312446

GETRAG

Part Submission Warrant

Part Name **SPEED GEAR 4 TH. CPL.** Customer Part Number **250.1.4222.37**

Shown on Drawing No. **250.1.4222.37** Organization Part #

Engineering Change Level **d 35670** Dated **01 August 2014**

Additional Engineering Changes Dated

Safety and/or Government Regulation ☐ Yes ☑ No Purchase Order No. Weight (kg) **0.9600**

Checking Aid No. Checking Aid Engineering Change Level Dated

ORGANIZATION MANUFACTURING INFORMATION

GETRAG MODUGNO

Organization Name & Supplier/Vendor Code

VIA DEI CICLAMINI N°4

Street Address

MODUGNO	**BARI**	**70026**	**ITALY**
City	Region	Postal Code	Country

CUSTOMER SUBMITTAL INFORMATION

REN

Customer Name/Division

Buyer/Buyer Code

TYP 250

Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? ☑ Yes ☐ No ☐ n/a

Submitted by IMDS or other customer format:

Are polymeric parts identified with appropriate ISO marking codes? ☐ Yes ☐ No ☑ n/a

REASON FOR SUBMISSION (Check at least one)

- ☐ Initial Submission
- ☑ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts Produced at Additional Location
- ☑ Other - please specify below

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☑ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at organization's manufacturing location.

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☑ material and functional tests ☐ appearance criteria ☑ statistical process package

These results meet all drawing and specification requirements: ☑ Yes ☐ NO (If "NO" - Explanation Required)

Mold / Cavity / Production Process

DECLARATION

I hereby affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of ____ / ____ hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION / COMMENTS: **New documentation for first PPAP lost**

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☑ n/a

Organization Authorized Signature Date **14 Jan 2015**

Print Name **Pennacchia Vincenzo** Phone No. **tel 390805858580** Fax No.

Title **GPS Leader** E-mail vincenzo.pennacchia@getrag.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☒ Approved ☐ Rejected ☐ Other

Customer Signature Date 15.01.15

Print Name Customer Tracking Number (optional)

March 2006 CFG-1001

STIRNRAD GEAR	außenverzahnt external
Zähnezahl z Number of teeth	53
Modul m_n Normal module	1.600000
Eingriffswinkel α_n Normal pressure angle	17° 30' 0"
Schrägungswinkel β Helix angle	29° 0' 0"
Steigungsrichtung Hand of helix	LEFT
Profilverschiebungsfaktor x Addendum modification coeff.	-0.226
Teilkreisdurchmesser d Pitch diameter	96.956
Kopfkreisdurchmesser d_a Outside diameter	$101.00_{-0.20}$
Kopfnutzkreisd. theo. max. d_{Na} Tip diam. usable theo.	100.55
Kopfnutzkreisd. theo. min. d_{Na} Tip diam. usable theo.	100.12
Fußkreisdurchmesser d_f Root diameter	$90.60_{-0.35}$
Fußnutzkreisdurchmesser d_{Nf} Root diameter usable	93.43
Grundkreisradius r_b Base circle radius	45.605
Grundkreisdurchmesser d_b Base diameter	91.211
Normalzahndicke max. s_n Normal tooth thickness	2.207
Normalzahndicke min. s_n Normal tooth thickness	2.177
Meßzähnezahl k Number of teeth spanned	
Zahnweite max. W_k Base tangent length	
Zahnweite min. W_k Base tangent length	
Meßkugeldurchmesser D_M Ball diameter	2.5000
Diam. Zweikugelmaß max. M_{dK} Measurement o. balls	98.769
Diam. Zweikugelmaß min. M_{dK} Measurement o. balls	98.668
Verdrehflankenspiel theo. Circumferential backlash	0.071 0.176

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

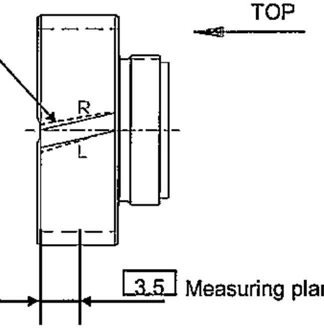
Wkz-Profil siehe Werkzeugdatenblatt Nr.
For Tooth profile, see tool data sheet number 250.1.4223.37

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

	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 ± 0.007	0.000 ± 0.007	Teilungssprung f_u Diff. bet. adjacent pitches	0.018
Flankenl.-Winkelabweich. $f_{H\beta}$ Tooth alignment error	+ 0.010 ± 0.013	- 0.015 ± 0.013	Teilungs-Summenabweich. F_{pk} Cumulative circ. pitch error	
Flankenl.-Gesamtabweich. F_β Total alignment error	0.016	0.016	Rundlaufabweichung F_r Radial run-out	0.032
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	0.040
Einflanken-Wälzsprung f_i' Tang. tooth to tooth comp. err.			Zweifl.-Wälzsprung f_i'' Radial tooth to tooth comp. err.	0.016
Radbreite im Meßkreis d_M b Facewidth in meas. diam.	16.55		Meßkreis Krümmungsradius ρ_{dM} Radius of curvature meas. diam.	14.00

right fl. = drive

TOP

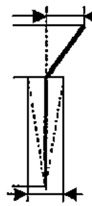


3.5 Measuring plane for MdK

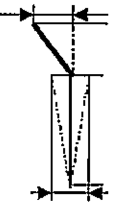
Hondurchmesser = $92.68_{-0.30}$ ≡ 8.22
honing diameter

+	linke Flanke left flank	-	Profil Profile	-	rechte Flanke right flank	+

Kopf / Tip: 21.16, 20.64, 16.08, 15.00 — $0.006^{+0.008}$ $0.008^{+0.008}$ (a) — 21.16, 20.64, 16.08, 15.00



linke Flanke / left flank
rechte Flanke / right flank:
Lineare Auswertung/
Linear regression
Profil nicht hohlballig/
Profile not concave



Fuß / Root: 10.12 (a) 10.12

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

* Schreibbeginn
* Start of checking Ø = $92.68_{-0.30}$ ≡ 8.22

+	linke Flanke left flank	-	Flankenlinie Tooth trace	+	rechte Flanke right flank	-

unten / down

crowning:
$(0.003^{+0.002}) (0.8*b)$

Lead Twist l.Fl. +0.010 ± 0.008
Lead Twist r.Fl. +0.010 ± 0.008
(Lead Twist = fHß_Root minus fHß_Tip)
fHß_Root at rdNf 10.12, fHß_Tip at rdNa 20.34

oben / up (b)

$f_{H\beta}$ = + 0.010 ± 0.006 Average values $f_{H\beta}$ = - 0.015 ± 0.006

* ffαf (zwischen dNf und dem Schreibbeginn ds) max ffα/2, jedoch 0.003 zulässig
* ffαf (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

Buch.	Anz.	Änd.Nr.		Datum	Name
b	1	35978	See change report	20130515	Cricenti
a	2	35392	See change report	13/05/2011	Cricenti

Verteiler:

Schutzvermerk nach DIN 34 beachten

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

Remark:

Abbildungen sind unmaßstäblich.
Diagrams not to scale.

Ersatz für

Erstverwendung bei Getriebetype: 250.0.0004.16

	Datum	Name
gez.	2009-11-18	Paaßen, Holger
gepr.		

Verzahnungsblatt Endkontrolle
Final Check Gear Data
Benennung:
Naming:
Schaltrad 4.Gg.

Zeichnungsnummer:
Drawing number:
250.1.4223.37

GETRAG Production Part Approval

DIMENSIONAL TEST RESULTS

Organization:	GETRAG	Part Number:	250.1.4222.37
Supplier/Vendor Code:	GETRAG Modugno	Part Name:	SR4
INSPECTION FACILITY: NA		Design Record Change Level:	d 35670 01 08 2014
		Engineering Change Documents:	

Organization Measurement Results (Data)

Item	Dimension/Specification	Specification / Limits		Test Date	Qty. Tested	1	2	3	4	5	controllo distuttivo	Ok	Not Ok
1	Profile Teeth	–	–		5	OK	OK	OK	OK	OK		ok	
2	Root diameter	90.600	90.250		5	90.371	90.371	90.373	90.373	90.370		ok	
3	Outside diameter	101.000	100.800		5	100.810	100.804	100.849	100.930	100.802		ok	
4	MDK	98.769	98.668		5	98.720	98.725	98.719	98.705	98.718		ok	

March 2006 CFG-1003

SIGNATURE	TITLE	DATE
G. Russo	QPE	14 Jan 2015

Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0412_06 0 ZPK 117057	Controllore:	turno C	Data:	09.01.2015 11:48
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.:	5	Angolo pressione	17.5°	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formmeßt	Angolo elica	-29°	Inizio elab. M1	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#1)1mm
Werkzeug:	Charge:	Ang. Base	-27.54°	Fat.scor.pr. x	-.226

Testa

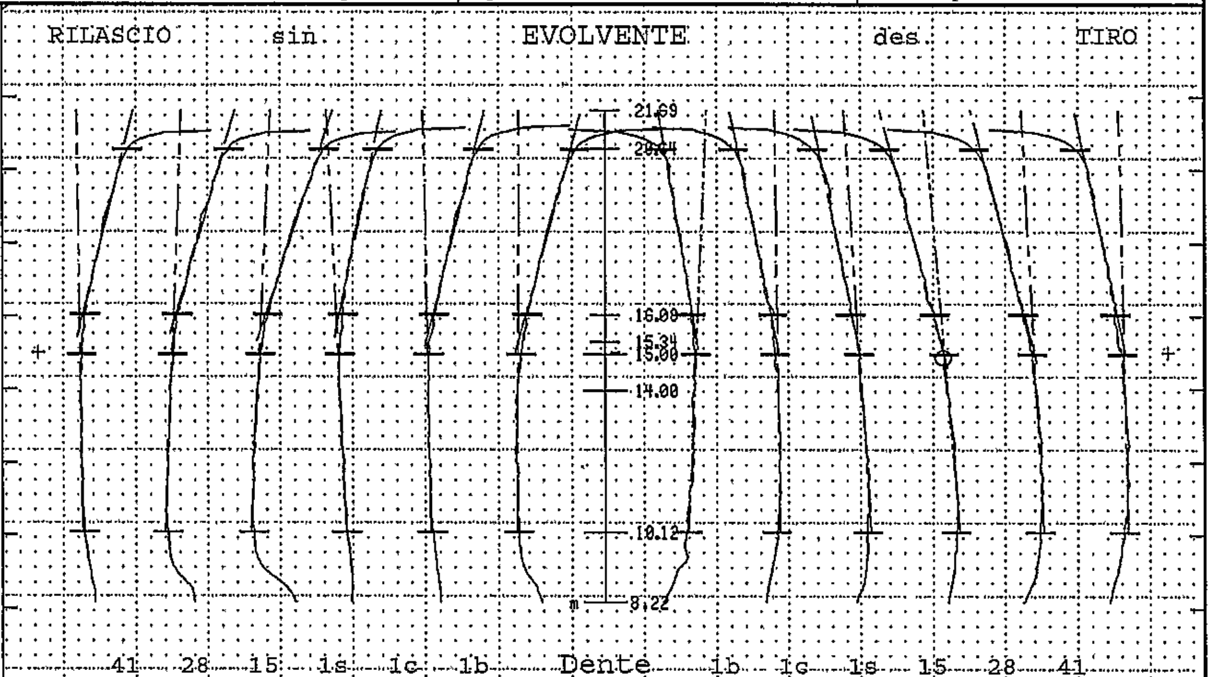
20 µm

Va500:1

Vb5:1

2 mm

Piede



Tolerance		Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm	±6	-1	Var a 3							±6	Var a 3						-2	
fHα	±7	-1	1	-2	-2	2	1	0		±7	2	-1	-3	-4	-3	-1	-2	
Fα		2	1	2	2	2	2	2			3	2	3	4	3	2	3	
ffα	9	1	1	1	1	1	1	2		9	1	1	1	1	2	2	2	
Cα	0/4	1	0	1	1	0	0	1		0/4	1	1	1	1	1	1	1	
fKo	-14/-6	-13	-13	-12	-14	-12	-14	-14		-16/-8	-11	-10	-8	-10	-12	-10	-11	

Sotto

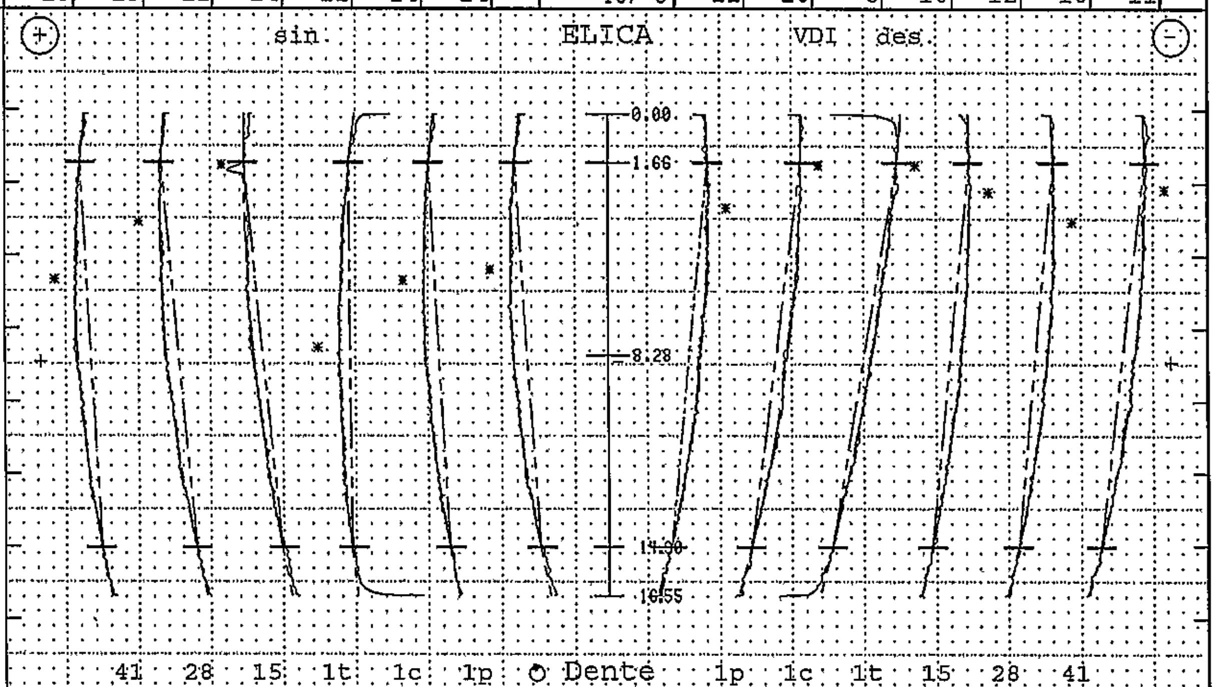
20 µm

Va500:1

Vb4:1

2.5 mm

Sopra



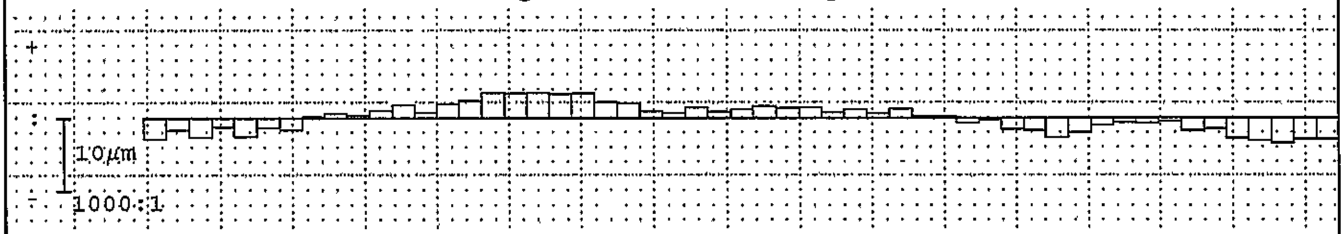
N:Z

fHßm	10±6	10	Var ß 6							-15±6	Var ß 5						-14	
fHß	10±13	10	7	12	13	1	7	9		-15±13	-13	-17	-23	-13	-12	-15	-14	
Fß	16	4	3	3	7	8	3	2		16	3	3	7	3	3	2	3	
ffß	9	3	1	2	6	1	1	1		9	2	2	2	1	1	2	2	
Cß	3/5	4	4	3	3	3	4	4		3/5	3	3	2	3	3	4	3	
Bd	10±8	8								10±8							10	

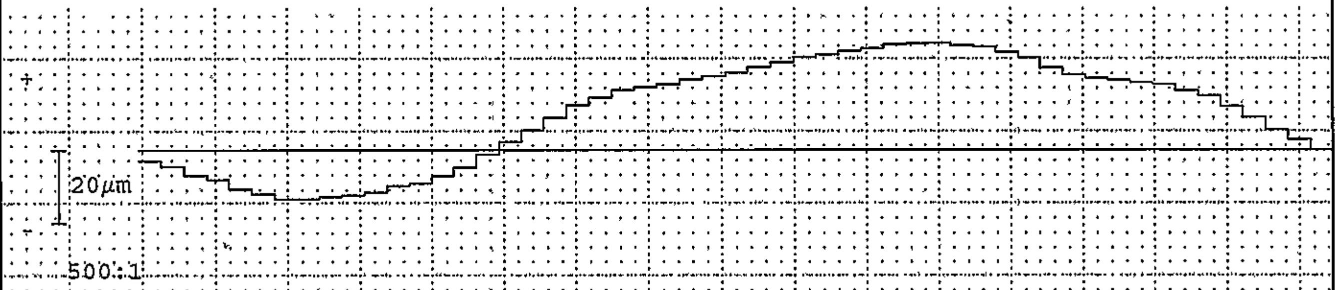
Ruota cilindrica Divisione

Nr. prog.: STI0412_06 0	ZPK 117057	Controllore:	turno C	Data:	09.01.2015 11:48
Denominazione:	SR4	Numero denti z	53	Angolo pressione	17.5°
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Angolo elica	-29°
Commessa/serie nr.:	5	Untersuchungszweck:	Laufende Messung		
Masch.Nr.:	M001	Spindel: Formmest 1	Satzzeug:	Charge:	

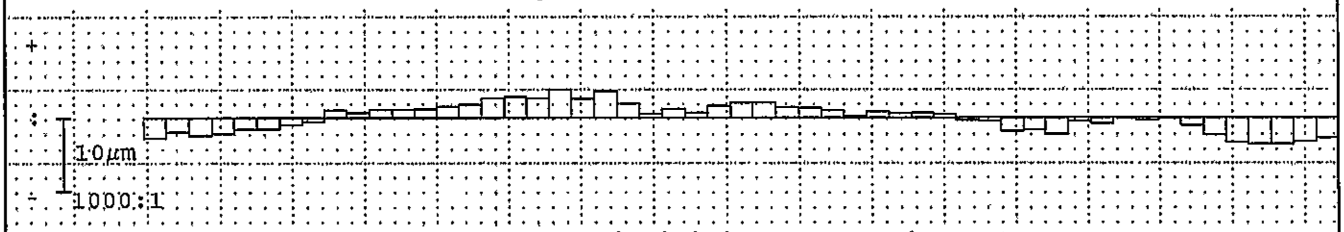
Errori singoli di divisione fp fianco sinistro



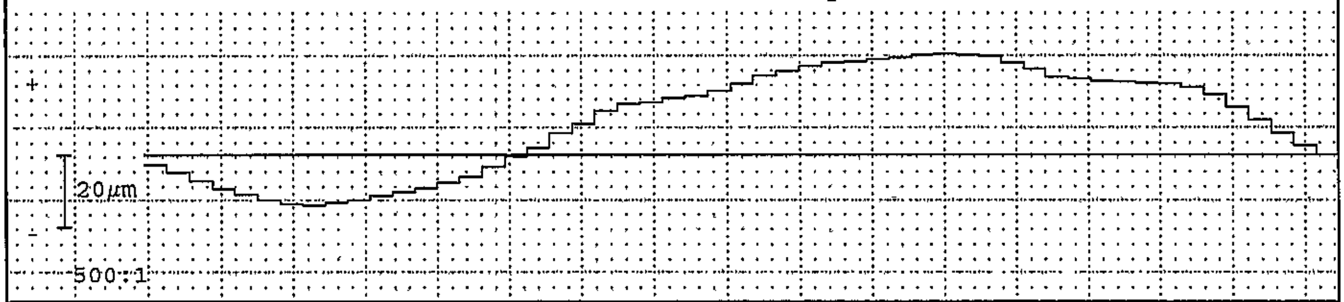
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



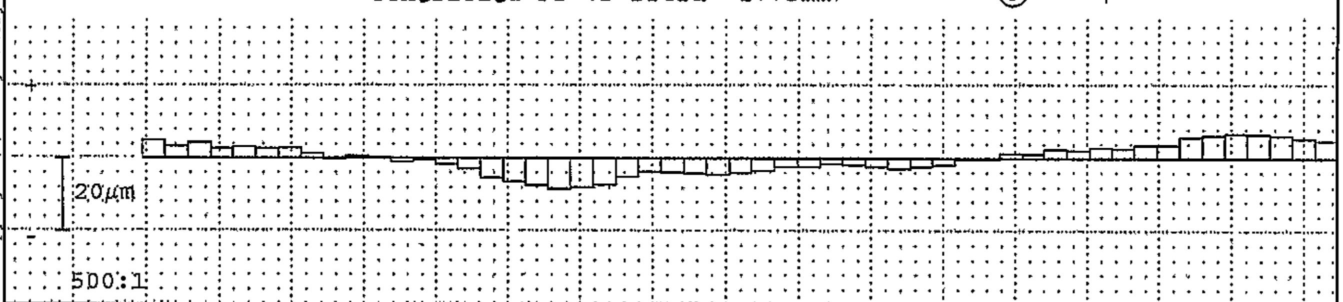
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:96.233 z=8.3mm

		fianco sinistro / RILASCIO				fianco destro / TIRO			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	4		14		4		14	
Gr. salto di passo	fu max	2		18		2		18	
Scarto di divisione	Rp	7				8			
Err. globale di divisione	Fp	43		50		42		50	
Err. cordale di divisione	Fpz/8	22				22			

Centricità Fr (Ø-sfera =2.75mm) ◎ : 11µm



Err. di concentricità	Fr	15	32	
Variaz. spessore dente	Rs			

Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0	P26 B7681	Controllore: turno B	Data: 09.01.2015 11:28
Denominazione:	SR4	Numero denti z 53	Largh.fasc.dent. b 16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m 1.6mm	Tratto evolv. La 4.88mm
Commessa/serie nr.:	4	Angolo pressione 17° 30´ 00"	Tratto elica Lß 13.24mm
Masch.Nr.:	M001 Spindel: Formm	Angolo elica -29° 00´ 00"	Inizio elab. Ml 10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db 91.2106mm	Palpatore Ø (#2C)1mm
Werkzeug:	Charge:	Ang. Base -27° 32´ 25"	Fat.scor.pr. x -.226

Testa

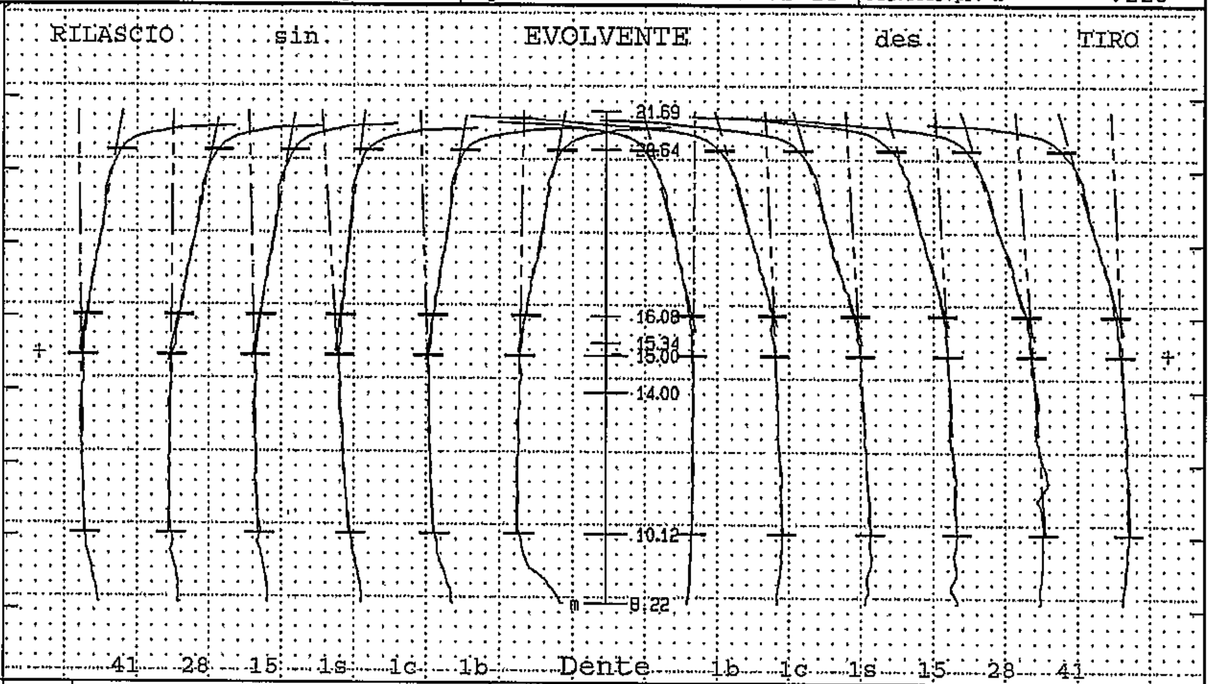
20 µm

Va500:1

Vb5:1

2 mm

Piede



Tolerance		Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm	±6	1	Var a 2							±6	Var a 2						-3	
fHα	±7	1	1	-1	1	3	1	-1		±7	0	-2	-3	-3	-4	-2	-3	
Fα		2	1	1	2	3	2	1			1	2	3	3	5	3	3	
ffα	9	1	1	1	1	1	1	1		9	1	1	1	1	3	1	2	
Cα	0/4	1	1	1	1	1	1	0		0/4	0	0	0	0	1	1	1	
fKo	-14/-6	-11	-10	-11	-11	-10	-11	-9		-16/-8	-12	-11	-12	-11	-13	-12	-12	

Sotto

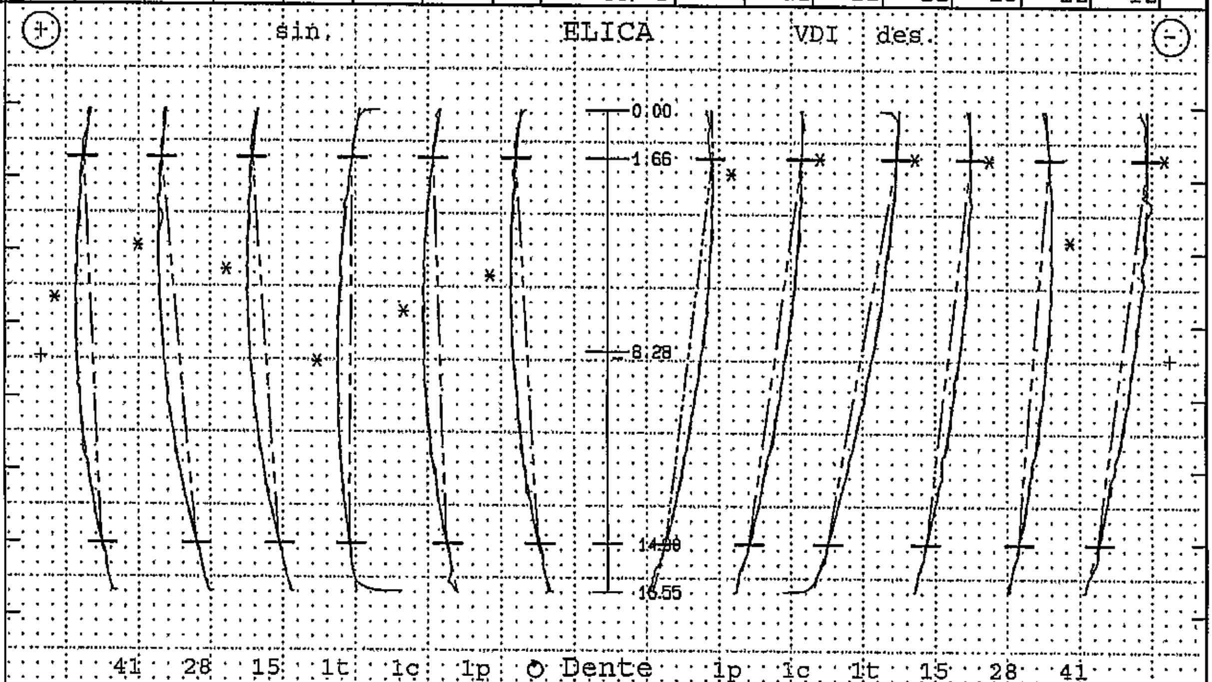
20 µm

Va500:1

Vb4:1

2.5 mm

Sopra



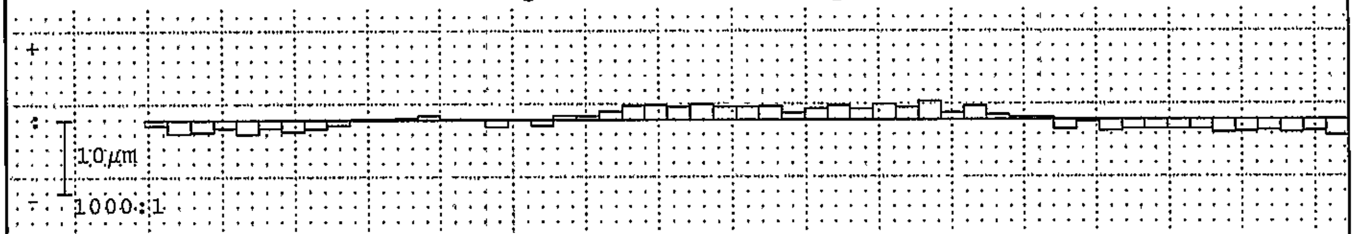
N:Z

fHßm	10±6	8	Var ß 8							-15±6	Var ß 8						-16	
fHß	10±13	8	6	12	9	-1	4	7		-15±13	-16	-19	-24	-15	-11	-17	-16	
Fß	16	4	4	3	2	10	6	3		16	2	3	8	1	4	3	3	
ffß	9	1	1	2	1	1	1	1		9	1	1	1	1	1	3	2	
Cß	3/5	4	4	4	4	4	4	4		3/5	4	3	3	3	4	3	3	
Bd	10±8	8								10±8							8	

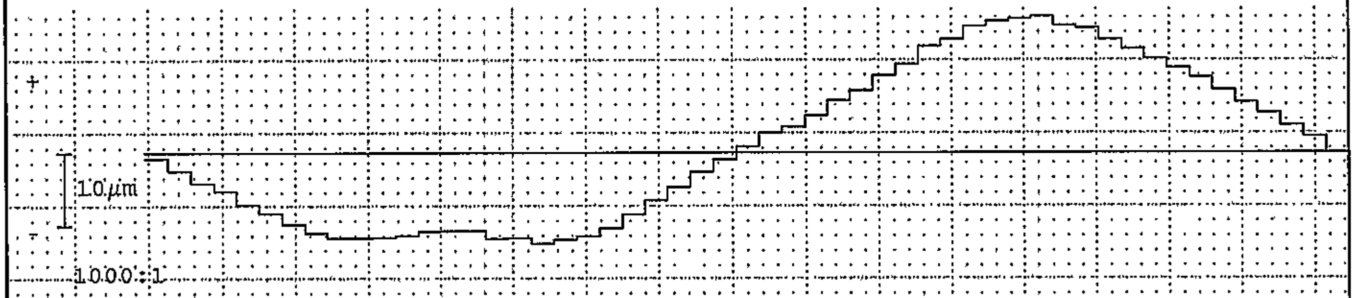
Ruota cilindrica Divisione

Nr. prog.: STI0412_06 0	P26 B7681	Controllore:	turno B	Data:	09.01.2015 11:28
Denominazione:	SR4	Numero denti z	53	Angolo pressione	17° 30´ 00"
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Angolo elica	-29° 00´ 00"
Commessa/serie nr.:	4	Untersuchungszweck:	Laufende Messung		
Masch.Nr.:	M001	Spindel: Formnest1	Werkzeug:	Charge:	

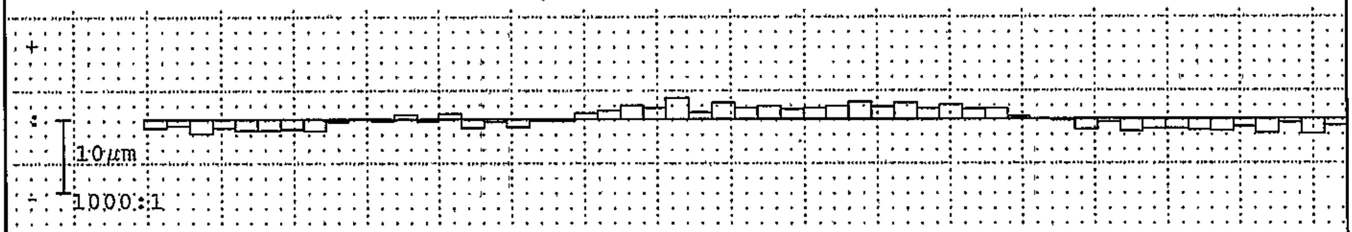
Errori singoli di divisione fp fianco sinistro



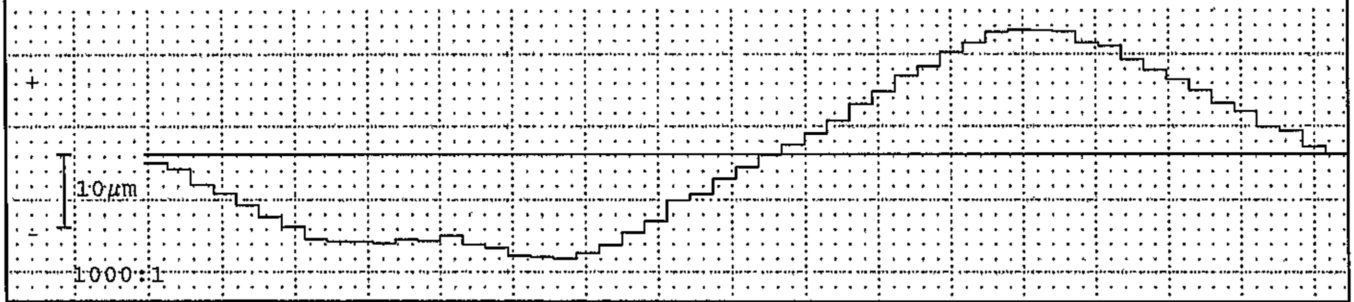
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



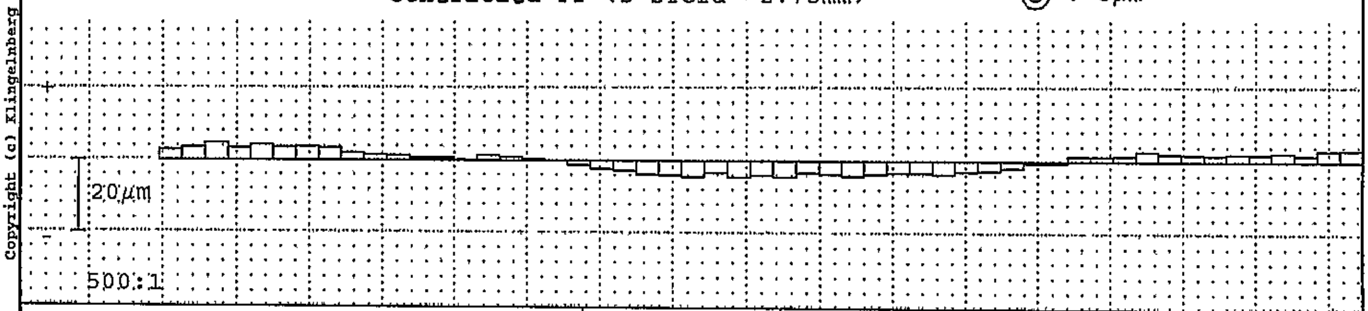
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:96.233 z=8.3mm

		fianco sinistro / RILASCIO				fianco destro / TIRO			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	3		14		3		14	
Gr. salto di passo	fu max	2		18		2		18	
Scarto di divisione	Rp	5				5			
Err. globale di divisione	Fp	31		50		31		50	
Err. cordale di divisione	Fpz/8	13				13			

Centricità Fr (Ø-sfera =2.75mm) ◎ : 8µm

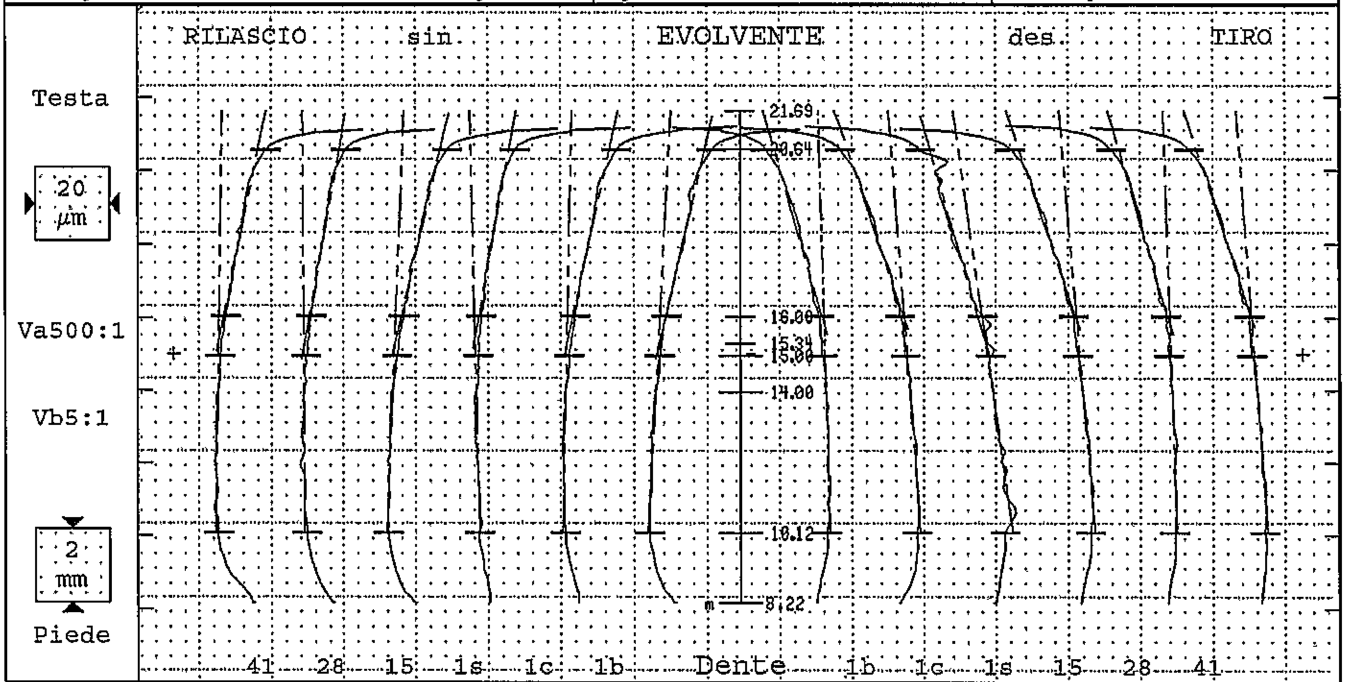


Err. di concentricità	Fr	9	32	
Variaz. spessore dente	Rs			

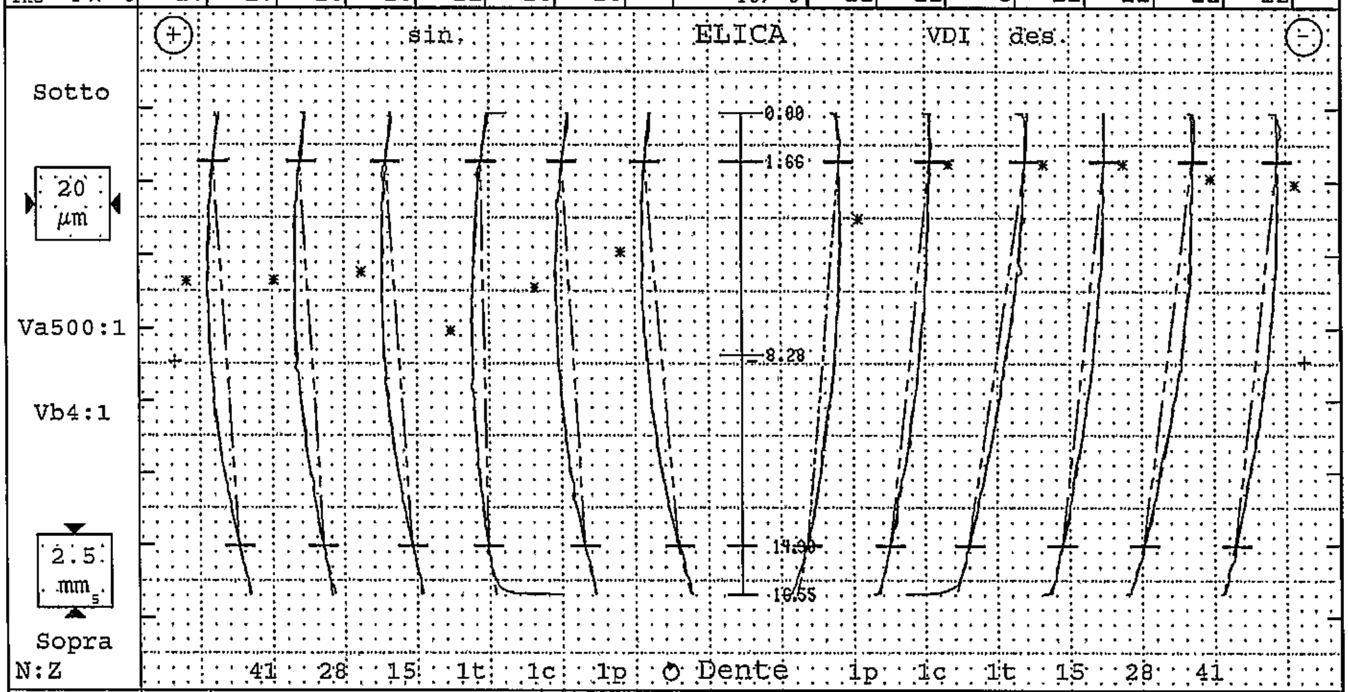
KLINGELNBERG

Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0	PNC35 B4784	Controllore:	Turno a	Data:	09.01.2015 11:19
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.:	3	Angolo pressione	17.5°	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formm...	Angolo elica	-29°	Inizio elab. M1	10.12mm
Untersuchungszweck:	Laufende Messung	ø Base db	91.2106mm	Palpatore ø	(#2)1mm
Werkzeug:	Charge:	Ang. Base	-27.54°	Fat.scor.pr. x	-.226



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm ±6	-1	Var a 2							±6	Var a 2						-4	
fHα ±7	-1	-1	0	-2	1	-1	-3		±7	-1	-4	-7	-4	-2	-4	-4	
Fα	2	2	2	3	2	2	3			2	4	7	4	2	4	4	
ffα 9	1	1	2	1	1	1	1		9	1	2	4	2	1	1	2	
Cα 0/4	1	1	1	1	1	1	1		0/4	1	1	0	1	1	1	1	
fKo -14/-6	-10	-10	-10	-10	-11	-10	-10		-16/-8	-12	-12	-8	-12	-12	-12	-12	

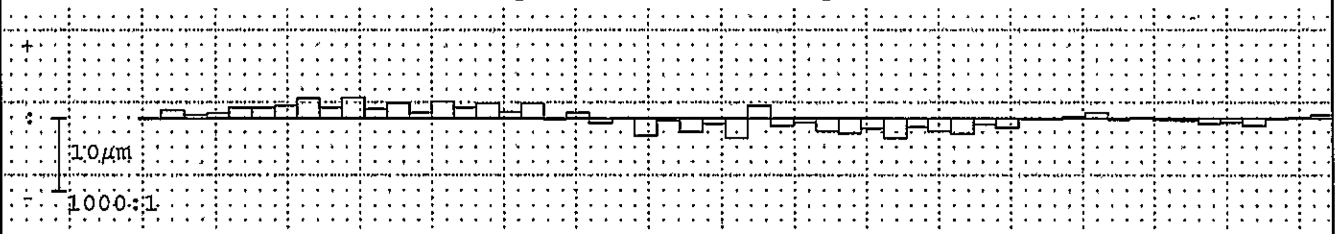


fHßm 10±6	8	Var ß 2							-15±6	Var ß 3						-15
fHß 10±13	8	9	8	9	2	7	11		-15±13	-11	-14	-20	-15	-17	-15	-15
Fß 16	3	2	3	2	7	3	2		16	3	1	4	1	2	1	1
ffß 9	1	1	1	1	1	1	1		9	1	1	2	1	1	1	1
Cß 3/5	4	4	4	4	3	4	4		3/5	3	3	3	3	4	3	3
Bd 10±8	9								10±8							9

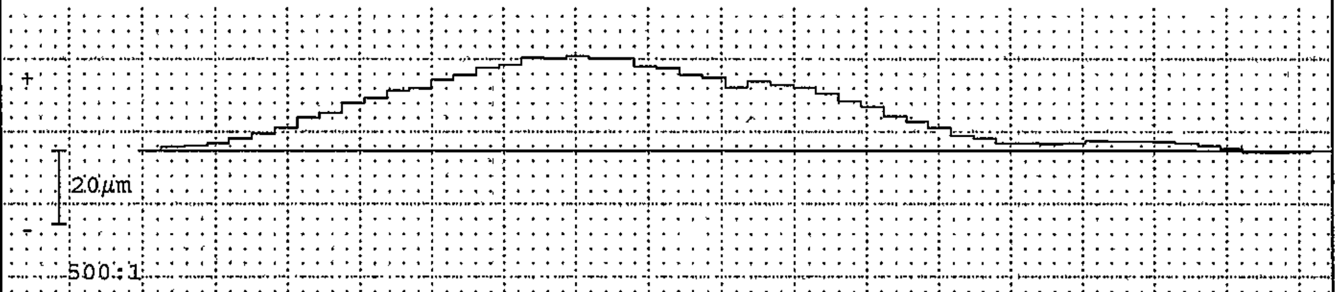
Ruota cilindrica Divisione

Nr. prog.: STI0412_06 0 PNC35 B4784	Controllore: Turno a		Data: 09.01.2015 11:19
Denominazione: SR4	Numero denti z	53	Angolo pressione 17.5°
Numero disegno.: 250.1.4223.37-IF	Modulo m	1.6mm	Angolo elica -29°
Commessa/serie nr.: 3	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmeßteil	Werkzeug:		Charge:

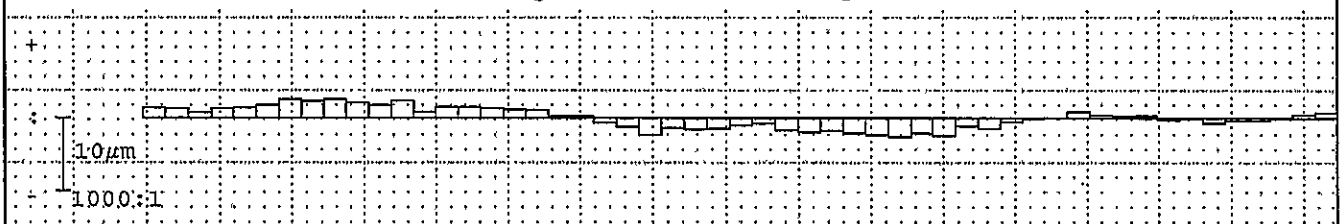
Errori singoli di divisione fp fianco sinistro



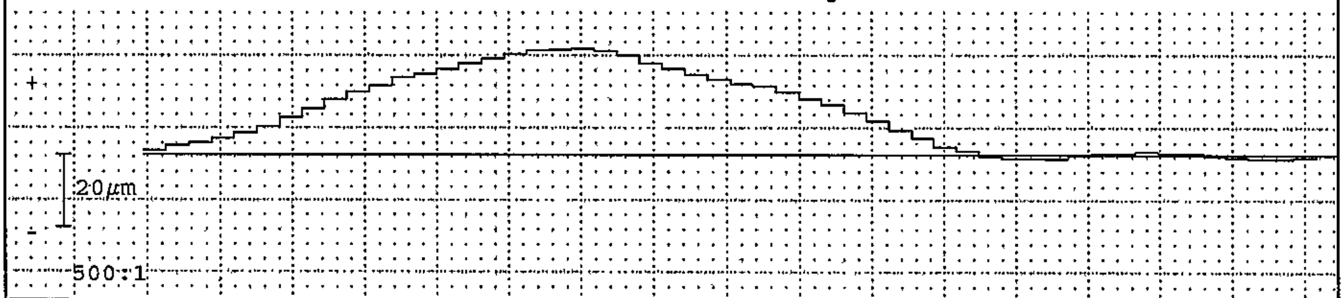
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

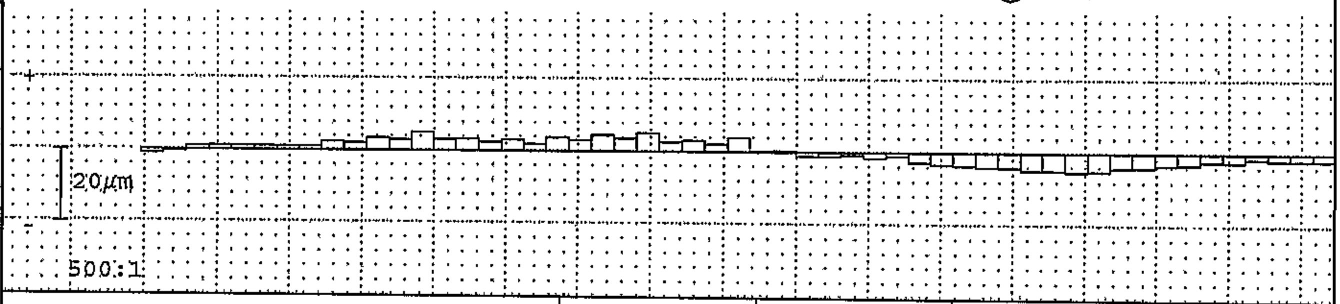


Errore somma di divisione Fp fianco destro



Corsa per misura divis.:96.233 z=8.3mm		fianco sinistro / RILASCIO				fianco destro / TIRO			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	3		14		3		14	
Gr. salto di passo	fu max	4		18		2		18	
Scarto di divisione	Rp	6				6			
Err. globale di divisione	Fp	27		50		31		50	
Err. cordale di divisione	Fpz/8	13				15			

Centricità Fr (Ø-sfera =2.75mm) ◎ : 8µm



Err. di concentricitá	Fr	10	32	
Variaz. spessore dente	Rs			

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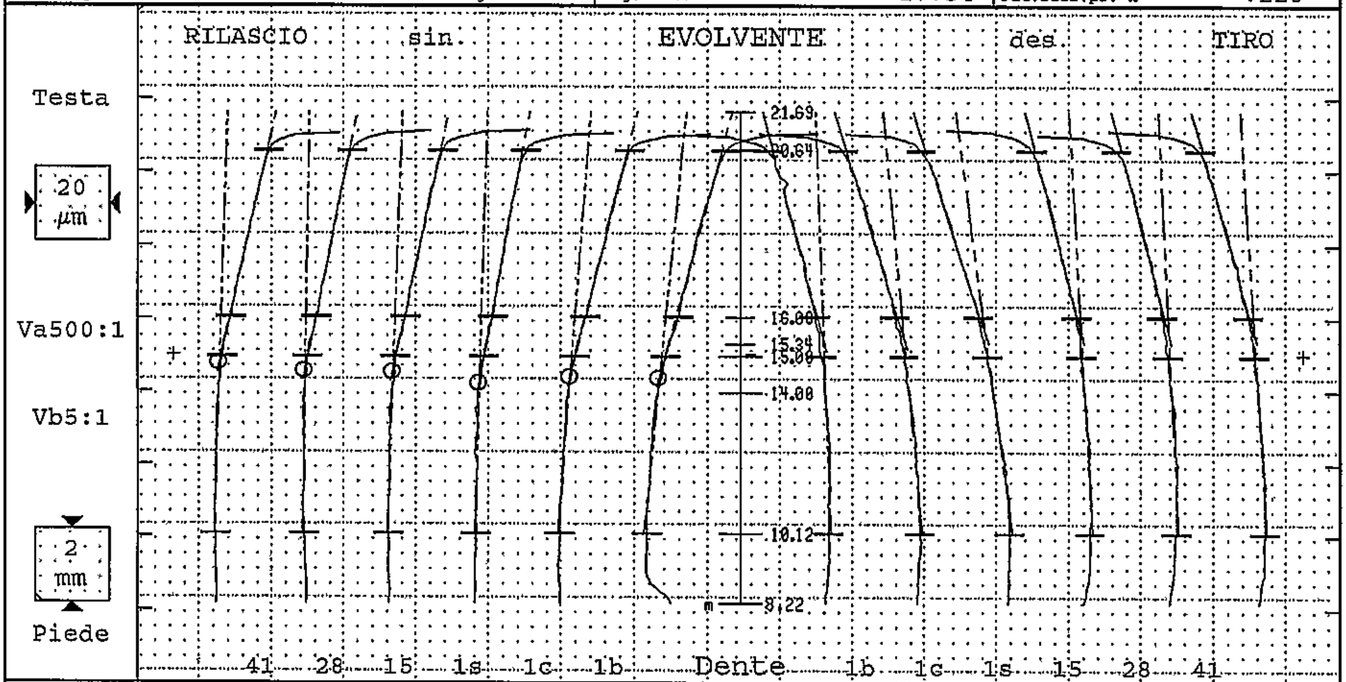
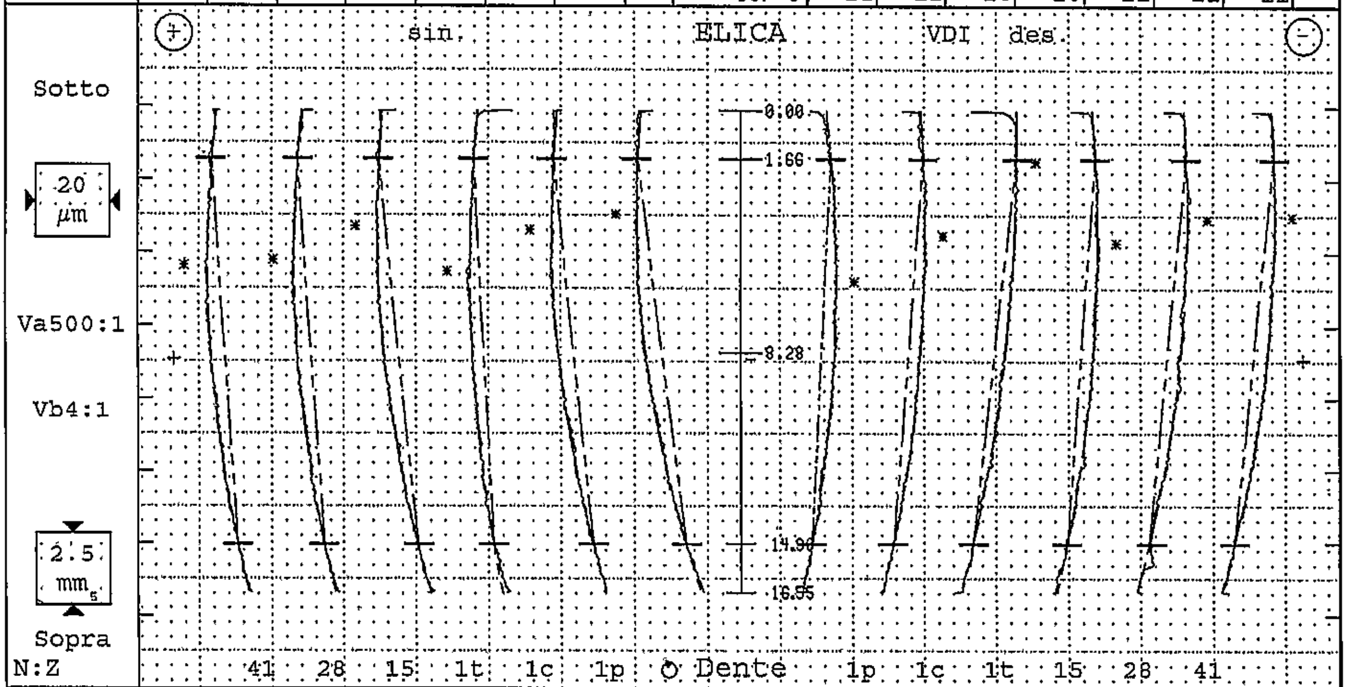
Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0 ZPK 117057	Controllore: turno d	Data: 09.01.2015 11:09	
Denominazione: SR4	Numero denti z 53	Largh.fasc.dent. b 16.55mm	
Numero disegno.: 250.1.4223.37-IF	Modulo m 1.6mm	Tratto evolv. La 4.88mm	
Commessa/serie nr.: 2	Angolo pressione 17.5°	Tratto elica LB 13.24mm	
Masch.Nr.: M001 Spindel: Formmest	Angolo elica -29°	Inizio elab. M1 10.12mm	
Untersuchungszweck: Laufende Messung	Ø Base db 91.2106mm	Palpatore Ø (#1)1mm	
Werkzeug: Charge:	Ang. Base -27.54°	Fat.scor.pr. x -.226	



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm ±6	-2	Var a 3							±6	Var a 3						-3	
fHα ±7	-2	-2	-1	-2	-1	-4	-5		±7	-2	-5	-7	-3	-2	-3	-3	
Fα	2	2	1	2	2	4	5			3	5	6	3	3	3	4	
ffα 9	1	1	1	1	2	1	2		9	1	1	1	1	1	1	1	
Cα 0/4	1	1	1	1	1	1	1		0/4	1	1	1	1	1	1	1	
fKo -14/-6	-11	-11	-11	-11	-10	-11	-11		-16/-8	-12	-11	-10	-10	-11	-11	-11	

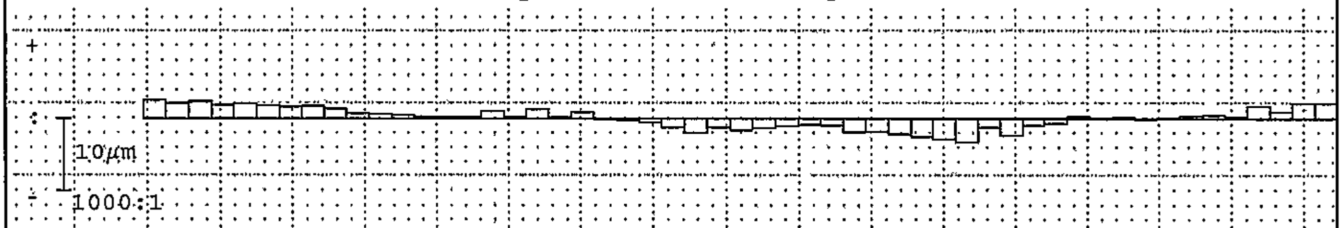


Tolerance	Medio							Qual	Tolerance							Medio	Qual
fHßm 10±6	11	Var ß 4							-15±6	Var ß 4						-12	
fHß 10±13	11	9	9	13	7	13	16		-15±13	-7	-11	-15	-10	-13	-14	-12	
Fß 16	3	2	2	4	3	3	6		16	9	4	2	5	5	3	4	
ffß 9	1	1	1	1	1	1	1		9	1	1	2	2	2	1	2	
Cß 3/5	4	4	4	4	3	4	5		3/5	4	3	3	3	4	4	4	
Bd 10±8	9								10±8							8	

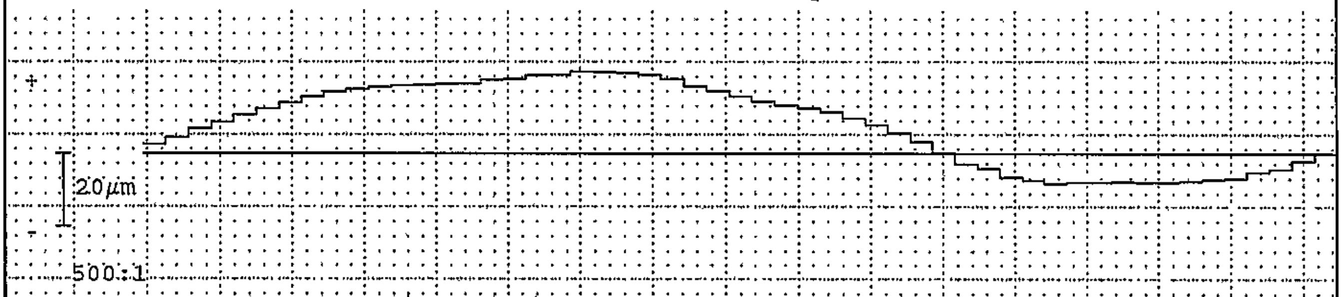
Ruota cilindrica Divisione

Nr. prog.: STI0412_06 0	ZPK 117057	Controllore: turno d	Data: 09.01.2015 11:09
Denominazione:	SR4	Numero denti z 53	Angolo pressione 17.5°
Numero disegno.:	250.1.4223.37-IF	Modulo m 1.6mm	Angolo elica -29°
Commessa/serie nr.:	2	Untersuchungszweck: Laufende Messung	
Masch.Nr.:	M001	Spindel: Formrad Werkzeug:	Charge:

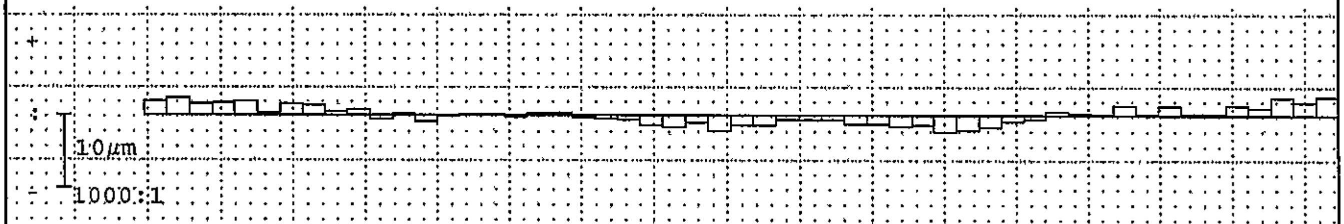
Errori singoli di divisione fp fianco sinistro



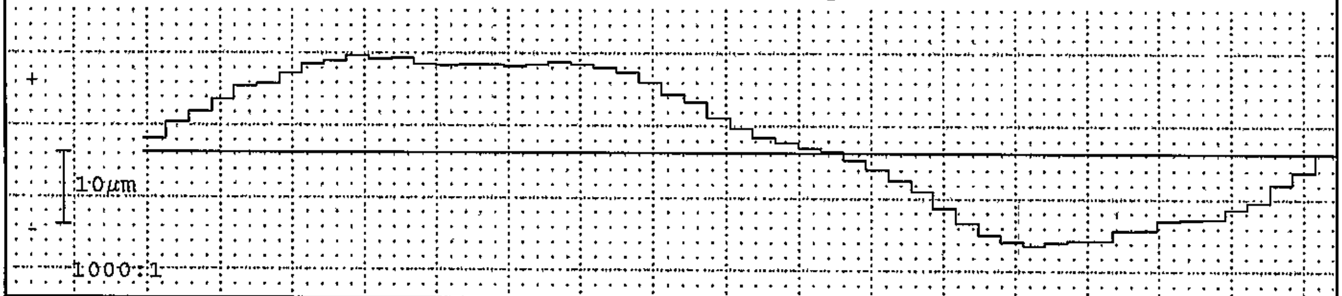
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



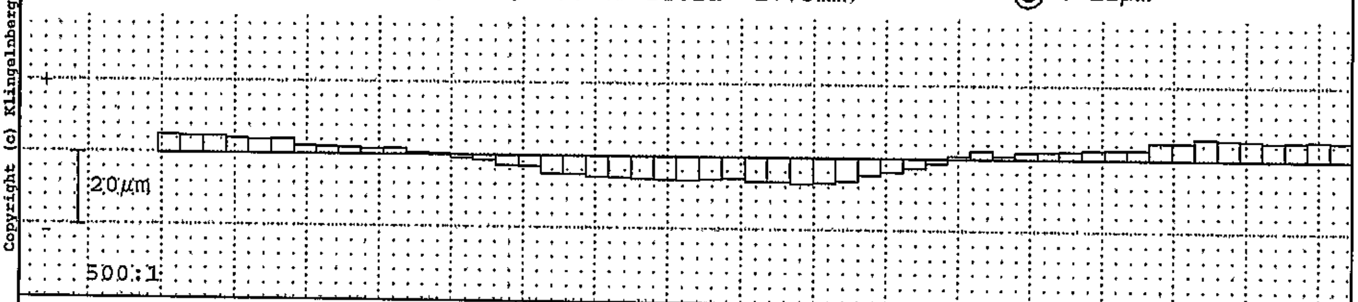
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:96.233 z=8.3mm

		fianco sinistro / RILASCIO				fianco destro / TIRO			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	3		14		2		14	
Gr. salto di passo	fu max	2		18		2		18	
Scarto di divisione	Rp	6				4			
Err. globale di divisione	Fp	31		50		26		50	
Err. cordale di divisione	Fpz/8	16				14			

Centricità Fr (Ø-sfera =2.75mm) ◎ : 12µm



Err. di concentricità	Fr	13	32	
Variaz. spessore dente	Rs			

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Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o005 0 P26 B7590	Controllore:	TURNO d	Data:	09.01.2015 10:59
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. Lα	4.88mm
Commessa/serie nr.:	1	Angolo pressione	17.5°	Tratto elica Lβ	13.24mm
Masch.Nr.:	M001 Spindel: Formmesst.	Angolo elica	-29°	Inizio elab. Ml	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#2B)1mm
Werkzeug: Charge:		Ang. Base	-27.54°	Fat.scor.pr. x	-.226

Testa

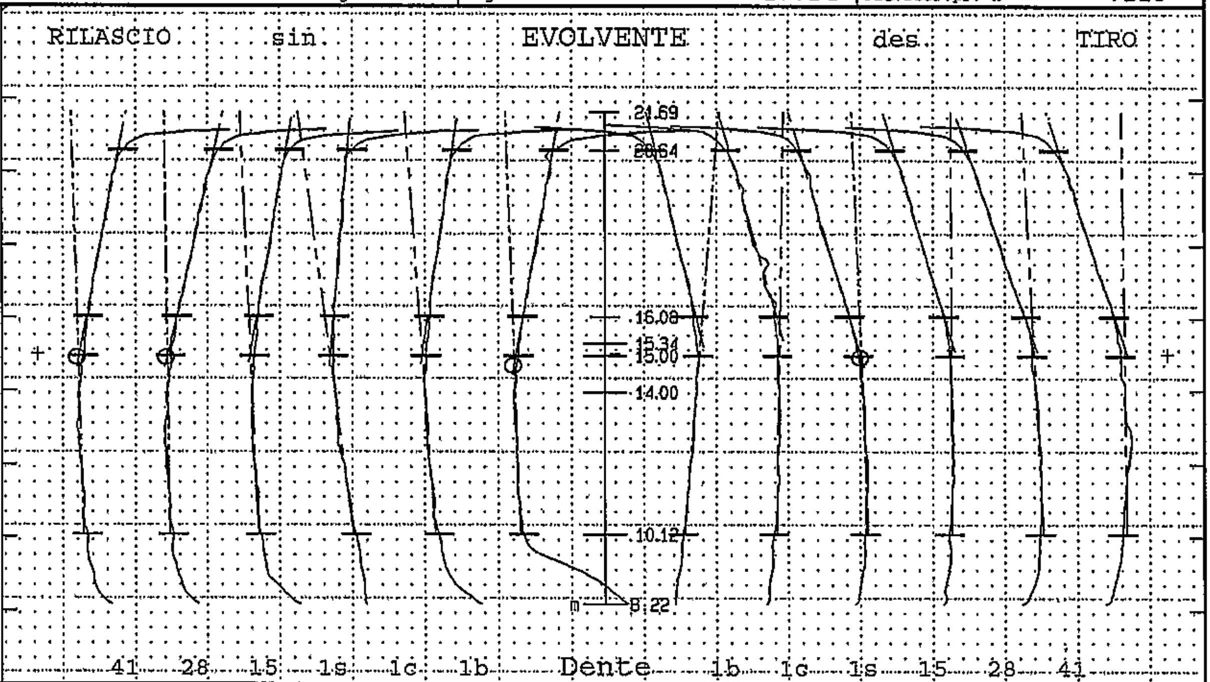
20 µm

Va500:1

Vb5:1

2 mm

Piede



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm ±6	2	Var 3							±6	Var 3						-1	
fHα ±7	2	1	1	2	6	4	2		±7	4	1	-2	0	-2	-1	-1	
Fα	3	3	2	3	7	4	3			4	2	3	1	3	3	2	
ffα 9	2	2	2	2	2	2	2		9	1	1	1	1	1	3	2	
Cα 0/4	1	1	2	1	1	1	1		0/4	0	1	1	1	1	2	1	
fKo -14/-6	-13	-13	-14	-12	-12	-12	-13		-16/-8	-17	-15	-15	-16	-15	-16	-16	

Sotto

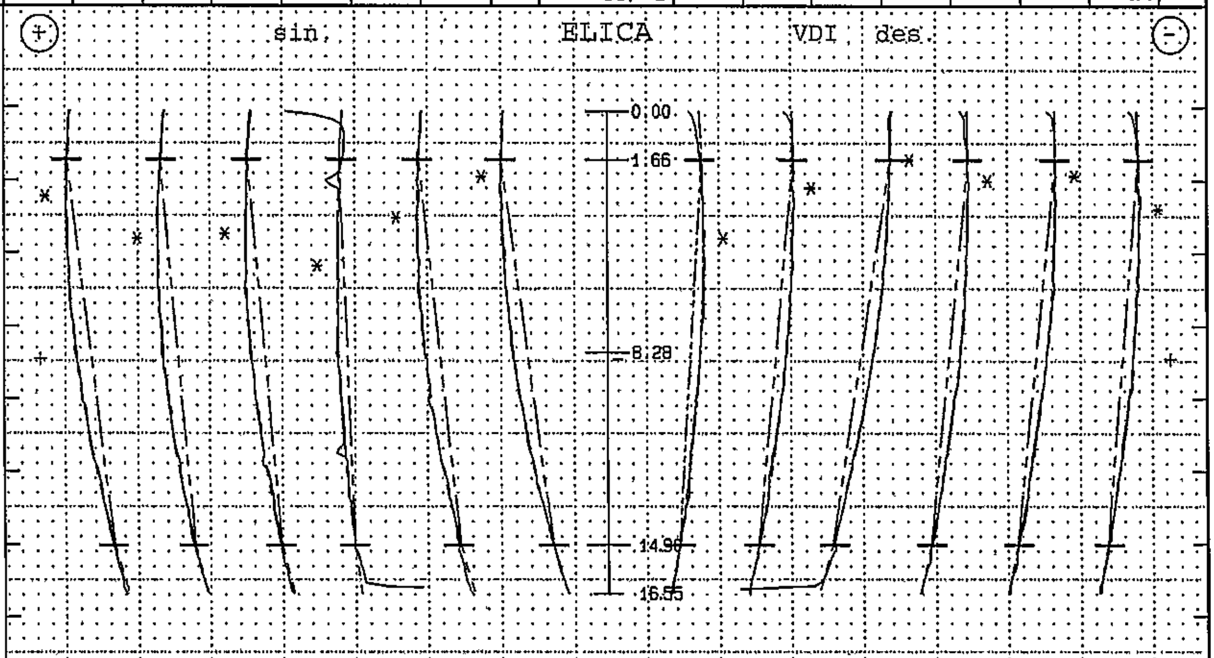
20 µm

Va500:1

Vb4:1

2.5 mm

Sopra



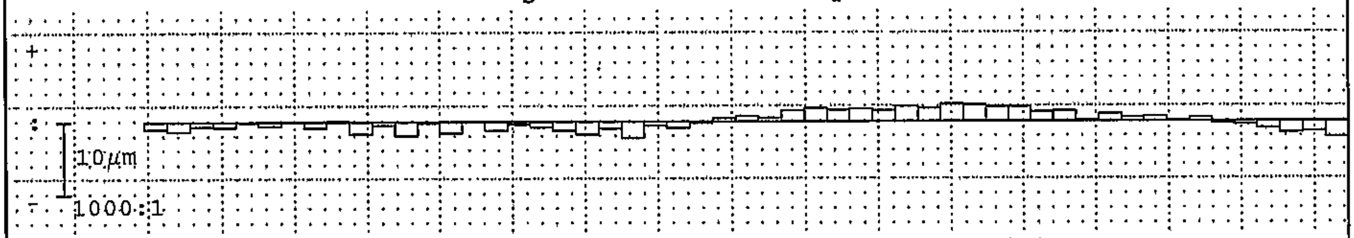
N:Z 41 28 15 1t 1c 1p Dente 1p 1c 1t 15 28 41

Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHβm 10±6	14	Var 4							-15±6	Var 2						-13	
fHβ 10±13	14	16	12	12	5	14	17		-15±13	-8	-13	-20	-13	-13	-11	-13	
Fβ 16	3	5	2	2	16	3	6		16	7	3	5	3	3	5	4	
ffβ 9	1	1	1	1	4	1	1		9	1	1	1	1	1	1	1	
Cβ 3/5	4	4	4	4	2	4	4		3/5	3	3	3	3	3	3	3	
Bd 10±8	12								10±8							12	

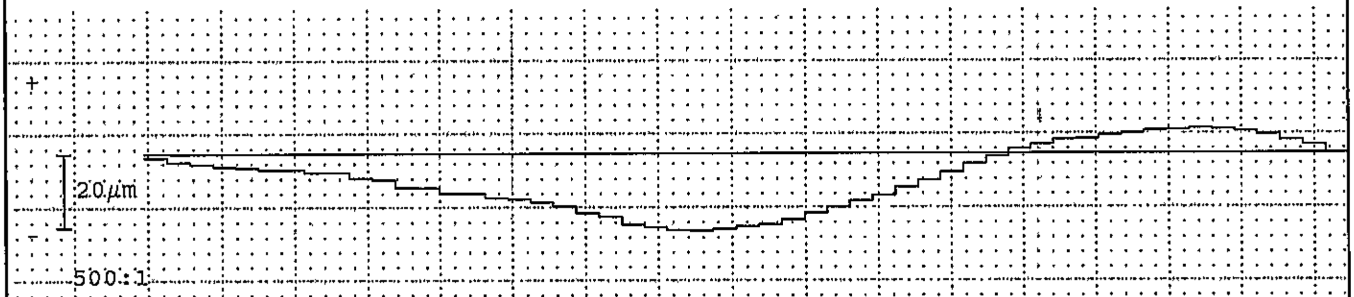
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590	Controllore: TURNO d	Data:	09.01.2015 10:59
Denominazione: SR4	Numero denti z 53	Angolo pressione	17.5°
Numero disegno.: 250.1.4223.37-IF	Modulo m 1.6mm	Angolo elica	-29°
Commessa/serie nr.: 1	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmeßt	Werkzeug:	Charge:	

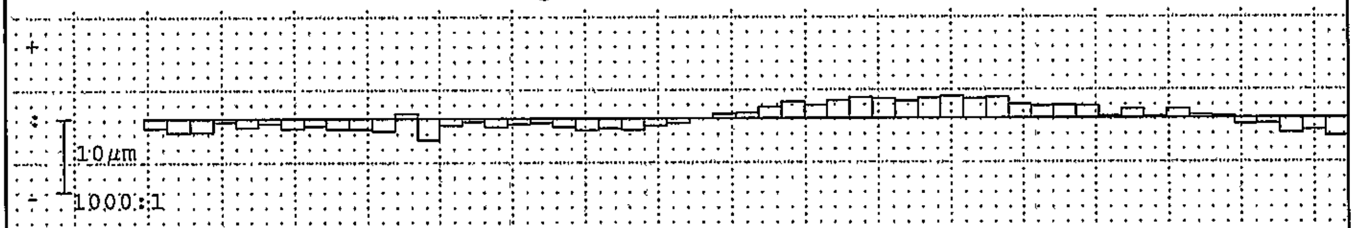
Errori singoli di divisione fp fianco sinistro



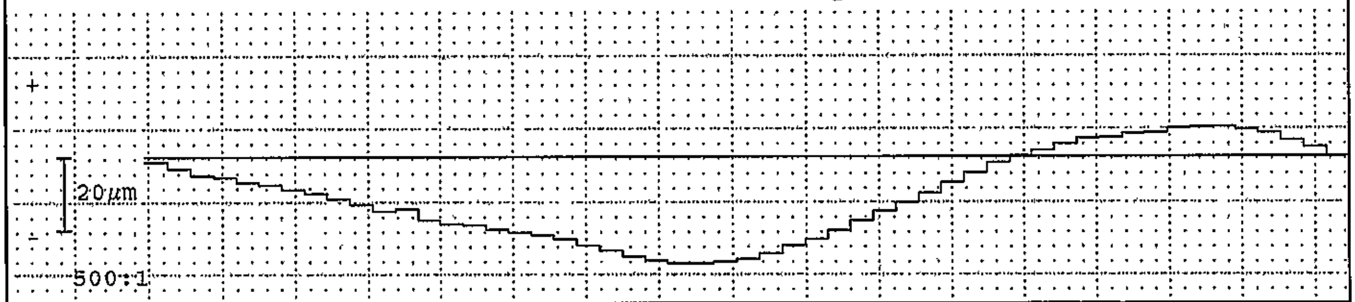
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



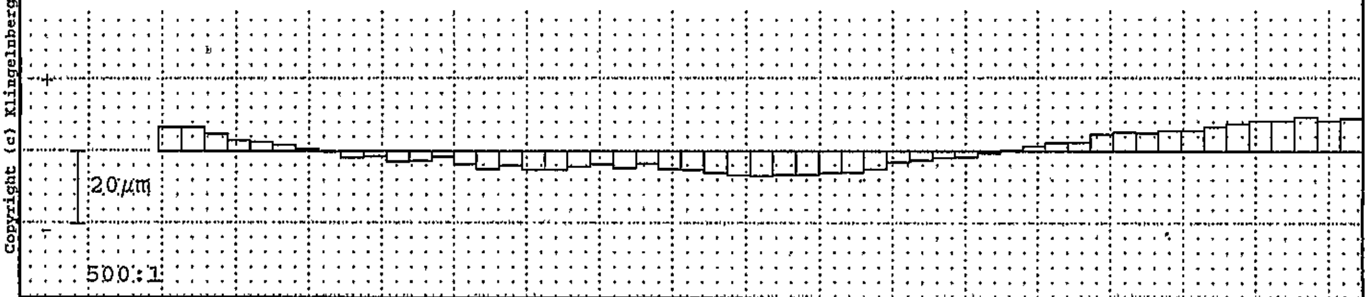
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:96.233 z=8.3mm

		fianco sinistro / RILASCIO				fianco destro / TIRO			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	2		14		3		14	
Gr. salto di passo	fu max	2		18		4		18	
Scarto di divisione	Rp	4				6			
Err. globale di divisione	Fp	28		50		37		50	
Err. cordale di divisione	Fpz/8	14				18			

Centricità Fr (Ø-sfera =2.75mm) ◎ : 14µm

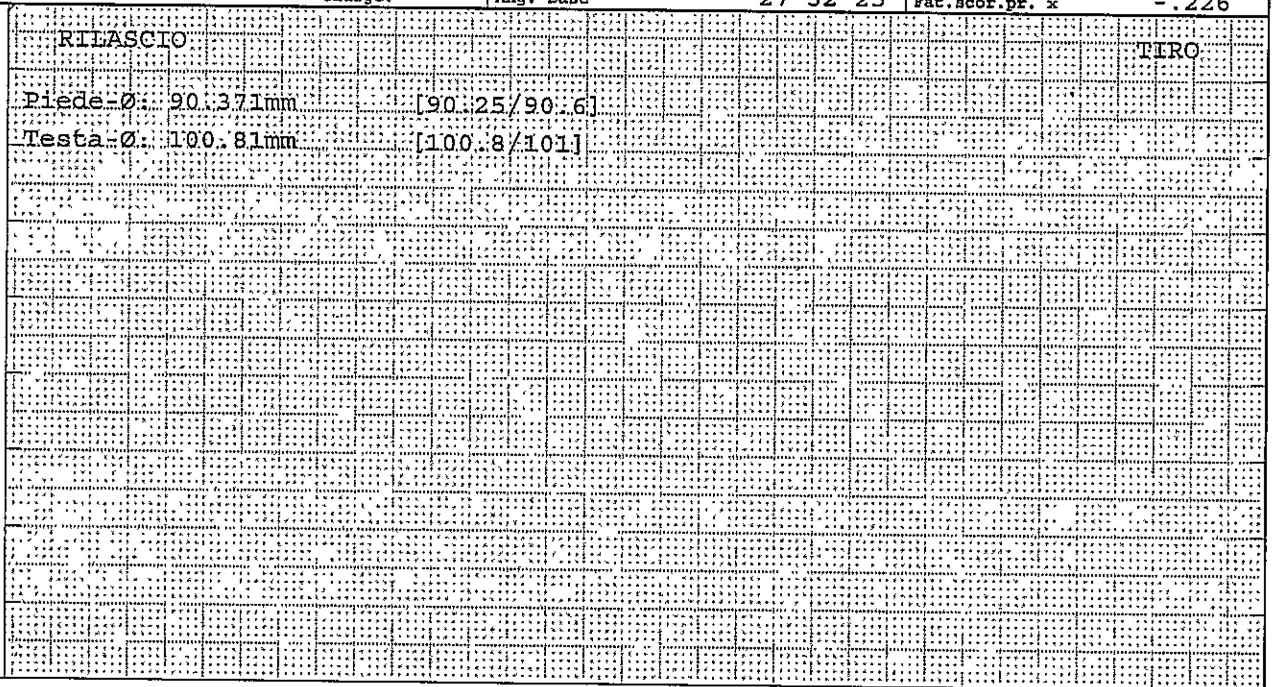


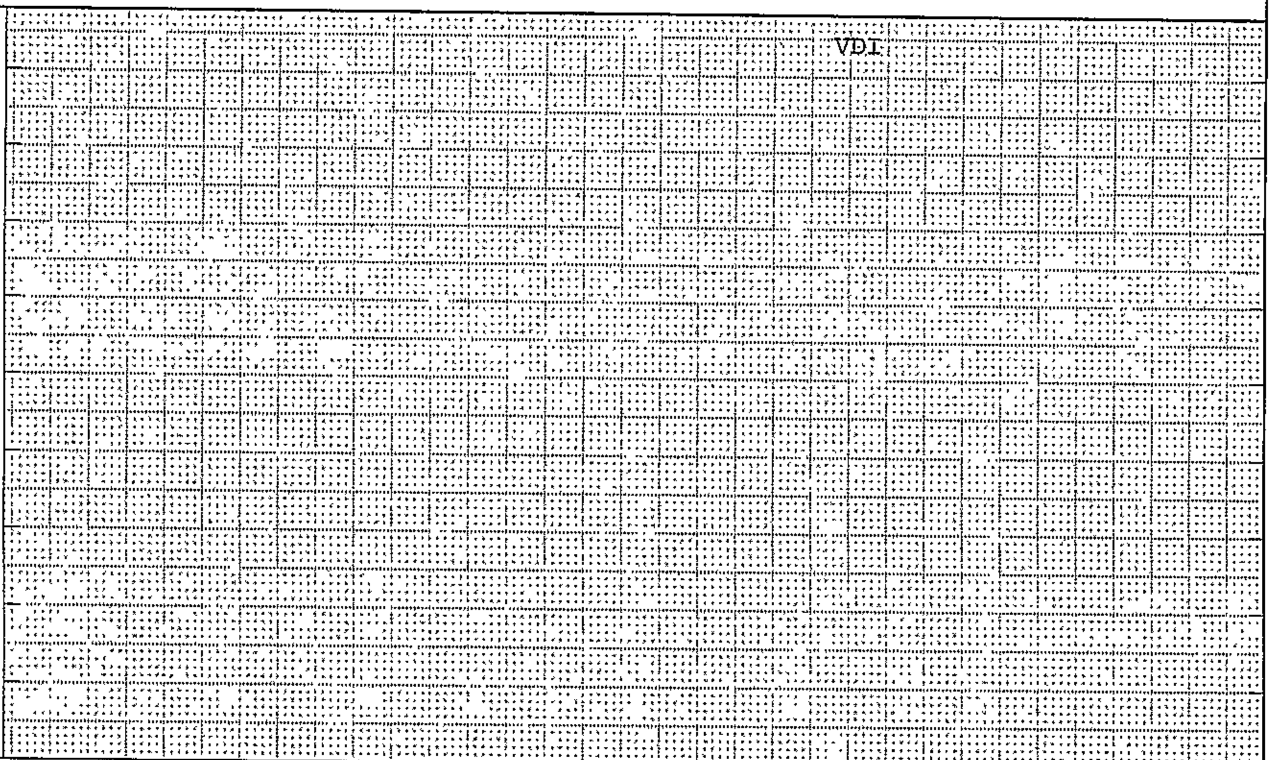
Err. di concentricitá	Fr	16	32	
Variaz. spessore dente	Rs			

KLINGELNBERG

Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0	P26 B7681	Controllore:	turno c	Data:	09.01.2015 08:38
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. Lα	4.88mm
Commessa/serie nr.:	1	Angolo pressione	17°30'00"	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formnest1	Angolo elica	-29°00'00"	Inizio elab. M1	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#2C) 1mm
Werkzeug:	Charge:	Ang. Base	-27°32'25"	Fat.scor.pr. x	-.226





Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0	P26 B7681	Controllore:	turno c	Data:	09.01.2015 08:36
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.:	2	Angolo pressione	17°30'00"	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formnest 1	Angolo elica	-29°00'00"	Inizio elab. Ml	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#2C) 1mm
Werkzeug:	Charge:	Ang. Base	-27°32'25"	Fat.scor.pr. x	-.226

RILASCIO

TIRO

Piede-Ø: 90.371mm [90.25/90.6]

Testa-Ø: 100.804mm [100.8/101]

VDI

Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412 06 0	P26 B7681	Controllore:	turno c	Data:	09.01.2015 08:39
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.:	3	Angolo pressione	17°30'00"	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formnest	Angolo elica	-29°00'00"	Inizio elab. M1	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#2C) 1mm
Werkzeug:	Charge:	Ang. Base	-27°32'25"	Fat.scor.pr. x	-.226

RILASCIO

TIRO

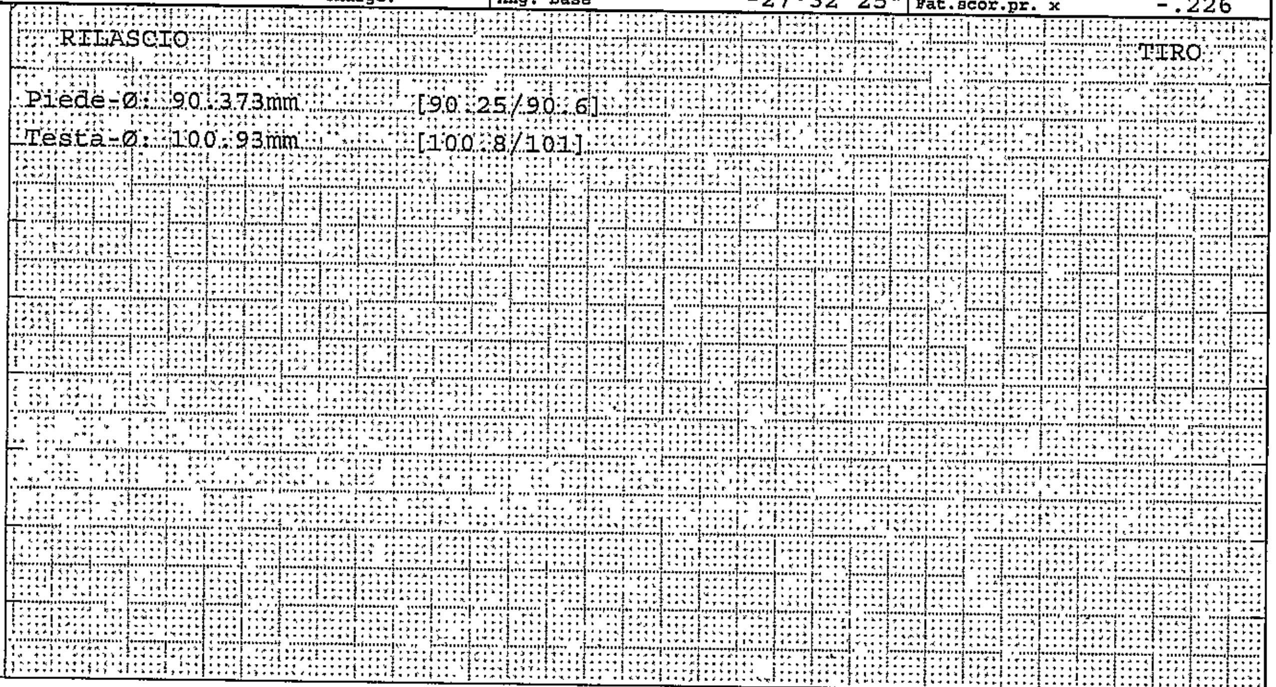
Piede-Ø: 90.373mm [90.25/90.6]

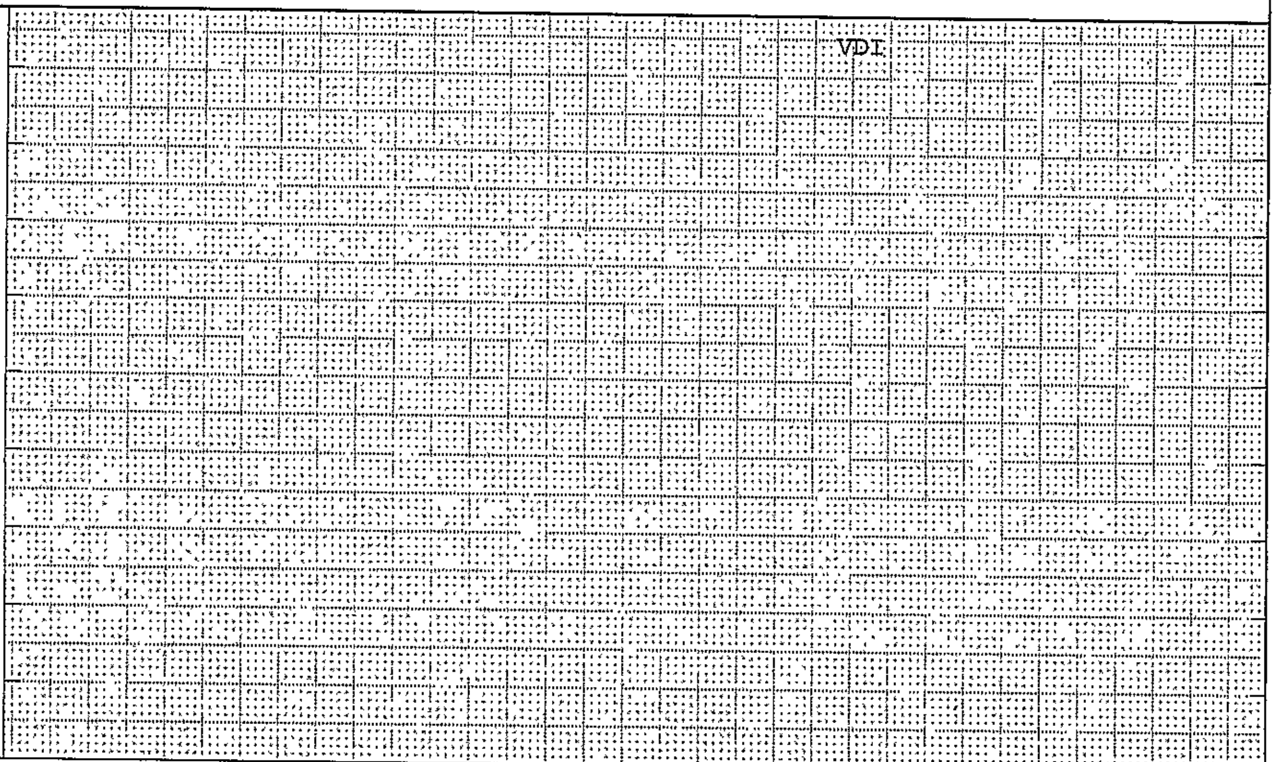
Testa-Ø: 100.849mm [100.8/101]

VDI

Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412 06 0 P26 B7681	Controllore: turno c	Data:	09.01.2015 08:40
Denominazione: SR4	Numero denti z 53	Largh.fasc.dent. b	16.55mm
Numero disegno.: 250.1.4223.37-IF	Modulo m 1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.: 4	Angolo pressione 17°30'00"	Tratto elica Lß	13.24mm
Masch.Nr.: M001 Spindel: Formnest 1	Angolo elica -29°00'00"	Inizio elab. Ml	10.12mm
Untersuchungszweck: Laufende Messung	Ø Base db 91.2106mm	Palpatore Ø	(#2C) 1mm
Werkzeug: Charge:	Ang. Base -27°32'25"	Fat.scor.pr. x	-.226





Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0412_06 0 P26 B7681		Controllore:	turno c	Data:	09.01.2015 08:46
Denominazione:	SR4	Numero denti z	53	Largh.fasc.dent. b	16.55mm
Numero disegno.:	250.1.4223.37-IF	Modulo m	1.6mm	Tratto evolv. La	4.88mm
Commessa/serie nr.:	5	Angolo pressione	17°30'00"	Tratto elica Lß	13.24mm
Masch.Nr.:	M001 Spindel: Formnest1	Angolo elica	-29°00'00"	Inizio elab. M1	10.12mm
Untersuchungszweck:	Laufende Messung	Ø Base db	91.2106mm	Palpatore Ø	(#2C) 1mm
Werkzeug:	Charge:	Ang. Base	-27°32'25"	Fat.scor.pr. x	-.226

RILASCIO

TIRO

Piede-Ø: 90.37mm [90.25/90.6]

Testa-Ø: 100.802mm [100.8/101]

VDI

Point	Caractheristic	Tolerance	Part 1	Part 2	Part 3	Part 4	Part 5
4	MDK	98.769 / 98.668	98.720	98.725	98.719	98.705	98.718

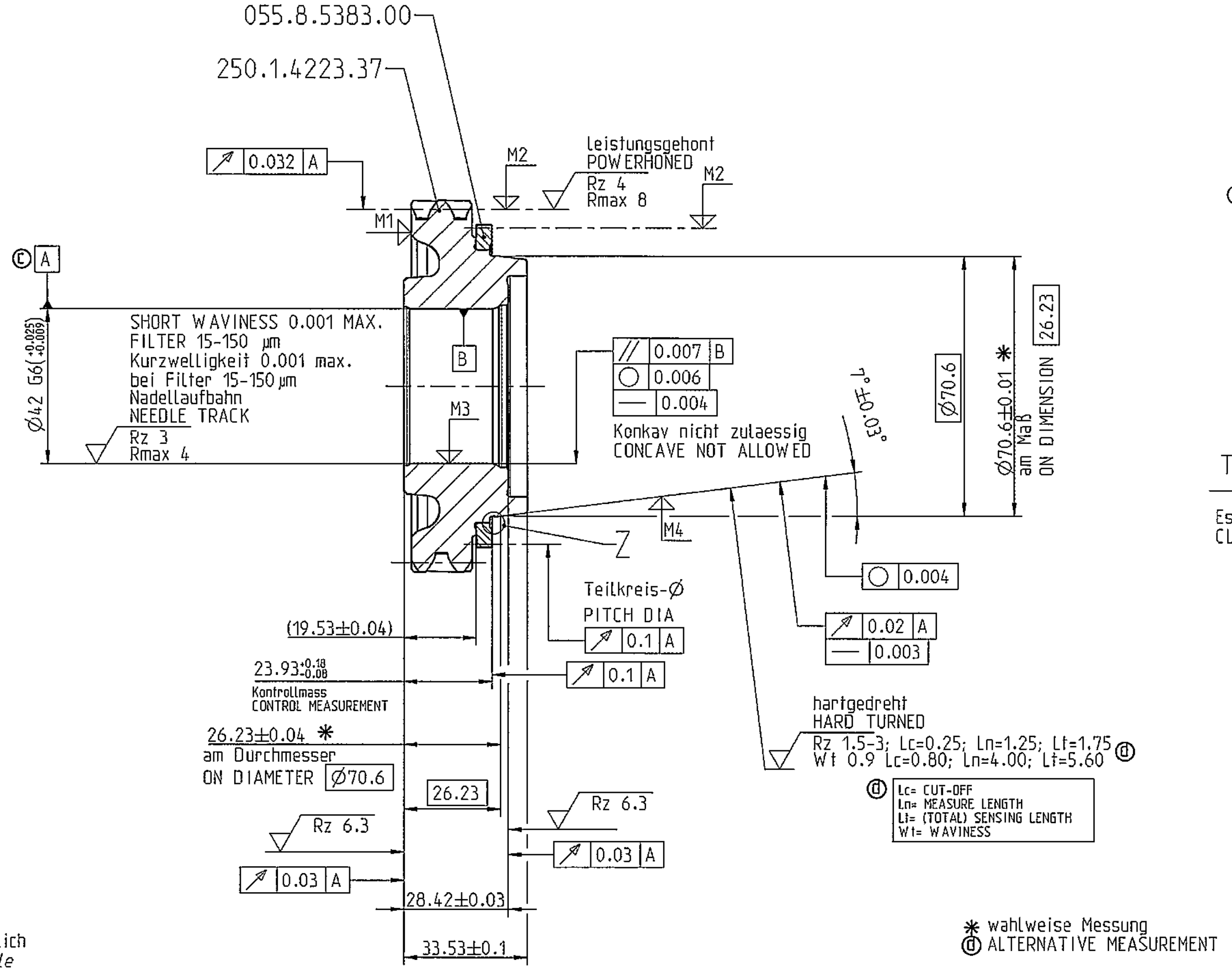
Manual measures by Marposs

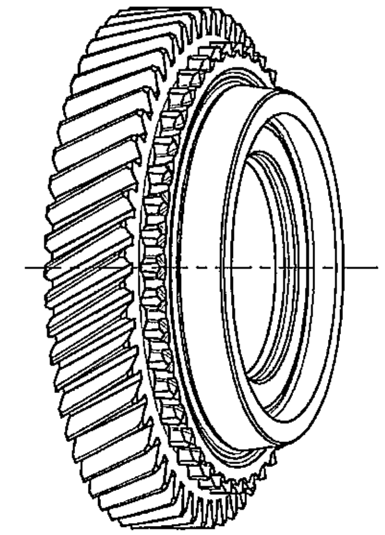
DG 250 1 4222 37

09,Jan ,2015

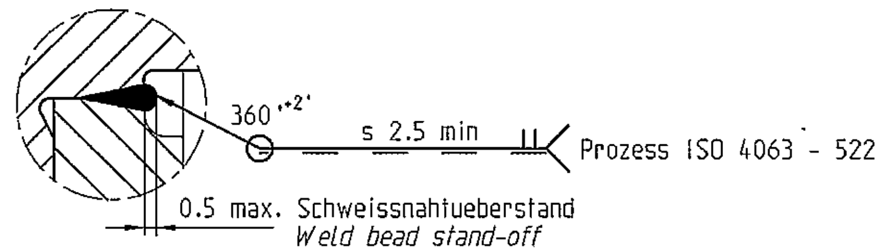
Design Release:	2014-08-18 Agapi.Raidt
Function Release:	2014-08-22 Alejandro.Mejia
Geardata Release:	not required
Material Release:	not required
SAP Release:	2014-09-15 Ruth.Ernstberger
Document Status:	approved

Fuer Freigabeinformation freihalten! KEEP FREE FOR RELEASE INFORMATION!





Z
unmassstaeblich
not to scale

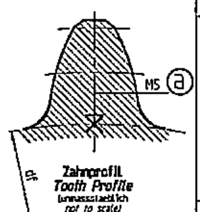


Ⓒ CHECKED ACCORDING ENGINEERING SPECIFICATION
S 3S7R-7M161-AA. DEVIATION FROM THIS SPECIFICATION:
LONGITUDINAL MICRO CRACKS IN THE WELDING MATERIAL ARE
PERMISSIBLE TO A TOTAL OF 2% AROUND THE CIRCUMFERENCE.

einsatzgehaertet und angelassen
M1 (Oberflaechenhaerte) : 80.5+2.5 HRA
M2 (Zahnflanke) : CHD (Eht) 550=0.5+0.4
M3 (Bohrung) : CHD (Eht) 550= 0.3 min.
ⓐ M4 (Konus) : CHD (Eht) 550= 0.4+0.4
ⓐ M5 (Kernhaerte) : min. 300 HV10

CASE HARDENED AND TEMPERED
M1 (CASE HARDNESS) : 80.5+2.5 HRA
M2 (TOOTH FLANK) : CHD (Eht) 550=0.5+0.4
M3 (BORE) : CHD (Eht) 550= 0.3 min.
M4 (CONE) : CHD (Eht) 550= 0.4+0.4
M5 (INSIDE BASE OF TOOTH) : min. 300 HV10

* wahlweise Messung
ⓓ ALTERNATIVE MEASUREMENT



ⓓ Fuer GETRAG intern:
Dieses Bauteil ist Bestandteil der Gruppen Nummer 250.1.6419.00
Lieferant/Hersteller: Bari
GETRAG INTERNAL ONLY:
THIS COMPONENT IS PART OF GROUP NUMBER 250.1.6419.00
SUPPLIER/MANUFACTURER: Bari

Fuer die Lieferung und Kennzeichnung im Data Matrix Code
(Bauteil und/oder Verpackung)
muss die Gruppen Nummer 250.1.6419.00 verwendet werden.
FOR SHIPPMENT AND IDENTIFICATION WITHIN THE DATA MATRIX CODE
(COMPONENT AND/OR PACKAGING)
THE GROUP NUMBER 250.1.6419.00 HAS TO BE USED.

PPAP nach / ACCORDING TO 250.1.4222.37

Technische Sauberkeit / TECHNICAL CLEANLINESS:

Es gelten die Sauberkeitsanforderungen nach GN 4340-1
CLEANLINESS REQUIREMENTS OF THE GN 4340-1 HAVE TO BE ABIDED

Naehere Angaben zur Verzahnung
siehe Verzahnungsblatt
250.1.4223.37
FURTHER GEAR DATA SEE
DATA SHEET NUMBER
250.1.4223.37

(√)
-0.3 -0.1

GCG/TS 803001	0	<M>	d	3x	35670	Oberflaechenbearbeitung/SURFACE FINISH geaendert/CHANGED; Text neu/TEXT NEW; wahlweise Messung/ALTERNATIVE MEASUREMENT war/WAS wahlweise Messung/OPTIONAL MEASUREMENT	20140801
	0	▽					
	0	<M>	c	2x	35622_1	Hauptschnitt/MAIN SECTION: Bezug/REFERENCE A neu/NEW; Z: Bemerkung/NOTE neu/NEW;	20130122
GN 3010	0	<C>	b	1x	35453_1	Bemerkung/NOTE neu/NEW	20120313
	0	<A>	a	3x	35619	Legende fuer Haerteangaben korrigiert KEY NOTE FOR HARDNESS CALLOUT CORRECTED; M5 war/WAS M4; M5 (Kernhaerte / INSIDE BASE OF TOOTH) war / WAS M4; M4 (Konus / CONE) CHD (Eht) 550 = 0.4+0.4 neu / NEW ADDED	20120228
CAD Prof Engineer			--	--	35068	Spezifikationsreifegrad F erteilt SPECIFICATION MATURITY LEVEL F APPROVED	20091116
Massstab / SCALE M: 1:1 (--)			Buchst. CHANGE INDEX	Anzahl NUMBER	Aend.-Nr. CHANGE REQUEST NO.	Aenderung --nur mittels CAD zulaessig; FMEA ueberpruefen-- MODIFICATION --ONLY ALLOWED BY CAD; CHECK FMEA--	Datum DATE

Allgemeintoleranzen fuer Laengenmasse, Form und Lage ISO 2768 - mH gebrochene Kanten, Radien und Winkelmasse ISO 2768 - v
GENERAL TOLERANCES FOR LINEAR DIMENSIONS, FORM AND POSITION ISO 2768 - mH; CHAMFERS, RADII AND ANGULAR DIMENSIONS ISO 2768 - v

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Auswertung der Durchmessermessung erfolgt nach der Gauss-Methode (Arithmetischer Mittelwert)
EVALUATION OF THE DIAMTER MEASUREMENT IS CARRIED OUT ACCORDING TO THE GAUSS METHOD (ARITHMETICAL MEAN VALUE)

Form- und Lagetolerierung FORM AND POSITION TOLERANCES EN ISO 1101	Tolerierung TOLERANCING ISO 8015	Oberflaechenangaben SURFACE TEXTURE GN 4005	Werkstueckkanten BREAK EDGES ISO 13715

Werkstoff / MATERIAL

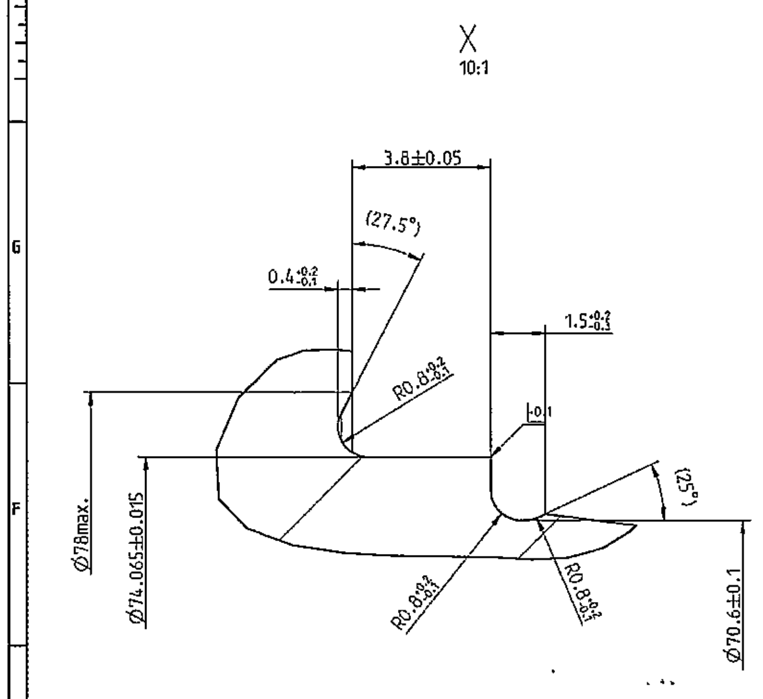
GETRAG
Getriebe- und Zahnradfabrik Hermann Hagenmeyer GmbH & Cie KG

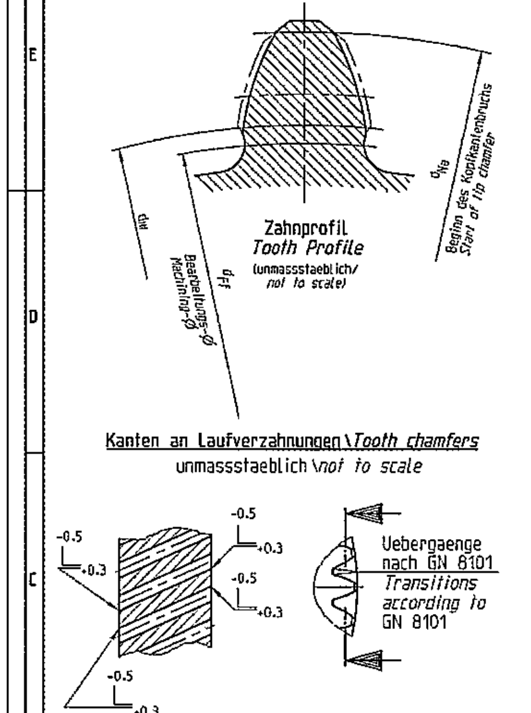
oelbenetzte Oberflaeche OIL WETTED SURFACE 0 mm²	Halbzeug SEMI-FINISHED –		
	Gesamtoberflaeche SURFACE AREA 0 mm²	Masse MASS 0.960 kg	Schutzvermerk nach ISO 16016 beachten PROTECTION PER ISO 16016
Benennung / ITEM NAME		Artikel-Nr./ ITEM NO. Blatt/SHEET 1 von/OF 1	Reifegrad MATURITY: F; Format SIZE: A2
Schaltrad 4. Gang vst. SPEED GEAR 4TH. CPL.		2501422237 CAD-Modell: 2501422237	
Ersatz fuer SUBSTITUTE FOR –	INTRALINK DATA / Zchng / DRW: / MODEL:	CHECKED IN BY: Agapi.Raidt / Agapi.Raidt	CHECKED IN ON: dd.mm.yyyy hh:mm:ss — 18.08.2014 10:02:07 / 01.08.2014 11:41:00; VERSION 10 / 19.

Document Revision: 20140818100246, printed on 2017-07-27 at 10:39 by Mirko.Vicenti

Design Release: 2011-04-18 Uwe.Leibbrand
Function Release: 2011-04-19 Klaus Kranich
Geardata Release: 2009-11-18 I.A. Holger.Paassen
Material Release: not required
SAP Release: 2011-05-04 Hartmut.Kobald
Document Status: approved
Fuer Freigabeinformation freihalten! KEEP FREE FOR RELEASE INFORMATION!

X
10:1





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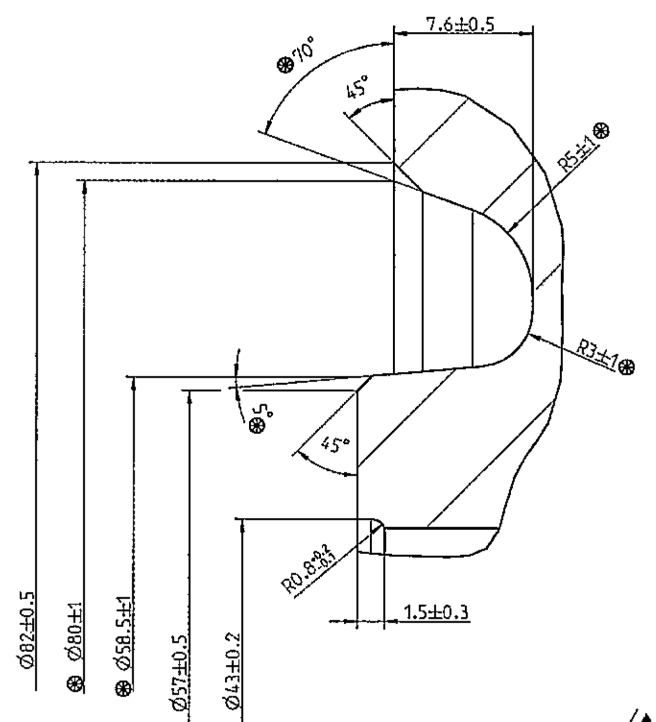

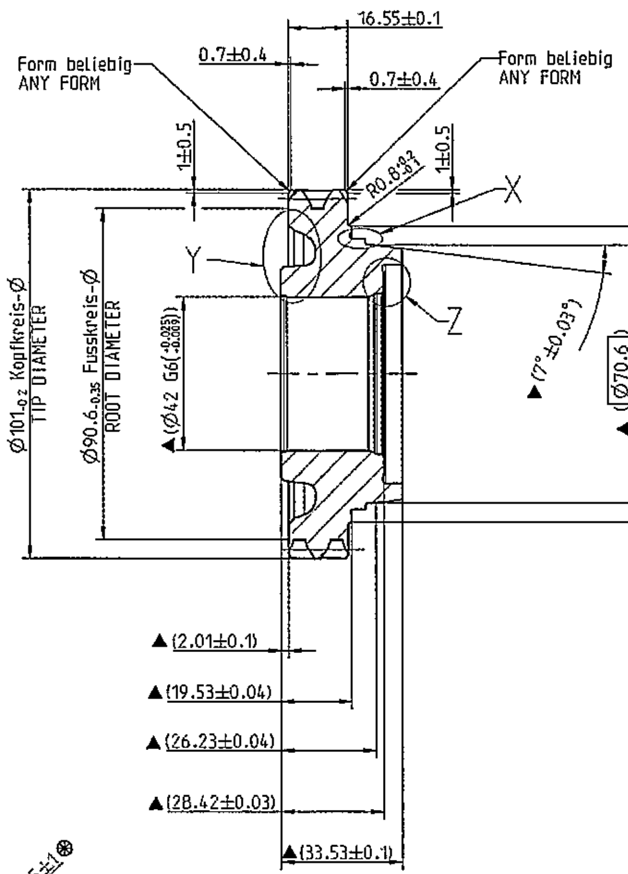

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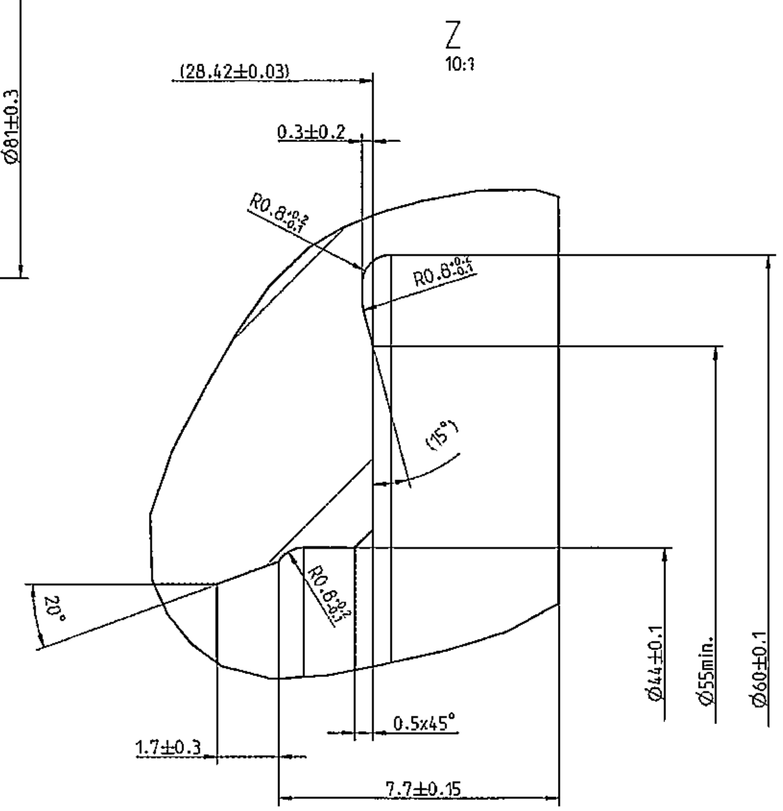
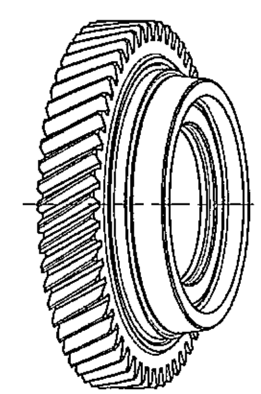
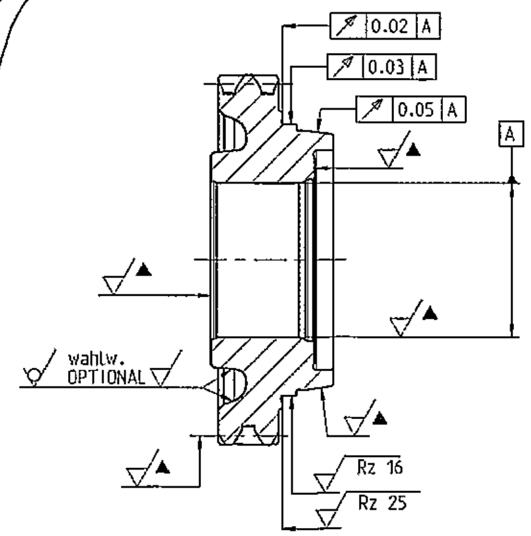




vorbearbeitet, Fertigmass ▲ (...)
siehe 250.1.4222.37
PREMACHINED, FINISHED DIMENSION ▲ (...)
SEE 250.1.4222.37

Naehere Angaben zur Verzahnung
siehe Verzahnungsblatt gleicher Nummer
FURTHER GEAR DATA SEE
DATA SHEET SAME NUMBER



Rz 40

@ ⊛ Rohteilgeometrie, keine Pruefmaße
RAW PART GEOMETRY, AS REFERENCE ONLY

@ Rohteilnummer/RAW PART NUMBER
250.1.3643.90 und/AND 250.1.3643.91

Haerteangaben siehe
Schaltrad 4.Gg. vsl. 250.1.4222.37
HEAT TREATMENT SEE
SPEED GEAR 4TH. CPL. 250.1.4222.37

Aussenverzahnung / EXTERNAL GEAR		
Zahnwelle/ SPLINE DATA EXTERNAL		
Bezugsdurchmesser / REFERENCE DIAMETER d_B		
Modul / NORMAL MODULE m_n		1.600
Zaehnezahl / NUMBER OF TEETH z		53
Eingriffswinkel / NORMAL PRESSURE ANGLE α_n		17.5°
Schraegungswinkel / HELIX ANGLE β		29.0°
Richtung / HAND OF HELIX		LEFT, links
Bezugsprofil / BASIC RACK		
Profilverschiebung/ADDENDUM MODIFICATION $x \cdot m_n$	Nennmass / NOMINAL	-0.362
Qualitaet / GEAR TOOTH QUALITY (DIN3960)		8
Toleranzklasse / TOLERANCE CLASS		
Zahndicke / TOOTH THICKNESS s_n (Lehrenmass / GAGE DIMENSION)	effective max.	
Zahndicke / TOOTH THICKNESS s_n (Einzelmessung / ACTUAL)	max.	2.207
	min.	2.177
Messkugel-Ø / BALL DIA D_M		2.50
Pruefmass / MEASUREMENT OVER BALLS M_{dK} (Einzelmessung / ACTUAL)	max.	98.769
	min.	98.668

GCG/TS 803001	0	<M>					
	0	∇					
GN 3010	0	<M>					
	0	<C>					
	0	<A>					
CAD Pro/Engineer		a	2x	35401	keine Pruefmaße/AS REFERENCE ONLY und/AND Rohteilnummer/RAW PART NUMBER neu/NEW	20110413
		--	--	35068	Spezifikationsreifegrad F erteilt SPECIFICATION MATURITY LEVEL F APPROVED	20091116
Massstab / SCALE M: 1:1 (--)		Buchst. CHANGE INDEX	Anzahl NUMBER	Aend.-Nr. CHANGE REQUEST NO	Aenderung --nur mittels CAD zulaessig FMEA ueberpruefen-- MODIFICATION --ONLY ALLOWED BY CAD; CHECK FMEA--	Datum DATE

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Werkstoff / MATERIAL GCG_805000_02_20MnCrS5
Halbzeug SEMI-FINISHED -
oelbenetzte Oberflaeche OIL WETTED SURFACE 0 cm²
Gesamtoberflaeche SURFACE AREA 34405 mm²
Masse MASS 0.915 kg

GETRAG
Getriebe- und Zahnradfabrik Hermann Hagenmeyer GmbH & Cie KG
Schutzvermerk nach ISO 16016 beachten
PROTECTION PER ISO 16016

Benennung / ITEM NAME
Schaltrad 4. Gang
SPEED GEAR 4TH

Artikel-Nr./ ITEM NO. 2501422337
Blatt/SHEET 1 von/OF 1
Reifegrad MATURITY F
Format SIZE A1
CAD-Modell: 2501422337

Ersatz fuer SUBSTITUTE FOR -

INTRALINK DATA	CHECKED IN BY	CHECKED IN ON: dd.mm.yyyy hh-mm-ss	VERSION
Zchng / DRW-	Petra.Kaufmann	13.04.2011 08-20-15	1+
MODEL:	Petra.Kaufmann	13.04.2011 08-24-20	5+

Document Revision: 20110418082619, printed on 2017-07-27 at 10:57 by Mirko.Vicenti