OF - Documents

Books - Literature - Additives

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FRENCO

Documentation

The OF documentation includes knowledge transfer of gears and splines, simple explanations, no longer available standards and educational games. They are, at the same time, the only spline literature that is available other than spline standards.

FRENCO Books:	Summary of documents on one issue
OFL Literature:	Easy understanding explanations of known knowledge
OFS Descriptions:	Explanations of technical correlations
OFD Definitions:	Definitions of not general proven correlations

Prices on request by phone: +49 9187 9522 0

FRENCO Books

Volume 1	**Splines Quality Assurance** 154 pages *item no.: KD-0101*	1. Gears and splines (former OFL 01) 2. Quality assurance of splines overview (former OFS 10) 3. Inspection of splines with measuring machines (former OFD 13) 4. Control of manufacturing process (former OFS 01) 5. Actual and effective inspection methods (former OFS 04) 6. Actual and effective inspection instruments (former OFS 05) 7. Effective fit clearance (former OFS 03) 8. Effective backlash tolerance limit (former OFS 18) 9. One flank taper masters (former OFD 03) 10. Helical Splines (former OFS 14)
Volume 2	**Splines The position of the spline axis** 106 pages *item no.: KD-0102*	1. Tolerances of location (former OFD 01 and OFS 06) 2. Clamping systems for splines (former HWS-T) 3. Variation of angularities (former OFD 04)
Volume 3	**Splines Standards and Calculation** 122 pages *item no.: KD-0103*	1. List of standards (former OFS 24) 2. Summary of spline standards (former OFS 13) 3. Explanation of spline standards (former OFL 03) 4. Spline design without use of standards (former OFL 02)

Volume 4	**Gearss Quality Assurance** 178 pages *item no.: KD-0104*	1. Gear train (former OFS 19) 2. Dimensions and tolerances (former OFS 20) 3. The evolvent (former OFS 17) 4. History of gear measurment (OFS 2) 5. Rolling Inspection (OFS 09) 6. Inspection of individual deviation (OFS 11) 7. Deviation analysis (former OFS 12) 8. Different measurment methods – different results (OFD 12)
Volume 5	**Die Verzahnungs-messtechnik im Wandel der Zeit** 236 pages *item no.: KD-0105*	1. Vorgeschichte 2. Das Jahrhundert des Zahnrades 3. Verzahnungsmesstechnik heute 4. Ausblicke in die Zukunft So far only available in German language.

FRENCO Literature

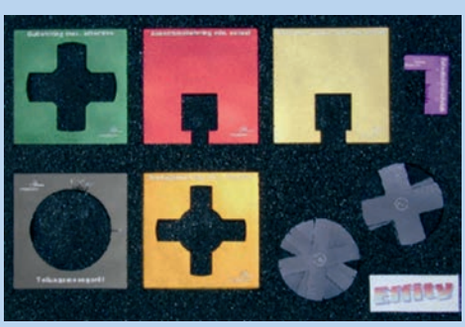
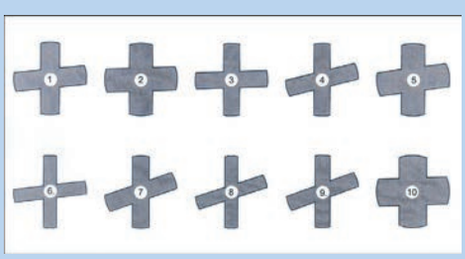
Only available in above mentioned books:

No.	Subject	Title	Included in Book
OFL 01	Involute splines	**Quality assurance**	**Volume 1**
OFL 02	**Splines**	**Spline design without use of standards**	**Volume 3**
OFL 03	Splines	**Explanation of spline standards**	**Volume 3**
OFL 06	Gears and Splines	**Formulas inspection dimensions**	**Volume 3**

Available as separate documents:

No.	Subject	Title	Pages	Version
OFL 04	Splines and Gears	**Gears and splines not available**		
OFL 05	Involute Splines	**Inspection Rules for metrology instruments** 1. Statistical tolerance limit STA 2. Spline gauges 3. Spline gauge ring with one flank master plug gauge 4. Profiled setting master 5. Master gears 6. One flank taper arbor 7. Variable 3-disc indicating gauge 8. Runout inspection	67	01/15
OFL 07	Splines	**USA Standard ANSI B 92.1 - 1970** soft metric version	154	1970
OFL 07-1	Splines	**USA Standard ANSI B 92.1** Changes in 1996 edition	8	1997
OFL 08	Splines	**USA Norm ANSI B 92.2 M**	254	1989

OFL-Literature

No.	Subject	Title	Pages	Version
OFL 11	Gears and Splines	**Dictionary** german-englisch englisch-german	66	01/15
OFL 12	Gears and Splines	**Dictionary** german-englisch-italian	28	03/15
OFL 13	Involute Serrations	**JIS B 1602 – 1961** **Japanische Standard**	22	1961
OFL 14	Involute Splines	**JIS D 2001 – 1959** **Japanische Standard**	40	1959
OFL 15	Metrology of Gears and Splines	**FRENCO – Pädie** Encyclopaedia of metrology	40	05/13
OFL 16	Splines	**Manual for Technicians**	109	03/08
OFL 17	Splines	**Effity** Educational game to learn about and understand splines within the tolerance chart. 10 sample parts, 6 measuring instruments and a coloured instruction manual.  		2004
OFL 17-1	Splines	**Effity,** separate instructions	36	2005

OFS Descriptions

Only available in above mentioned books:

No.	Subject	Title	Included in Book
OFS 01	Splines	**Control of manufacturing process**	**Volume 1**
OFS 02	Gears and Splines	**History of gear artefacts**	**Volume 4**
OFS 04	Splines	**Actual and effective inspection methods**	**Volume 3**
OFS 05	Splines	**Actual and effective inspection instruments**	**Volume 1**
OFS 06	Gears and Splines	**Methods of determining the axis of spline and gear**	**Volume 2**
OFS 09	Gears	**Gear rolling inspection**	**Volume 4**
OFS 10	Gears and Splines	**Quality assurance of gears and splines**	**Volume 4**
OFS 11	Gears and Splines	**Analytical inspection**	**Volume 4**
OFS 12	Gears and Splines	**Deviation analysis**	**Volume 4**
OFS 13	Splines	**Summary of spline standards**	**Volume 3**
OFS 14	Splines	**Helical splines**	**Volume 1**
OFS 17	Gears and Splines	**The involute, simple explanation**	**Volume 4**
OFS 18	Splines	**Effective backlash tolerance limit**	**Volume 1**
OFS 19	Gears	**Mating gears**	**Volume 4**
OFS 20	Gears	**Deviation of size, tolerances, ranges of quality**	**Volume 4**
OFS 24	Splines	**Listing of standards**	**Volume 3**
OFS 25	Splines	**The position of the spline axis**	**Volume 3**
OFS 26	Splines	**Inspection of splines**	**Volume 1**

Available as separate documents:

No.	Subject	Title	Pages	Version
OFS 03	Splines	**Effective fit clearance**	12	08/99
OFS 15	Gears and Splines	**Various types of gears and splines**	8	04/09
OFS 23	Gears and Splines	**Production methods**	20	01/06
OFS 28	Splines	**Splines with serrations** Calculation	78	03/10
OFS 29	Gears and Splines	**Quality assurance** Reading of semicolon-analysis	28	03/10
OFS 30	Gears and Splines	**Quality assurance** Presentation forms of gear deviations	20	04/11

OFD-Definitions

Only available in above mentioned books:

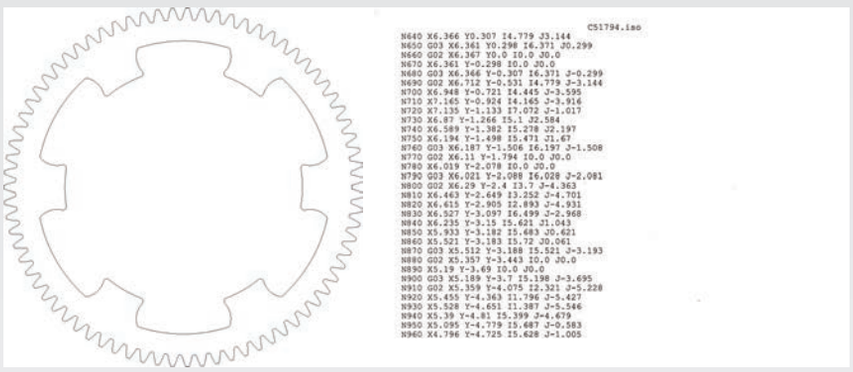
No.	Subject	Title	Included in Book
OFD 01	Splines	**Spline tolerances of location**	**Volume 2**
OFD 03	Splines	**One flank taper masters**	**Volume 1**
OFD 04	Splines	**Spline variations of angularity**	**Volume 2**
OFD 12	The dimension tooth thickness	**Various measuring methods**	**Volume 4**
OFD 13	Splines	**Inspection of splines by the use of inspection machines**	**Volume 1**

Available as separate documents:

No.	Subject	Title	Pages	Version
OFD 10	Gear and spline high precision	**Acceptance or rejection of gauges and masters with regard to the tolerance limits of size and form variations**	24	09/12
OFD 11	Tolerance limits	**Acceptance or rejection of specimen with regard to tolerance limits (ISO 14253)**	12	11/12

Additives

Spline-files DXF and ISO



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N720 X7.135 Y-1.133 I7.072 J-1.017
N730 X6.87 Y-1.266 I5.1 J2.584
N740 X6.589 Y-1.382 I5.278 J2.197
N750 X6.194 Y-1.498 I5.471 J1.67
N760 G03 X6.187 Y-1.506 I6.197 J-1.508
N770 G02 X6.11 Y-1.794 I0.0 J0.0
N780 X6.019 Y-2.078 I0.0 J0.0
N790 G03 X6.021 Y-2.088 I6.028 J-2.081
N800 G02 X6.29 Y-2.4 I3.7 J-4.363
N810 X6.463 Y-2.649 I3.252 J-4.701
N820 X6.615 Y-2.905 I2.893 J-4.931
N830 X6.527 Y-3.097 I6.499 J-2.968
N840 X6.235 Y-3.15 I5.621 J1.043
N850 X5.933 Y-3.182 I5.683 J0.621
N860 X5.521 Y-3.183 I5.72 J0.061
N870 G03 X5.512 Y-3.188 I5.521 J-3.193
N880 G02 X5.357 Y-3.443 I0.0 J0.0
N890 X5.19 Y-3.69 I0.0 J0.0
N900 G03 X5.189 Y-3.7 I5.198 J-3.695
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N950 X5.095 Y-4.779 I5.687 J-0.583
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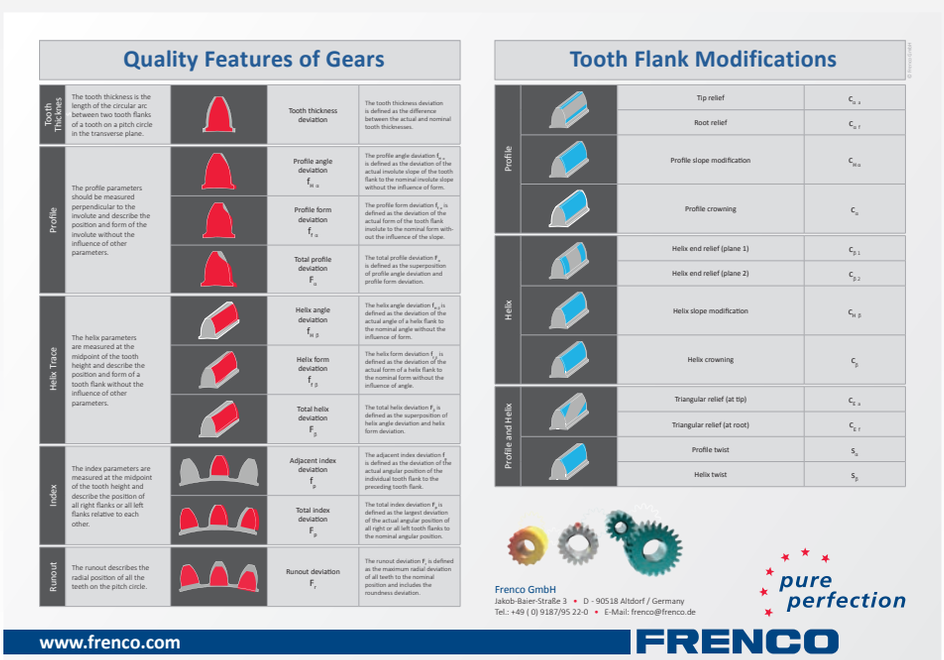
Spline template

Poster of quality features and tooth flank modifications



Quality Features of Gears

Tooth Thickness	The tooth thickness is the length of the circular arc between two tooth flanks of a tooth on a pitch circle in the transverse plane.		Tooth thickness deviation	The tooth thickness deviation is defined as the difference between the actual and nominal tooth thicknesses.
Profile	The profile parameters should be measured perpendicular to the involute and describe the position and form of the involute without the influence of other parameters.		Profile angle deviation $f_{H\alpha}$	The profile angle deviation $f_{H\alpha}$ is defined as the deviation of the actual involute slope of the tooth flank to the nominal involute slope without the influence of form.
			Profile form deviation $f_{f\alpha}$	The profile form deviation $f_{f\alpha}$ is defined as the deviation of the actual form of the tooth flank involute to the nominal form without the influence of the slope.
			Total profile deviation F_{α}	The total profile deviation F_{α} is defined as the superposition of profile angle deviation and profile form deviation.
Helix Trace	The helix parameters are measured at the midpoint of the tooth height and describe the position and form of a tooth flank without the influence of other parameters.		Helix angle deviation $f_{H\beta}$	The helix angle deviation $f_{H\beta}$ is defined as the deviation of the actual angle of a helix flank to the nominal angle without the influence of form.
			Helix form deviation $f_{f\beta}$	The helix form deviation $f_{f\beta}$ is defined as the deviation of the actual form of a helix flank to the nominal form without the influence of angle.
			Total helix deviation F_{β}	The total helix deviation F_{β} is defined as the superposition of helix angle deviation and helix form deviation.
Index	The index parameters are measured at the midpoint of the tooth height and describe the position of all right flanks or all left flanks relative to each other.		Adjacent index deviation f_p	The adjacent index deviation f_p is defined as the deviation of the actual angular position of the individual tooth flank to the preceding tooth flank.
			Total index deviation F_p	The total index deviation F_p is defined as the largest deviation of the actual angular position of all right or all left tooth flanks to the nominal angular position.
Runout	The runout describes the radial position of all the teeth on the pitch circle.		Runout deviation F_r	The runout deviation F_r is defined as the maximum radial deviation of all teeth to the nominal position and includes the roundness deviation.

Tooth Flank Modifications

Profile		Tip relief	$C_{\alpha a}$
		Root relief	$C_{\alpha f}$
		Profile slope modification	$C_{H\alpha}$
		Profile crowning	C_{α}
Helix		Helix end relief (plane 1)	$C_{\beta 1}$
		Helix end relief (plane 2)	$C_{\beta 2}$
		Helix slope modification	$C_{H\beta}$
		Helix crowning	C_{β}
Profile and Helix		Triangular relief (at tip)	$C_{\gamma a}$
		Triangular relief (at root)	$C_{\gamma f}$
		Profile twist	S_{α}
		Helix twist	S_{β}

Frenco GmbH
Jakob-Baier-Straße 3 • D - 90518 Altdorf / Germany
Tel.: +49 (0) 9187/95 22-0 • E-Mail: frenco@frenco.de

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FRENCO GmbH
Gear + Spline Technology
Jakob-Baier-Str. 3 • D- 90518 Altdorf
www.frenco.com

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