

312167

GETRAG		Geardata-Sheet			D-No.: 251.6.1078.35		z = 34	
External gearing				Remark:				
Mating gear: ./.		i 34 / 34		a ./.		Type: 251		Speed: OS2
		i /		a		Customer: RSA		
z 34		m _n 1.000000		α 30 ° 0 ' 0 "		β 0 ° 0 ' 0 "		STRAIGHT
x -0.050		d 34.000		d _b 29.445		d _a 34.89 _{-0.25}		d _f 32.80 _{-0.59}
Tolerance Class 9				Tooth thckn. 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: 16.563 ÷ 16.529				
Rad. tooth to tooth comp. err. fi''		Tang. tooth to tooth comp. err. fi'		shaped: ÷				
Profile form error ffa		Profile angle error fHα		hobbed: ÷				
Total profile error Fα 0.021		Adjacent pitch err. fp 0.017		shaved: ÷				
Normal pitch error fpe		Diff. bet. adj. pitch. fu		Measurement over 2 balls DM= 2.00				
Cumulative pitch error Fp 0.040		Cum. circ. pitch err. Fpk		finished: 37.248 ÷ 37.185				
Cum. circ. pitch err. 1/8 extent Fpz/8		Radial run-out Fr 0.050		shaped: ÷				
Range of tooth thckn. error Rs		Longit. alignm. err. ffb		shaved: ÷				
Tooth alignment err. fhβ		Total alignment err. Fβ 0.011		usable diameter dNa 34.64		dNf 32.94		
				rad. of curvature pdNa 9.12		pdNf 7.38		
Tool		Bezugsprofil		DIN 5480				
grinding wheel		h _{aP0}		ρ _{aP0}		b		
<p>External Spline DIN 5480-W 35 x 1.00 x 34 x 9 v</p> <p>GAGE DIMENSION sn max. eff. = 1.613</p> <p>da NON STANDARD</p> <p>In Measurement planes 3.80 und 15.30 podNa min = 8.89 allowed</p>								
Ch.ind.		Ch. No.		Changes		Date		Name
VBL created: CRICENTI Date: 2015-12-04 Subst. for:								

Released by Fabrizio.Cricenti on 2015-12-04 Document Status: approved

		Geardata-Sheet			D-No.: 251.6.1078.35		z = 38																							
External gearing				Remark: IIIa																										
Mating gear: ./.		i 38 / 38		a ./.		Type: 251		Speed: OS2																						
		i /		a		Customer: RSA																								
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 39.66 _{-0.25}		d _f 37.80 _{-0.59}																						
Tolerance Class 9				Tooth thickn. s _n 2.107 ÷ 2.067																										
GO-GAGE takes priority over inspection of individual deviations				Base tangent length over 7 teeth																										
Radial composite err. F _i ''		Tangent. comp. err. F _i '		finished: 19.918 ÷ 19.884																										
Rad. tooth to tooth comp. err. f _i ''		Tang. tooth to tooth comp. err. f _i '		shaped: ÷																										
Profile form error f _{fα}		Profile angle error f _{Hα}		shaved: ÷																										
Total profile error F _α 0.021		Adjacent pitch err. f _p 0.017		Measurement over 2 balls DM= 2.00																										
Normal pitch error f _{pe}		Diff. bet. adj. pitch. f _u		finished: 42.057 ÷ 41.997																										
Cumulative pitch error F _p 0.040		Cum. circ. pitch err. F _{pk}		shaped: ÷																										
Cum. circ. pitch err. 1/8 extent F _{pz/8}		Radial run-out F _r 0.050		shaved: ÷																										
Range of tooth thickn. error R _s		Longit. alignm. err. f _{fβ}		usable diameter d _{Na} 39.59		d _{Nf} 37.94																								
Tooth alignment err. f _{Hβ}		Total alignment err. F _β 0.011		rad. of curvature p _{dNa} 11.00		p _{dNf} 9.44																								
Tool		Bezugsprofil		DIN 5480																										
grinding wheel		h _{aP0}		P _{aP0}		b																								
<p>External Spline DIN 5480-W 40 x 1.00 x 38 x 9 n</p> <p>GAGE DIMENSION s_n max. eff. = 2.130</p> <p>d_a and d_{Na} NON STANDARD</p>																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> </tr> <tr> <td>Ch.ind.</td> <td>Ch. No.</td> <td colspan="4">Changes</td> <td>Date</td> <td colspan="4">Name</td> </tr> </table>																				Ch.ind.	Ch. No.	Changes				Date	Name			
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		Geardata-Sheet			D-No.: 251.6.1078.35		z = 38																							
External gearing				Remark: IIIb																										
Mating gear: ./.		i 38 / 38		a ./.		Type: 251		Speed: OS2 -																						
		i /		a		Customer: RSA																								
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 39.66 _{-0.25}		d _f 37.60 _{-0.59}																						
Tolerance Class 9.3				Tooth thckn. sn 2.004 ÷ 1.959																										
GO-GAGE takes priority over inspection of individual deviations				Base tangent length over 7 teeth																										
Radial composite err. F _i ''		Tangent. comp. err. F _i '		finished: 19.829 ÷ 19.790																										
Rad. tooth to tooth comp. err. f _i ''		Tang. tooth to tooth comp. err. f _i '		shaped: ÷ hobbed: ÷																										
Profile form error f _{fα}		Profile angle error fH _α		shaved: ÷																										
Total profile error F _α 0.023		Adjacent pitch err. f _p 0.019		Measurement over 2 balls DM= 2.00																										
Normal pitch error f _{pε}		Diff. bet. adj. pitch. f _u		finished: 41.900 ÷ 41.831																										
Cumulative pitch error F _p 0.045		Cum. circ. pitch err. F _{pk}		shaped: ÷ hobbed: ÷																										
Cum. circ. pitch err. 1/8 extent F _{pz/8}		Radial run-out F _r 0.050		shaved: ÷																										
Range of tooth thckn. error R _s		Longit. alignm. err. f _{fβ}		usable diameter d _{Na} 39.41		d _{Nf} 37.94																								
Tooth alignment err. f _{Hβ}		Total alignment err. F _β 0.012		rad. of curvature p _{dNa} 10.84		p _{dNf} 9.44																								
Tool		Bezugsprofil		DIN 5480																										
grinding wheel		h _{aP0}		ρ _{aP0}		b																								
<p>External Spline DIN 5480-W 40 x 1.00 x 38 x 9.3 c</p> <p>GAGE DIMENSION sn max. eff. = 2.030</p> <p>da, dNa and df NON STANDARD</p>																														
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REPORT 16/261

Date: 08/11/2016
Author: F. Abbaticchio

Reason for analysis: <i>Motivo dell'indagine:</i>	PPAP
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Requester: <i>Richiedente:</i>	WLQ - Stefano Picerno
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Part Name: <i>Nome particolare:</i>	OUTPUT SHAFT 2
Material: <i>Materiale:</i>	GCG_805000 Part 2
State of part: <i>Stato del particolare:</i>	Finito

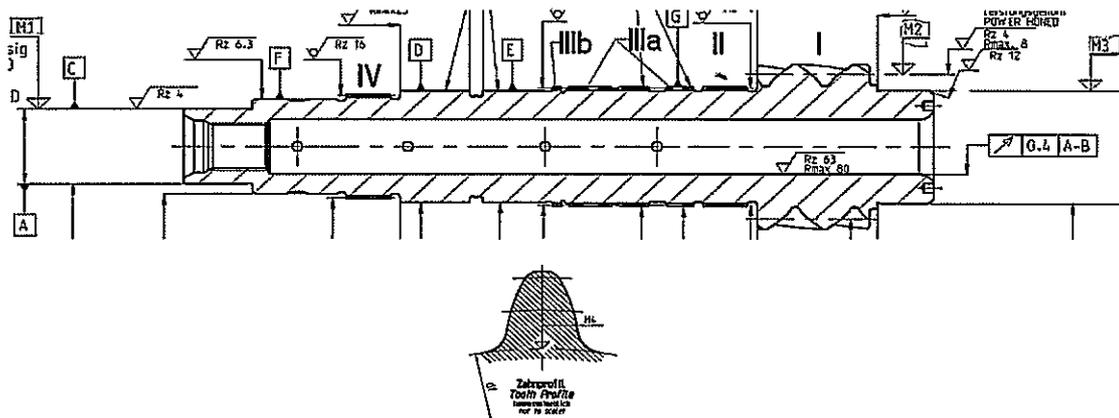
P/N:	2516107835
S/N:	-
Customer: <i>Cliente:</i>	-

Result: <i>Risultato:</i>	OK
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Distribution list: <i>Lista di distribuzione:</i>	WLQ - S. Picerno ELE - G. Pierro ME - L. Landriscina ME - G. Dachille
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Notes: <i>Note:</i>	Durezza a cuore al limite inferiore della specifica
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Drawing (Disegno)



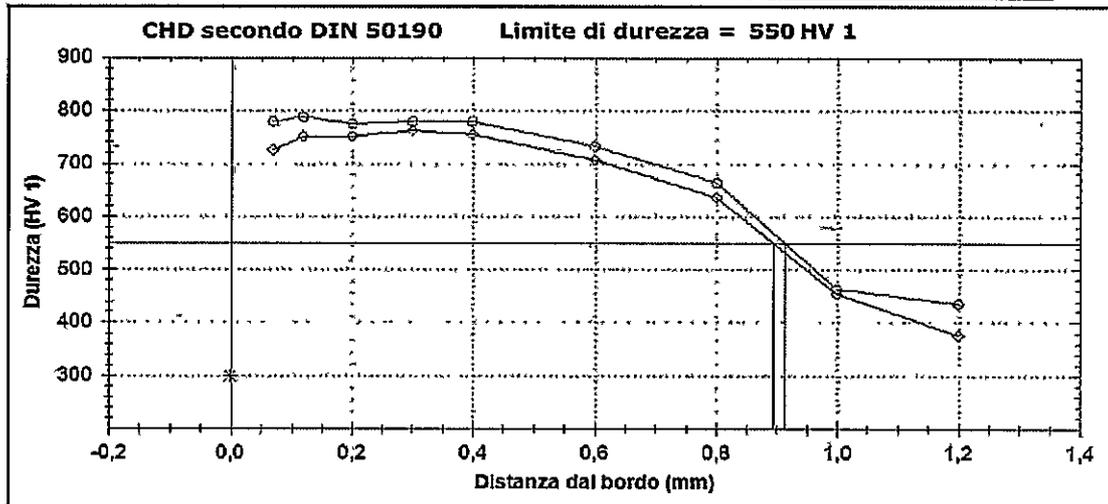
Picture 1: estratto del disegno del particolare, con posizione dei punti di misura per le caratteristiche metallurgiche.

Surface Hardness Verification (Verifica Durezza Superficiale)

Scale	Position	Values [mm]	Range
HRC	M1	61,4	-
HRA	M1	82,1	80.5 + 2.5

CHD and Core Hardness Verification (Verifica CHD e Durezza a Cuore)

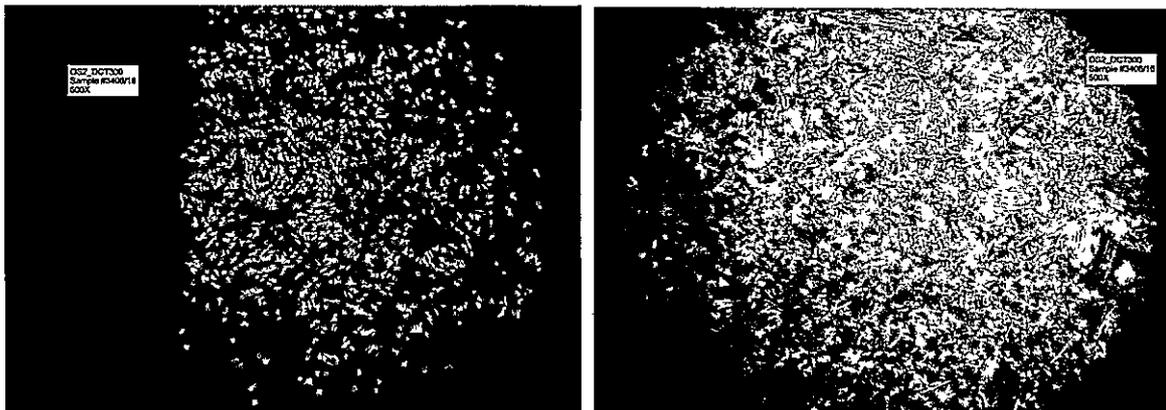
	Sample	Position	Measured Value	Range
CHD 550 HV1	3406/16	M2	0,91	0.70 + 0.50 mm
CHD 550 HV1	3406/16	M3	0,89	min 0.50 mm
Core hardness HV10	3406/16	M4	300	≥ 300



Picture 2: profili di durezza.

Analysis at Metallographic Microscope (Analisi al Microscopio Metallografico)

Sample #	3406/16
Gear - Tooth flank surface structure:	10 - 15%
Gear - Tooth base core structure:	poca martensite + bainite + tracce di ferrite



Picture 3: Microstruttura sul fianco dente (a sinistra) ed a cuore sulla base dente (a destra), ingrandimento 500x.

GETRAG		Geardata-Sheet			D-No.: 251.6.1078.35		z = 15	
External gearing				Remark:				
Mating gear: ./.		i 0 / 15		a ./.		Type: 251		Speed: OS2
		i /		a		Customer: RSA		
z 15		m _n 2.680000		α 20 ° 0 ' 0 "		β 24 ° 0 ' 0 "		LEFT
x 1.096		d 44.004		d _b 40.879		d _a 54.70 _{-0.26}		d _f 39.92 _{-0.30}
Gear quality; Tolerance zone					Tooth thickn. sn [6.347 ÷ 6.317]			
Test group acc. to DIN 3961 of Aug. 78					Base tangent length over 4 teeth			
Radial composite err. Fi''		Tangent. comp. err. Fi'		finished: [30.428 ÷ 30.399]				
Rad. tooth to tooth comp. err. fi''		Tang. tooth to tooth comp. err. fi'		shaped: 30.530 ÷ 30.501				
Profile form error ffa		Profile angle error fHα		shaved: ÷				
Total profile error Fα		Adjacent pitch err. fp		Measurement over 2 balls DM= 5.50				
Normal pitch error fpe		Diff. bet. adj. pitch. fu		finished: [56.778 ÷ 56.728]				
Cumulative pitch error Fp		Cum. circ. pitch err. Fpk		shaped: 56.954 ÷ 56.905				
Cum. circ. pitch err. 1/8 extent Fpz/8		Radial run-out Fr		shaved: ÷				
Range of tooth thickn. error Rs		Longit. alignm. err. ffβ		usable diameter dNa		53.68		dNf 42.08
Tooth alignment err. fHβ		Total alignment err. Fβ		rad. of curvature pdNa		17.40		pdNf 4.99
Tool		FRW -		m _{n0} 2.640591		α _{n0} 17.3129 °		β ₀ 23.6254 °
grinding wheel		h _{aP0}		ρ _{aP0}		b		
FOR PREMACHINING ONLY (HARD CONDITION) !								
Final measurement dimensions (gear errors and modifications) see final check gear data !								
Correction dimensions for machining in hard and soft condition in accordance with final measurement dim. !								
Root diam. (soft): df = 39.86 -0.21 Premachining with comma chip (soft): fHα = 15 μm Measurement according to the tool data, fHα ca. 0 μm								
Feedback soft - hard analysis necessary?								
no								
yes X								
Ch.ind.		Ch. No.		Changes		Date		Name
VBL created: CRICENTI Date: 2015-12-04 Subst. for:								

soft- hard analysis on date: _____