GETRAG	Geardata-Sheet External gearing	D-No.: 250.6.4305.35	z = 43
		Remark: IIb	

Mating gear:	i 43 / 43	a	Type: 250	Speed: FM 2. / 6.
	i /	a	Customer: RENAULT H5Ft	

z 43	m_n 1.000000	α 30 ° 0 ′ 0 ″	β 0 ° 0 ′ 0 ″	STRAIGHT
x -0.050	d 43.000	d_b 37.239	d_a 43.89 $_{-0.25}$	d_f 41.80 $_{-0.59}$

Tolerance Class 9.3 **GO-GAGE takes priority over inspection of individual deviations**		Tooth thickn. sn	1.487 ÷	1.442
		Base tangent length over 8 teeth		
Radial composite err. Fi ″	Tangent. comp. err. Fi ′	finished:	22.334 ÷	22.295
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:	46.065 ÷	45.992
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 43.64	dNf 41.94	
Tooth alignment err. fHβ	Total alignment err. Fβ 0.012	rad. of curvature ρdNa 11.38	ρdNf 9.65	

Tool	STW -	z_0	Steigung der Schraubenführ. 0.0000	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 44 x 1.00 x 43 x 9.3 h

GAGE DIMENSION sn max. eff. = 1.513

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

VBL created: PAAßEN Date: 2012-01-30 Subst. For:

Released by Holger.Paaen on 2012-01-30
Document Status: approved

GETRAG	Geardata-Sheet	D-No.: 250.6.4305.35	z = 43
	External gearing	Remark: IIa	

Mating gear:	i 43 / 43	a	Type: 250	Speed: FM 2. / 6.
	i /	a	Customer: RENAULT H5Ft	

z 43	m_n 1.000000	α 30 ° 0 ´ 0 ´´	β 0 ° 0 ´ 0 ´´	STRAIGHT
x -0.050	d 43.000	d_b 37.239	d_a 43.89 $_{-0.25}$	d_f 41.80 $_{-0.59}$

Tolerance Class	9	Tooth thickn. sn 1.590 ÷ 1.550
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 8 teeth
Radial composite err. Fi ´´	Tangent. comp. err. Fi ´	finished: 22.424 ÷ 22.389
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: 46.231 ÷ 46.167
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 43.64 dNf 41.94
Tooth alignment err. fHβ	Total alignment err. Fβ 0.011	rad. of curvature ρdNa 11.38 ρdNf 9.65

Tool	STW -	z_0	Steigung der Schraubenführ. 0.0000	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 44 x 1.00 x 43 x 9 v

GAGE DIMENSION sn max. eff. = 1.613

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

VBL created: PAAßEN Date: 2011-01-30 Subst. For:

GETRAG	Geardata-Sheet	D-No.: 250.6.4305.35	z = 38
	External gearing	Remark: IIIb	

Mating gear:	i 38 / 38	a	Type: 250	Speed: FM 1. / 5.
	i /	a	Customer: RENAULT H5Ft	

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 39.89 $_{-0.25}$	d_f 37.80 $_{-0.59}$

Tolerance Class 9.3		Tooth thickn. sn	2.064 ÷	2.019
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 7 teeth		
Radial composite err. Fi ´´	Tangent. comp. err. Fi ´	finished:	19.881 ÷	19.842
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:	41.992 ÷	41.923
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 39.64	dNf 37.94	
Tooth alignment err. fHβ	Total alignment err. Fβ 0.012	rad. of curvature ρdNa 11.05	ρdNf 9.44	

Tool	STW -	z_0	Steigung der Schraubenführ. 0.0000	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 40 x 1.00 x 38 x 9.3 h

GAGE DIMENSION sn max. eff. = 2.090

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

VBL created: PAAßEN Date: 2012-01-30 Subst. For:

Released by Holger.Paaen on 2012-01-30
Document Status: approved

GETRAG	Geardata-Sheet	D-No.: 250.6.4305.35	z = 38
	External gearing	Remark: IIIa	

Mating gear:	i 38 / 38	a	Type: 250	Speed: FM 1. / 5.
	i /	a	Customer: RENAULT H5Ft	

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 39.89 $_{-0.25}$	d_f 37.80 $_{-0.59}$

Tolerance Class 9		Tooth thickn. sn	2.167 ÷ 2.127
GO-GAGE takes priority over inspection of individual deviations		Base tangent length over 7 teeth	
Radial composite err. Fi ´´	Tangent. comp. err. Fi ´	finished:	19.970 ÷ 19.935
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:	42.148 ÷ 42.088
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 39.64	dNf 37.94
Tooth alignment err. fHβ	Total alignment err. Fβ 0.011	rad. of curvature ρdNa 11.05	ρdNf 9.44

Tool	STW -	z_0	Steigung der Schraubenführ. 0.0000	
grinding wheel	h_{aP0}	ρ_{aP0}	b	

External Spline DIN 5480-W 40 x 1.00 x 38 x 9 v

GAGE DIMENSION sn max. eff. = 2.190

da NON STANDARD

Spline is rolled.

Ch.ind.	Ch. No.	Changes	Date	Name

VBL created: PAAßEN Date: 2011-01-30 Subst. For:

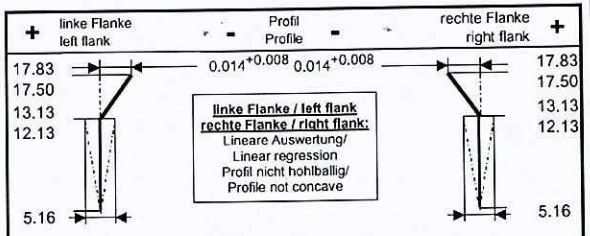
Released by Holger.Paaen on 2012-01-30
Document Status: approved

Released by Fabrizio.Cricenti on 2017-08-15
Document Status: approved

STIRNRAD / GEAR		außenverzahnt / external
Zähnezahl / Number of teeth	z	20
Modul / Normal module	m_n	2.300000
Eingriffswinkel / Normal pressure angle	α_n	20° 0' 0"
Schrägungswinkel / Helix angle	β	26° 42' 0"
Steigungsrichtung / Hand of helix		LEFT
Profilverschiebungsfaktor / Addendum modification coeff.	x	0.600
Teilkreisdurchmesser / Pitch diameter	d	51.490
Kopfkreisdurchmesser / Outside diameter (a)	d_a	59.85 $_{-0.26}$
Kopfnutzkreisd. theo. max. / Tip diam. usable theo.	d_{Na}	59.55
Kopfnutzkreisd. theo. min. / Tip diam. usable theo.	d_{Na}	59.15
Fußkreisdurchmesser / Root diameter	d_f	45.80 $_{-0.32}$
Fußnutzkreisdurchmesser / Root diameter usable	d_{Nf}	48.79
Grundkreisradius / Base circle radius	r_b	23.842
Grundkreisdurchmesser / Base diameter	d_b	47.685
Normalzahndicke / Normal tooth thickness	max. s_n	4.617
Normalzahndicke / Normal tooth thickness	min. s_n	4.587
Meßzähnezahl / Number of teeth spanned	k	
Zahnweite / Base tangent length	max. W_k	
Zahnweite / Base tangent length	min. W_k	
Meßkugeldurchmesser / Ball diameter	D_M	3.5000
Diam. Zweikugelmaß / Measurement o. balls	max. M_{dK}	57.686
Diam. Zweikugelmaß / Measurement o. balls	min. M_{dK}	57.621
Verdrehflankenspiel / Circumferential backlash	theo.	0.066 0.172

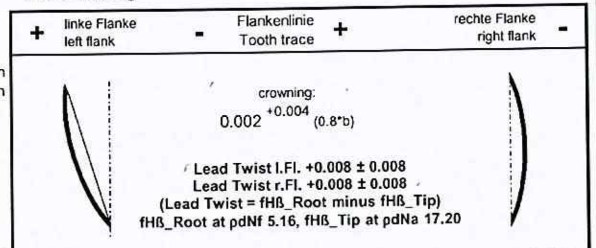
Toleranzen der Verzahnung (DIN 3961 vom Aug. 1978) gültig für Werte am Einzelzahn
Tolerances of gearing (DIN 3961 of Aug. 1978) valid for values at individual tooth (8)

	linke Fl. / left flank	rechte Fl. / right flank		
Profil-Formabweichung $f_{f\alpha}$ / Profile form error	# 0.009		Eingriffsteilungs-Abweich. f_{pe} / Normal pitch error	0.014
Profil-Gesamtabweichung F_α / Total profile error			Teilungs-Einzelabweichung f_p / Adjacent pitch error	0.014
Profil-Winkelabweichung $f_{H\alpha}$ / Profile angle error	0.000 ± 0.008	0.000 ± 0.008	Teilungssprung f_u / Diff. bet. adjacent pitches	0.018
Flankenl.-Winkelabweich. $f_{H\beta}$ / Tooth alignment error	+ 0.025 ± 0.013	0.000 ± 0.013	Teilungs-Summenabweich. F_{pk} / Cumulative circ. pitch error	
Flankenl.-Gesamtabweich. F_β / Total alignment error			Rundlaufabweichung F_r / Radial run-out	0.040
Flankenl.-Formabweich. $f_{f\beta}$ / Longitudinal alignment err.	# 0.009		Zahndickenschwankung R_s / Range of tooth thickn. error	
Teilungs-Gesamtabweich. F_p / Cumulative pitch error	0.050			
Einf.-Wälzabweichung F_i' / Tangential composite error			Zweifl.-Wälzabweichung F_i'' / Radial composite error	0.045
Einflanken-Wälzsprung f_i' / Tang. tooth to tooth comp. err.			Zweifl.-Wälzsprung f_i'' / Radial tooth to tooth comp. err.	0.018
Radbreite im Meßkreis d_M b / Facewidth in meas. diam.	34.42		Meßkreis Krümmungsradius ρ_{dM} / Radius of curvature meas. diam.	11.13



$f_{H\alpha}$ = 0.000 ± 0.006 Average values $f_{H\alpha}$ = 0.000 ± 0.006

* Schreibbeginn
* Start of checking Ø = 48.05 $_{-0.30}$ ≡ 2.96

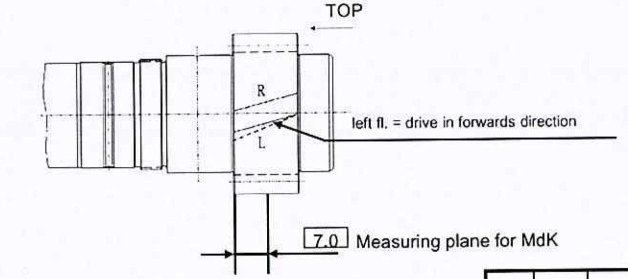


$f_{H\beta}$ = + 0.025 ± 0.006 Average values $f_{H\beta}$ = 0.000 ± 0.006

* ffα (zwischen dNf und dem Schreibbeginn ds) max ffα/2, jedoch 0.003 zulässig
* ffα (between dNf and start of checking ds) max ffα/2, 0.003 allowable.

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



Hondurchmesser = 48.05 $_{-0.30}$ ≡ 2.96
honing diameter

(b)

#Waviness evaluation (fitted sine) in profile and helix direction until 4th gear order.
Grenzkurve/limiting curve

Profile:	n0 = 0.60 K = 2.80 R = 7.30
helix:	n0 = 0.88 K = 0.05 R = 17.50

Order referenced to the considered gear

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

Wkz-Profil siehe Werkzeugdatenblatt Nr. 250.6.4305.35
For Tooth profile, see tool data sheet number

b	1	C001225	See CO	20170814	Cricenti
a	1	C007260	See CO	########	Cricenti
Buch.	Anz.	Änd.Nr.		Datum	Name

Verteiler:

Schutzvermerk nach ISO 16016 beachten
Protection per ISO 16016

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

Abbildungen sind unmaßstäblich.
Diagrams not to scale.

Ersatz für:
Erstverwendung bei Getriebetype: 250
Remark:

	Datum	Name
gez.	2012-01-30	Paaßen, Holger
gepr.		

Verzahnungsblatt Endkontrolle
Final Check Gear Data
Benennung:
Naming:
Output Shaft K1

Zeichnungsnummer:
Drawing number:
250.6.4305.35

Document Revision: 20170815133115, printed on 2018-03-29 at 11:16 by Luca.Delia