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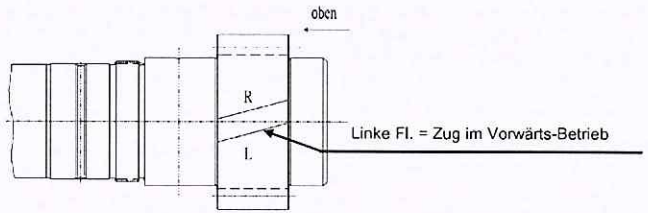
Document Status: approved

STIRNRAD / GEAR	außenverzahnt / external	Toleranzen der Verzahnung (DIN 3961 vom Aug. 1978) gültig für Werte am Einzelzahn / Tolerances of gearing (DIN 3961 of Aug. 1978) valid for values at individual tooth (8)				
Zähnezahl z / Number of teeth	18		linke Fl. / left flank	rechte Fl. / right flank		
Modul m_n / Normal module	2.300000	Profil-Formabweichung $f_{f\alpha}$ / Profile form error	0.004#		Eingriffsteilungs-Abweich. f_{pe} / Normal pitch error	0.014
Eingriffswinkel α_n / Normal pressure angle	20° 0' 0"	Profil-Gesamtabweichung F_α / Total profile error			Teilungs-Einzelabweichung f_p / Adjacent pitch error	0.014
Schrägungswinkel β / Helix angle	26° 42' 0"	Profil-Winkelabweichung $f_{H\alpha}$ / Profile angle error	0.000 ± 0.007	0.000 ± 0.007	Teilungssprung f_u / Diff. bet. adjacent pitches	0.018
Steigungsrichtung / Hand of helix	LINKS	Flankenl.-Winkelabweich. $f_{H\beta}$ / Tooth alignment error	-0.025 ± 0.013	0.000 ± 0.013	Teilungs-Summenabweich. F_{pk} / Cumulative circ. pitch error	
Profilverschiebungsfaktor x / Addendum modification coeff.	1.032	Flankenl.-Gesamtabweich. F_β / Total alignment error	0.016	0.016	Rundlaufabweichung F_r / Radial run-out	0.032
Teilkreisdurchmesser d / Pitch diameter	46.341	Flankenl.-Formabweich. $f_{f\beta}$ / Longitudinal alignment err.	0.004#		Zahndickenschwankung R_s / Range of tooth thickn. error	
Kopfkreisdurchmesser d_a (g) / Outside diameter	55.80 $_{-0.26}$	Teilungs-Gesamtabweich. F_p / Cumulative pitch error	0.040			
Kopfnutzkreisd. theo. max. d_{Na} / Tip diam. usable theo.	55.50	Einf.-Wälzabweichung F_i' / Tangential composite error			Zweifl.-Wälzabweichung F_i'' / Radial composite error	0.036
Kopfnutzkreisd. theo. min. d_{Na} / Tip diam. usable theo.	55.07	Einflanken-Wälzsprung f_i' / Tang. tooth to tooth comp. err.			Zweifl.-Wälzsprung f_i'' / Radial tooth to tooth comp. err.	0.014
Fußkreisdurchmesser d_f / Root diameter	42.75 $_{-0.35}$	Radbreite im Meßkreis d_M b / Facewidth in meas. diam.	33.98		Meßkreis Krümmungsradius ρ_{dM} / Radius of curvature meas. diam.	12.24
Fußnutzkreisdurchmesser d_{Nf} / Root diameter usable	44.83					
Grundkreisradius r_b / Base circle radius	21.458					
Grundkreisdurchmesser d_b / Base diameter	42.916					
Normalzahndicke max. s_n / Normal tooth thickness	5.341					
Normalzahndicke min. s_n / Normal tooth thickness	5.311					
Meßzähnezahl k / Number of teeth spanned	5					
Zahnweite max. W_k / Base tangent length	32.977					
Zahnweite min. W_k / Base tangent length	32.949					
Meßkugeldurchmesser D_M / Ball diameter	3.5000					
Diam. Zweikugelmaß max. M_{dK} / Measurement o. balls	53.992					
Diam. Zweikugelmaß min. M_{dK} / Measurement o. balls	53.933					
Verdrehflankenspiel theo. / Circumferential backlash	0.066 / 0.174					



Hondurchmesser = 43.55 $_{-0.30}$ ≡ 3.70
honing diameter

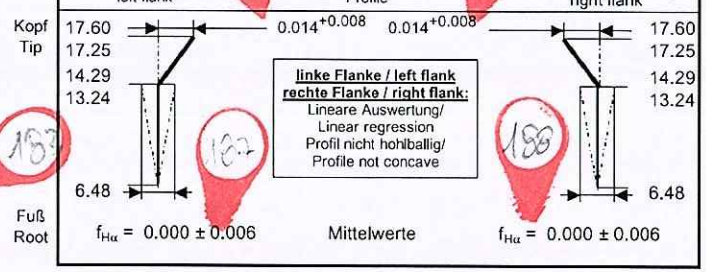
#Flanken- und Profilformabweichung ffa und ffb ausgewertet mit Fourier. Auswertung bis 30. Ordnung
Flank and profile fomr errors ffa and ffb evaluated using Fourier. Evaluation untill 30th order

ffb	n0 = 0.80	
	K = 0.7	
	R = 0.95	
ffa	n0 = 0.03	
	K = 0.25	
	R = 0.60	

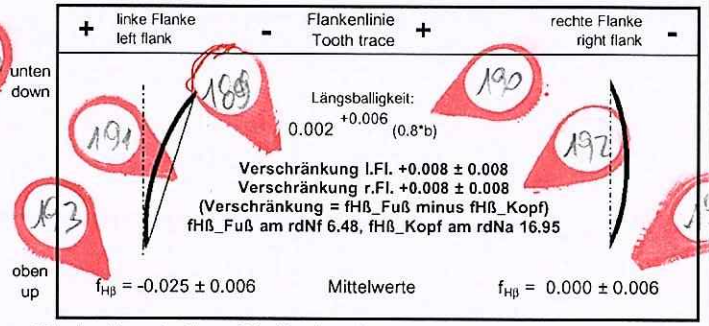
(h)

Vorbearbeitungsdaten siehe Verzahnungsblatt Vorbearbeitung gleicher Nr.
For pre-machining dimensions, see gear data sheet same number

Wkz-Profil siehe Werkzeugdatenblatt Nr. 250.6.4245.35
For Tooth profile, see tool data sheet number



* Schreibbeginn
* Start of checking ∅ = 43.55 $_{-0.30}$ ≡ 3.70



* Plusabweichung des bis zum Schreibbeginn verlängerten vermittelnden Ist-Profiles max $f_{f\alpha}/2$
* Plusdeviation of the average profile, extended to the start of checking, max $f_{f\alpha}/2$

Profil- und Flankenlinienprüfung nach VDI/VDE 2612
Tabellenwerte für F_β und $f_{H\beta}$ sind auf die gesamte Radbreite im Meßkreis d_M bezogen
Flankenlinienprüfbereich Lβ = 0.8*b hochgerechnet auf 1.0*b
Begriffe für Stirnräder nach DIN 868, 3960, 3998

Profile and helix checking according to VDI/VDE 2612
Listed tolerance data for F_β and $f_{H\beta}$ refers to the total face width in the meas. dia. d_M
Tooth trace testing area Lβ = 0.8*b calculated to 1.0*b
Terms of the tooth system according to DIN (German Industrial Standards) No. 868, 3960, 3998

Buch.	Anz.	Änd.Nr.		Datum	Name
h	1	C001225	See CO	20150617	Cricenti
g	1	36042	see CO	20140526	Cricenti

Verteiler:

Schutzvermerk nach DIN 34 beachten

GETRAG
GETRAG Getriebe- und Zahnradfabrik Hermann Hagenmeyer GmbH & Cie KG

Abbildungen sind unmaßstäblich.
Diagrams not to scale.

Ersatz für
Erstverwendung bei Getriebetype: 250.0.0004.17

Remark:

	Datum	Name
gez.	2008-02-04	Paaßen, Holger
gepr.		

Verzahnungsblatt Endkontrolle
Final Check Gear Data
Benennung:
Naming:
Abtriebswelle K2

Zeichnungsnummer:
Drawing number:
250.6.4245.35

GETRAG	Gear - testing	D-No.: 250.6.4245.35	z = 32
	External gearing	Remark:	

Mating gear:	i 32 / 32	a	Type: 250.0.0004.17	Speed: FM 3.
	i /	a	Customer: Renault	

z 32	m_n 1.000000	α 30 ° 0 ′ 0 ″	β 0 ° 0 ′ 0 ″	STRAIGHT	
x -0.050	d 32.000	d_b 27.713	d_a 32.89 $_{-0.25}$	d_f 30.80 $_{-0.59}$	

Tolerance Class 9		Tooth thickn. sn 1.590 ÷ 1.550	
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 6 teeth	
Radial composite err. Fi ″	Tangent. comp. err. Fi ′	finished: 16.470 ÷ 16.435	
Rad. tooth to tooth comp. err. fi ″	Tang. tooth to tooth comp. err. fi ′	shaped: hobbed: ÷	
Profile form error ffα	Profile angle error fHα	shaved: ÷	
Total profile error Fα 0.021	Adjacent pitch err. fp 0.017	Measurement over 2 balls DM= 2.00	
Normal pitch error fpe	Diff. bet. adj. pitch. fu	finished: 35.245 ÷ 35.182	
Cumulative pitch error Fp 0.040	Cum. circ. pitch err. Fpk	shaped: hobbed: ÷	
Cumu. circ. pitch err. 1/8 extent Fpz/8	Radial run-out Fr 0.050	shaved: ÷	
Range of tooth thickn. error Rs	Longit. alignm. err. ffβ	usable diameter dNa 32.64 dNf 30.94	
Tooth alignment err. fHβ	Total alignment err. Fβ 0.011	rad. of curvature ρdNa 8.62 ρdNf 6.88	

Tool	Bezugsprofil	DIN 5480		
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 33 x 1.00 x 32 x 9 v

GAGE DIMENSION sn max. eff. = 1.613

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

VBL drawn: PAAßEN Date: 09.01.08 Subst. For:

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Document Status: approved

GETRAG	Geardata-Sheet	D-No.: 250.6.4245.35	z = 38
	External gearing	Remark: IIIa	

Mating gear:	i 38 / 38	a	Type: 250.0.0004.17	Speed: FM 4. / RW.
	i /	a	Customer: Renault	

z	38	m_n	1.000000	α	30 ° 0 ′ 0 ″	β	0 ° 0 ′ 0 ″		STRAIGHT		
x	0.350	d	38.000	d_b	32.909	d_a	39.66 $_{-0.25}$	d_f	37.60 $_{-0.59}$		

Tolerance Class	9	Tooth thickn. sn	2.156	÷	2.116		
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 7 teeth					
Radial composite err. Fi ″	Tangent. comp. err. Fi ′	finished:	19.960	÷	19.927		
Rad. tooth to tooth comp. err. fi ″	Tang. tooth to tooth comp. err. fi ′	shaped: hobbed:		÷			
Profile form error ffα	Profile angle error fHα	shaved:		÷			
Total profile error Fα 0.021	Adjacent pitch err. fp 0.017	Measurement over 2 balls DM= 2.00					
Normal pitch error fpe	Diff. bet. adj. pitch. fu	finished:	42.131	÷	42.070		
Cumulative pitch error Fp 0.040	Cum. circ. pitch err. Fpk	shaped: hobbed:		÷			
Cumu. circ. pitch err. 1/8 extent Fpz/8	Radial run-out Fr 0.050	shaved:		÷			
Range of tooth thickn. error Rs	Longit. alignm. err. ffβ	usable diameter	dNa 39.44	dNf	37.74		
Tooth alignment err. fHβ	Total alignment err. Fβ 0.011	rad. of curvature	ρdNa 10.87	ρdNf	9.24		

Tool	Bezugsprofil	DIN 5480	$h_{aP0} = 0.65 \cdot m_n$
grinding wheel	h_{aP0}	ρ_{aP0}	b

External Spline DIN 5480-W 39.800 x 1.00 x 38 x 9 Fit freely selected

GAGE DIMENSION sn max. eff. = 2.179

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name
a	35112	Siehe Änd.	30.04.10	Cricenti

VBL drawn: PAAßEN Date: 09.01.08 Subst. For:

Released by Fabrizio.Cricenti on 2010-05-06
Document Status: approved

GETRAG	Geardata-Sheet	D-No.: 250.6.4245.35	z = 38
	External gearing	Remark: IIIb	

Mating gear:	i 38 / 38	a	Type: 250.0.0004.17	Speed: FM 4. / Rw	
	i /	a	Customer: Renault		

z	38	m_n	1.000000	α	30 ° 0 ′ 0 ″	β	0 ° 0 ′ 0 ″		STRAIGHT
x	0.350	d	38.000	d_b	32.909	d_a	39.66 $_{-0.25}$	d_f	37.60 $_{-0.59}$

Tolerance Class		9.3	Tooth thickn. sn	2.053	÷	2.008	
GO-GAGE takes priority over inspection of individual deviations			Base tangent length over 7 teeth				
Radial composite err. Fi ″	Tangent. comp. err. Fi ′		finished:	19.871	÷	19.832	
Rad. tooth to tooth comp. err. fi ″	Tang. tooth to tooth comp. err. fi ′		shaped: hobbed:		÷		
Profile form error ffα	Profile angle error fHα		shaved:		÷		
Total profile error Fα	0.023	Adjacent pitch err. fp	0.019	Measurement over 2 balls DM= 2.00			
Normal pitch error fpe		Diff. bet. adj. pitch. fu		finished:	41.975	÷	41.906
Cumulative pitch error Fp	0.045	Cum. circ. pitch err. Fpk		shaped: hobbed:		÷	
Cumu. circ. pitch err. 1/8 extent Fpz/8		Radial run-out Fr	0.050	shaved:		÷	
Range of tooth thickn. error Rs		Longit. alignm. err. ffβ		usable diameter	dNa 39.44	dNf	37.74
Tooth alignment err. fHβ		Total alignment err. Fβ	0.012	rad. of curvature	ρdNa 10.87	ρdNf	9.24

Tool	Bezugsprofil	DIN 5480	$h_{aP0} = 0.65 \cdot m_n$	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 39.800 x 1.00 x 38 x 9.3 Fit freely selected

GAGE DIMENSION sn max. eff. = 2.079

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name
a	35112	Siehe Änd.	30.04.10	Cricenti

VBL drawn: PAAßEN Date: 09.01.08 Subst. For:

Released by Fabrizio.Cricenti on 2010-05-06
Document Status: approved

GETRAG	Gear - testing	D-No.: 250.6.4245.35	z = 38
	External gearing	Remark:	

Mating gear: 250.1.4128.00	i 38 / 38	a	Type: 250.0.0004.17	Speed: Park. Lock Wheel	
	i /	a	Customer: Renault		

z 38	m_n 1.000000	α 30 ° 0 ′ 0 ″	β 0 ° 0 ′ 0 ″	STRAIGHT	
x 0.450	d 38.000	d_b 32.909	d_a 39.84 -0.25	d_f 37.80 -0.59	

Tolerance Class	9	Tooth thickn. sn	2.207 ÷ 2.167
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 7 teeth	
Radial composite err. Fi ″	Tangent. comp. err. Fi ′	finished:	20.005 ÷ 19.970
Rad. tooth to tooth comp. err. fi ″	Tang. tooth to tooth comp. err. fi ′	shaped: hobbed:	÷
Profile form error ffα	Profile angle error fHα	shaved:	÷
Total profile error Fα 0.021	Adjacent pitch err. fp 0.017	Measurement over 2 balls DM= 2.00	
Normal pitch error fpe	Diff. bet. adj. pitch. fu	finished:	42.209 ÷ 42.148
Cumulative pitch error Fp 0.040	Cum. circ. pitch err. Fpk	shaped: hobbed:	÷
Cumu. circ. pitch err. 1/8 extent Fpz/8	Radial run-out Fr 0.050	shaved:	÷
Range of tooth thickn. error Rs	Longit. alignm. err. ffβ	usable diameter dNa 39.59	dNf 37.94
Tooth alignment err. fHβ	Total alignment err. Fβ 0.011	rad. of curvature ρdNa 11.00	ρdNf 9.44

Tool	Bezugsprofil	DIN 5480	$h_{aP0} = 0.65 \cdot m_n$	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 40 x 1.00 x 38 x 9 Fit freely selected

GAGE DIMENSION sn max. eff. = 2.230

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

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