and balls
VA Indicating gages VA technical information
VP Indicating gages Type VP
VM Instruments for inspection with guiding profile
VMLE Indicating gages 1x1 dynamic
VML-Sys Dynamic inspection systems
VML-Soft Longitudinal dynamic software LDYN technical info.
VMF FAPP - Systems
VY Customized solutions VS

Universal Rotation Measurement

U Universal rotation measuring systems
UK URM-K
UK-T URM-K technical information
UR URM-R
UR-T URM-R T technical information
UWS URM Gear Rollscan
UWS-T URM Gear Rollscan technical information
UWZ URM-Double-Flank Gear Rolling Inspection Instruments

Gear and Spline Inspection

P Inspection capabilities
PD DKD - Calibration
PT Inspection technical information

Know-how Transfer

KP Software
KS Inplant spline seminars
KD OF - Documentations

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