



Seminars Gearing Technology

Geometry and Quality Assurance



FRENCO

Know How

The company FRENCO GmbH, located in Altdorf near Nuremberg, has been engaged in the special field of gear and spline metrology since 1978.

The seminar leader Norbert Weiss has been working for FRENCO since 1981. He gained his many years of experience in many departments of the company, from gear hobbing to the assembly of gear measuring devices, the preparation of test certificates for gears, the design of gear measuring technology and technical sales. Due to the cooperation in current standards for splines he is always up to date with the latest technology. The seminars are offered in German or English language. Mr. Weiss will be available after for consultation for the participants future business.

Involute splines are a peripheral technical area and are not included in the curriculum of engineering sciences. There are lectures at universities and a wide range of literature on gears such as cylindrical gears, bevel gears and worm gears. There are standards for splines, but literature is hardly available. FRENCO offers a wide range of documentation on the subject of splines and seminars. Each seminar participant receives a seminar book matching the training.

Participants and Conditions:

The seminars are suitable for design engineers, quality assurance staff, planners or development staff as well as for all those interested in gearing. No special previous knowledge of gearing is required. A basic technical understanding in the field of mechanical engineering is advantageous.

A group size of up to 15 participants is possible.

Contact Person:

Mr. Norbert Weiss

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FRENCO Seminar Offer

There are two seminars to choose from:

1. Seminar Involute Splines

A two-day training course for the geometric description and quality assurance requirements of a spline.

- individual appointment, directly at your location or at FRENCO in Altdorf near Nuremberg

2. Seminar Gears and Splines

One and a half day training for the geometric description and quality assurance requirements of gears.

- individual appointment, directly at your location or at FRENCO in Altdorf near Nuremberg

Workshop

Free time, place and date coordination

- individual topics by arrangement.

For example:

- Joint review of existing gearing descriptions
- Analysis of gauge design
- Joint analysis and elaboration of problem cases

Seminar Involute Splines

In this seminar the topic of involute splines is very comprehensively examined. This also includes an understanding of the terms used, such as pressure angle, module or base circle diameter and form circle diameter.

The two situations, actual and effective, are considered more closely.

The second section is about quality assurance of the splines and an understanding of the tolerance system.

During a training course, current drawings from your area can be viewed as an example.

Topic Sequence:

- Splines vs. gears
- Different flank form of the splines
- The basic data of a spline
- The pressure angle
- The module
- Diameter specifications, head, form and base circle diameter
- The size of a spline as tooth thickness or space width
- The profile shift
- Getting to know actual and effective for the first time
- Creation of tolerance diagrams
- Actual dimensions and effective values in tolerance graphs
- Spline in new condition and in used condition

- Insight into common standards, differences in gauge design

- Overview of quality characteristics
- Measurement of actual dimensions
- Function test, total deviation test
- Reading of test results of the measuring machine
- Locating deviation for actual and effective of splines



Seminar Gears & Splines

In the seminar the description of gears such as pressure angle, helix angle, normal module, taverse module or also base circle diameter and form circle diameter with root circle diameter will be taken through in detail.

The second section is about quality assurance of the gears.

During a training course, current drawings from your area can be viewed as an example.

Topic Sequence:

- Different gear types
- The involute with basic information of a gearing
- The pressure angle
- The helix angle
- The normal module, the traverse module
- Diameter specifications, tip diameter, form diameter and root diameter
- The size of the gearing as tooth thickness or space width
- The profile shift
- Dimension and tolerance series according to DIN 3967

- New standard DIN ISO 1328: 2018-03, quality classes

- Overview of quality assurance features
- Measurement of actual dimensions
- Single flank, double flank gear inspection as total deviation test
- Reading of test results of the measuring machine
- Locating deviation



Workshop

For both machine elements we are also at your disposal for a cooperation beyond the training area. We accompany seminar participants who want to put their newly acquired knowledge into practice, so that they quickly gain confidence in this specialist area.

But we also offer advice and many years of experience to help you advance your development projects. We can use resources such as our Klingelnberg measuring machines, our measuring room specialists or the FRESCO Reany software to support 100% evaluation of the gear geometry.

Topic Sequence:

- Individually by arrangement
- Place and date by arrangement

Contact Person:

Mr. Norbert Weiss

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List of References

Allied Signal, Phoenix, AZ	USA	Honda	USA
American Axle M., Buffalo, NY	USA	Honda	Belgium
American Axle M., Detroit	USA	Honda, Manaus	Brazil
Audi AG	Germany	Hörbiger	Germany
Audi AG, Győr	Hungary	IFA-Haldensleben	Germany
Bauch	China	John Deere, Horizontina	Brazil
BMW Dingolfing,	Germany	Linamar	Canada
BMW München	Germany	LUK, Bühl	Germany
Borg Warner, Seneca, SC	USA	Magna	Austria
Bosch	Mexico	Mahr, Göttingen	Germany
Bosch Rexroth	Germany	Mannesmann Rexroth	Germany
Brose	Germany	Mercedes Benz, Gaggenau	Germany
BRP Rotax	Germany	Mercury Marine, Fon du Lac, WI	USA
BTR, Sidney	Australia	Metaldyne	USA
Daimler Benz, Hamburg	Germany	Muhr und Bender	Germany
Daimler Benz, Kassel	Germany	PMG Füssen	Germany
Dana Corp., Fort Wayne, IN	USA	PMG	Spain
Dana, Porto Alegre	Brazil	Profiroll	Germany
Continental	Germany	Raufoss Technology	Norway
Ex-Cell-O	Germany	Sysma	Germany
Fässler AG, Dübendorf	Switzerland	Sirona, Bensheim	Germany
Felss	Germany	Schaeffler	Germany
Ford AG, Köln	Germany	Schaeffler	Brazil
GKN Brunico	Italy	Technische Akademie Wuppertal	Germany
GKN GTW Zumaya	Spain	Toyota Motorsport F1, Köln	Germany
GKN Ayra Cardan,	Spain	University Rostock	Germany
GKN GWB, Essen	Germany	University Milwaukee, WI	USA
GKN Indugasa, Vigo	Spain	Visteon	Poland
GKN Löbro, Offenbach	Germany	Visteon	Germany
GKN Raleigh, NC	USA	Volkswagen	China
GKN Unidrive, Clayton,	Australia	Volkswagen	Germany
GKN Zwickau	Germany	Zeiss 3D	Germany
GKN Celaya	Mexico	ZEN	Brazil
Graziano, Turino	Italy	ZF Saarbrücken	Germany
Heidrive	Germany	ZF Brandenburg	Germany
Hirschvogel Umformtechnik	Germany	ZF Sao Paulo	Brazil



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