GETRAG

Part Submission Warrant

Part Name: Double Gear | Customer Part Number: 250.1.4297.77

Shown on Drawing No.: 250.1.4297.77 | Organization Part #:

Engineering Change Level: a 35622-1 | Dated: 24 Jan 2013

Additional Engineering Changes: | Dated:

Safety and/or Government Regulation ☐ Yes ☑ No | Purchase Order No.: | Weight (kg): 1,400

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

RENAULT

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 1 Leader | E-mail: vincenzo.pennacchia@getrag.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☑ Approved ☐ Rejected ☐ Other

Customer Signature | Date: 14.01.15

Print Name | Customer Tracking Number (optional)

March 2006 CFG-1001

GETRAG Production Part Approval

DIMENSIONAL TEST RESULTS

Organization:	GETRAG	Part Number:	250.1.4297.77
Supplier/Vendor Code:	GETRAG Modugno	Part Name:	Double gear
INSPECTION FACILITY: NA		Design Record Change Level:	a 35622-1
		Engineering Change Documents:	

Item	Dimension/Specification	Specification / Limits		Test Date	Qty. Tested	Organization Measurement Results (Data) 1	2	3	4	5	test distruttivo	Ok	Not Ok
1	Profile Teeth ZR2	--	--		5	OK	OK	OK	OK	OK		ok	
2	Root diameter ZR2	107,42	107,12		5	107,233	107,385	107,233	107,233	107,221		ok	
3	Outside diameter ZR2	118,800	118,600		5	118,712	118,736	118,699	118,715	118,693		ok	
4	MDK ZR2	118,006	117,945		5	117,972	117,988	117,966	117,967	117,985		ok	
1A	Profile Teeth SR2	--	--		5	OK	OK	OK	OK	OK		ok	
2A	Root diameter SR2	75,65	75,20		5	75,354	75,351	75,353	75,344	75,353		ok	
3A	Outside diameter SR2	85,900	85,600		5	85,629	85,613	85,637	85,620	85,623		ok	
4A	MDK SR2	85,957	85,866		5	85,951	85,950	85,955	85,952	85,945		ok	

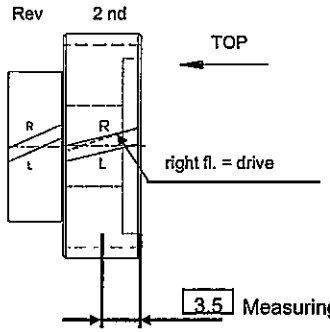
SIGNATURE	TITLE	DATE
G. Russo	QPE	14 Jan 2015

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					(7)
Zähnezahl z / Number of teeth	52		linke Fl. / left flank	rechte Fl. / right flank			
Modul m_n / Normal module	2.000000	Profil-Formabweichung $f_{f\alpha}$ / Profile form error	# 0.005		Eingriffsteilungs-Abweich. f_{pe} / Normal pitch error	0.010	
Eingriffswinkel α_n / Normal pressure angle	20° 0' 0"	Profil-Gesamtabweichung F_α / Total profile error			Teilungs-Einzelabweichung f_p / Adjacent pitch error	0.010	
Schrägungswinkel β / Helix angle	22° 0' 0"	Profil-Winkelabweichung $f_{H\alpha}$ / Profile angle error (b)	0.000 ± 0.007	0.012 ± 0.007	Teilungssprung f_u / Diff. bet. adjacent pitches	0.012	
Steigungsrichtung / Hand of helix	LEFT	Flankenl.-Winkelabweich. $f_{H\beta}$ / Tooth alignment error (a)	0.000 ± 0.013	+ 0.022 ± 0.013	Teilungs-Summenabweich. F_{pk} / Cumulative circ. pitch error		
Profilverschiebungsfaktor x / Addendum modification coeff.	0.275	Flankenl.-Gesamtabweich. F_β / Total alignment error			Rundlaufabweichung F_r / Radial run-out (a)	0.032	
Teilkreisdurchmesser d / Pitch diameter	112.168	Flankenl.-Formabweich. $f_{f\beta}$ / Longitudinal alignment err.	# 0.005		Zahndickenschwankung R_s / Range of tooth thickn. error		
Kopfkreisdurchmesser d_a / Outside diameter	118.80 $_{-0.20}$	Teilungs-Gesamtabweich. F_p / Cumulative pitch error	(a) 0.050				
Kopfnutzkreisd. theo. max. d_{Na} / Tip diam. usable theo.	118.40	Einf.-Wälzabweichung F_f / Tangential composite error			Zweifl.-Wälzabweichung F_r' / Radial composite error	0.028	
Kopfnutzkreisd. theo. min. d_{Na} / Tip diam. usable theo.	118.00	Einflanken-Wälzsprung f_f / Tang. tooth to tooth comp. err.			Zweifl.-Wälzsprung f_r' / Radial tooth to tooth comp. err.	0.012	
Fußkreisdurchmesser d_f / Root diameter	107.42 $_{-0.30}$	Radbreite im Meßkreis d_M b / Facewidth in meas. diam.	17.50		Meßkreis Krümmungsradius ρ_{dM} / Radius of curvature meas. diam.	21.95	
Fußnutzkreisdurchmesser d_{Nf} / Root diameter usable	110.17						
Grundkreisradius r_b / Base circle radius	52.205						
Grundkreisdurchmesser d_b / Base diameter	104.411						
Normalzahndicke max. s_n / Normal tooth thickness	3.464						
Normalzahndicke min. s_n / Normal tooth thickness	3.439						
Meßzähnezahl k / Number of teeth spanned							
Zahnweite max. W_k / Base tangent length							
Zahnweite min. W_k / Base tangent length		vor dem Aufpressen / before pressing					
Meßkugeldurchmesser D_M / Ball diameter	3.5000	geschliffen / ground	gehont / honed				
Diam. Zweikugelmaß max. M_{dK} / Measurement o. balls	118.006	s_n =					
Diam. Zweikugelmaß min. M_{dK} / Measurement o. balls	117.945	W_k =					
Verdrehflankenspiel theo. / Circumferential backlash	0.064 / 0.168	M_{dK} =					

3

2

4



Measuring plane for MdK

Für fp max. zwei Wellen zulässig
For fp max. two waves allowed

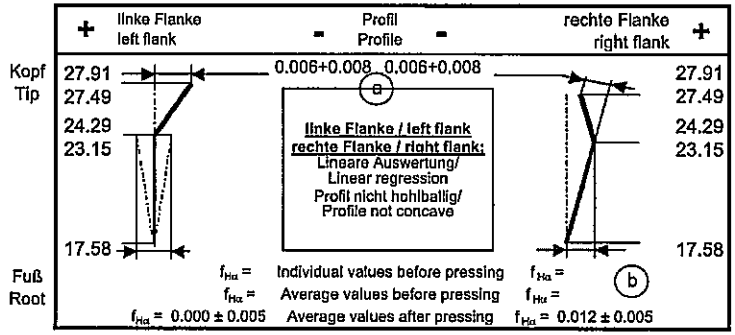
Bezugsprofil-Schleifscheibe
Grinding tool data

Schleifscheibenkopfhöhe h_{aP0S} = 2.800
Grinding wheel tip height

Schleifscheibenkopfradius ρ_{aP0S} = 0.787
Grinding wheel tip radius

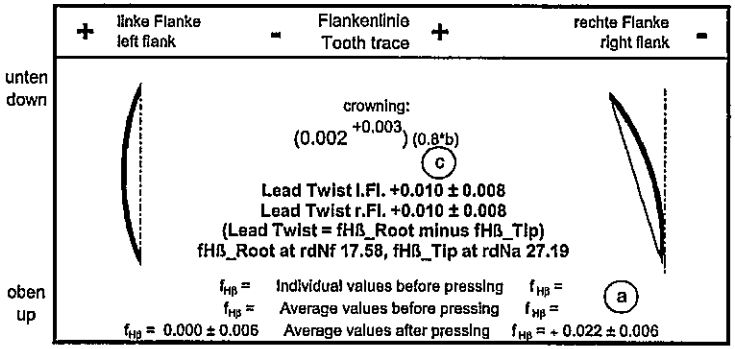
Schleifdurchmesser = 108.90 $_{-0.30}$ ≡ 15.47
grinding diameter

Hondurchmesser = 108.90 $_{-0.30}$ ≡ 15.47
honing diameter



* Schreibbeginn
* Start of checking

Ø = 108.90 $_{-0.30}$ ≡ 15.47



* 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
c	1	35978	See change report	20130515	Cricenti
b	2	35560	See change report	20111209	Cricenti
a	5	35392	See change report	13/05/2011	Cricenti

Verteiler:

Schutzvermerk nach DIN 34 beachten

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

Abbildungen sind unmaßstäblich.
Diagrams not to scale.

	Datum	Name
gez.	2011-03-23	Paaßen, Holger
gepr.		

Ersatz für
Erstverwendung bei Getriebetype: 250.0.0004.16

Verzahnungsblatt Endkontrolle
Final Check Gear Data
Benennung: Naming: Gear 2nd

Remark:

Zeichnungsnummer: Drawing number: 250.1.4220.75

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

Wkz-Profil siehe Werkzeugdatenblatt Nr. 250.1.4220.75
For Tooth profile, see tool data sheet number

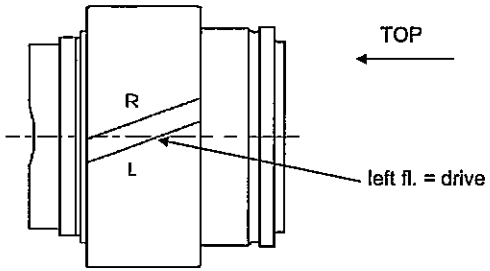
Der Verlauf der Profil- und Flankenlinie muss über den Messbereich stetig sein (ein- oder mehrfache Richtungsänderungen sind nicht zulässig)
The form of the profile and helix has to be continuous (one or more changes of directions are not allowed)

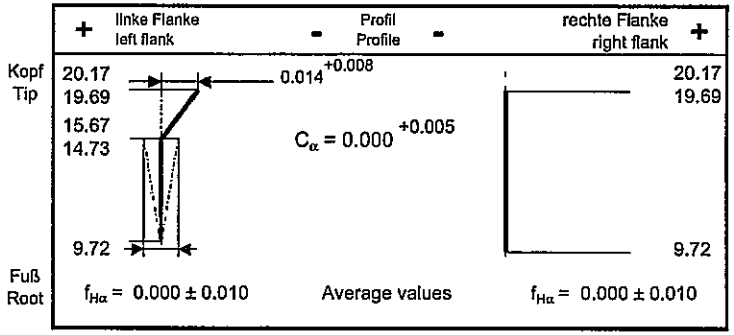
STIRNRAD / GEAR	außenverzahnt / external	Toleranzen der Verzahnung (DIN 3961 vom Aug. 1978) gültig für Werte am Einzelzahn / Tolerances of gearing (DIN 3961 of Aug. 1978) valid for values at individual tooth				
Zähnezahl z Number of teeth	43		linke Fl. / left flank	rechte Fl. / right flank		
Modul m_n Normal module	1.600000	Profil-Formabweichung $f_{f\alpha}$ Profile form error	0.022		Eingriffsteilungs-Abweich. f_{pe} Normal pitch error	0.020
Eingriffswinkel α_n Normal pressure angle	17° 30' 0"	Profil-Gesamtabweichung F_α Total profile error			Teilungs-Einzelabweichung f_p Adjacent pitch error	0.020
Schrägungswinkel β Helix angle	31° 0' 0"	Profil-Winkelabweichung $f_{H\alpha}$ Profile angle error	0.000 ± 0.018	0.000 ± 0.018	Teilungssprung f_u Diff. bet. adjacent pitches	0.025
Steigungsrichtung Hand of helix	LEFT	Flankenl.-Winkelabweich. $f_{H\beta}$ Tooth alignment error	0.000 ± 0.025	0.000 ± 0.025	Teilungs-Summenabweich. F_{pk} Cumulative circ. pitch error	
Profilverschiebungsfaktor x Addendum modification coeff.	0.330	Flankenl.-Gesamtabweich. F_β Total alignment error			Rundlaufabweichung F_r Radial run-out	0.056
Teilkreisdurchmesser d Pitch diameter	80.264	Flankenl.-Formabweich. $f_{f\beta}$ Longitudinal alignment err.	0.014		Zahndickenschwankung R_s Range of tooth thickn. error	
Kopfkreisdurchmesser d_a Outside diameter	85.90 -0.30	Teilungs-Gesamtabweich. F_p Cumulative pitch error	0.063			
Kopfnutzkreisd. theo. max. d_{Na} Tip diam. usable theo.	85.45	Einf.-Wälzabweichung F_i' Tangential composite error			Zweifl.-Wälzabweichung F_i'' Radial composite error	0.056
Kopfnutzkreisd. theo. min. d_{Na} Tip diam. usable theo.	85.00	Einflanken-Wälzsprung f_i' Tang. tooth to tooth comp. err.			Zweifl.-Wälzsprung f_i'' Radial tooth to tooth comp. err.	0.022
Fußkreisdurchmesser d_f Root diameter	75.65 -0.45	Radbreite im Meßkreis d_M b Facewidth in meas. diam.	12.50		Meßkreis Krümmungsradius ρ_{dM} Radius of curvature meas. diam.	13.72
Fußnutzkreisdurchmesser d_{Nf} Root diameter usable	77.80					
Grundkreisradius r_b Base circle radius	37.665					
Grundkreisdurchmesser d_b Base diameter	75.330					
Normalzahndicke max. s_n Normal tooth thickness	2.846					
Normalzahndicke min. s_n Normal tooth thickness	2.811					
Meßzähnezahl k Number of teeth spanned	8					
Zahnweite max. W_k Base tangent length	37.280					
Zahnweite min. W_k Base tangent length	37.246					
Meßkugeldurchmesser D_M Ball diameter	3.0000					
Diam. Zweikugelmaß max. M_{dK} Measurement o. balls	85.957					
Diam. Zweikugelmaß min. M_{dK} Measurement o. balls	85.866					
Verdrehflankenspiel theo. Circumferential backlash	0.072 0.192					

3A

2A

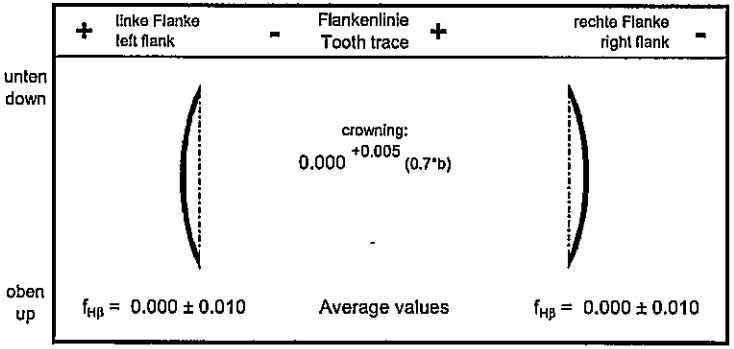
4A





* Schreibbeginn
* Start of checking

Ø = 77.07 -0.30 ≡ 8.14



* 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 = 0.7*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 = 0.7*b calculated to 1.0*b
Terms of the tooth system according to DIN (German Industrial Standards) No. 868, 3960, 3998

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

Wkz-Profil siehe Werkzeugdatenblatt Nr. 250.1.4298.00
For Tooth profile, see tool data sheet number

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 Getriebetyp. 250

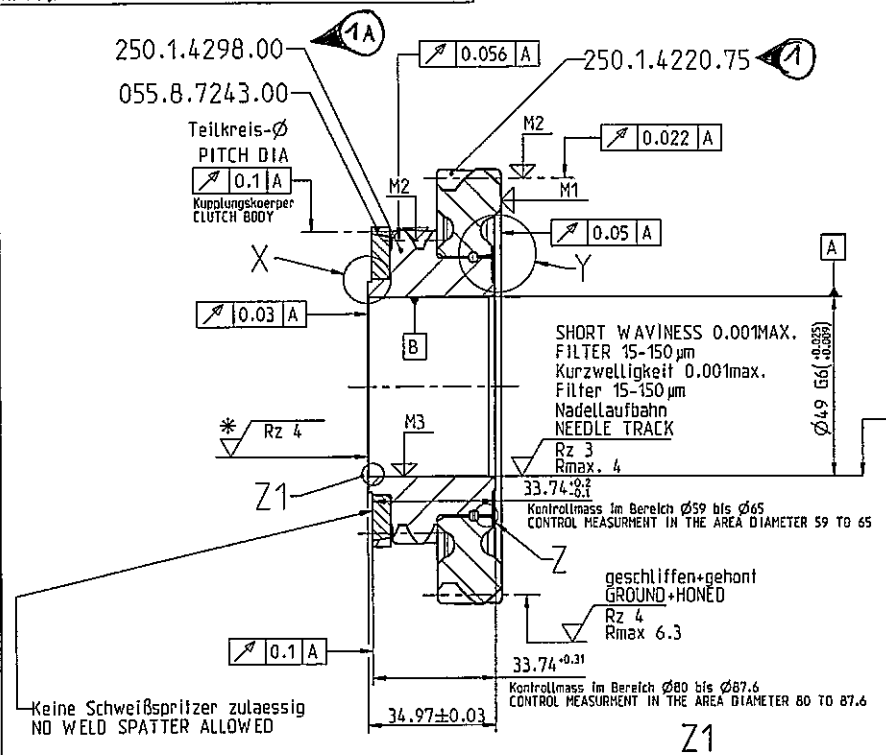
Remark:

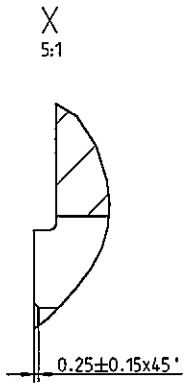
	Datum	Name
gez.	2011-09-12	Paaßen, Holger
gepr.		

Verzahnungsblatt Endkontrolle
Final Check Gear Data
Benennung:
Naming:
Double-Speed G. 2nd/Rev

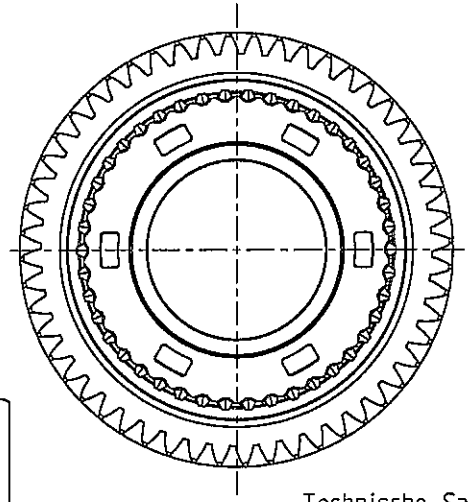
Zeichnungsnummer:
Drawing number:
250.1.4298.00

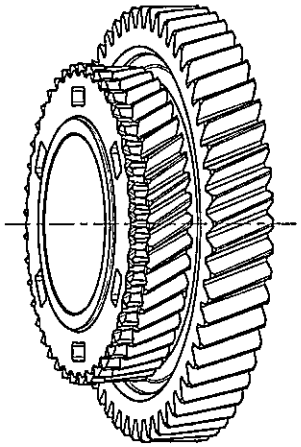
Fuer Freigabeinformation freilassen! KEEP FREE FOR RELEASE INFORMATION!





*MACHINING PARAMETER AT
HARD TURNING OPERATION:
FEED MOTION 0.04 TO 0.05 mm/revolution





Fuer GETRAG intern:
Dieses Bauteil ist Bestandteil der Gruppen Nummer 250.1.6449.00
Lieferant/Hersteller: Barl
GETRAG INTERNAL ONLY:
THIS COMPONENT IS PART OF GROUP NUMBER 250.1.6449.00
SUPPLIER/MANUFACTURER. Barl

Fuer die Lieferung und Kennzeichnung im Data Matrix Code
(Bauteil und/oder Verpackung)
muss die Gruppen Nummer 250.1.6449.00 verwendet werden.
FOR SHIPPMENT AND IDENTIFICATION WITHIN THE DATA MATRIX CODE
(COMPONENT AND/OR PACKAGING)
THE GROUP NUMBER 250.1.6449.00 HAS TO BE USED.

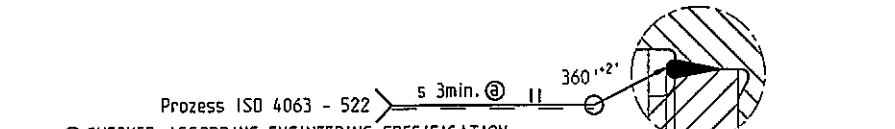
PPAP nach / ACCORDING TO 250.1.4297.77

Technische Sauberkeit / TECHNICAL CLEANLINESS:

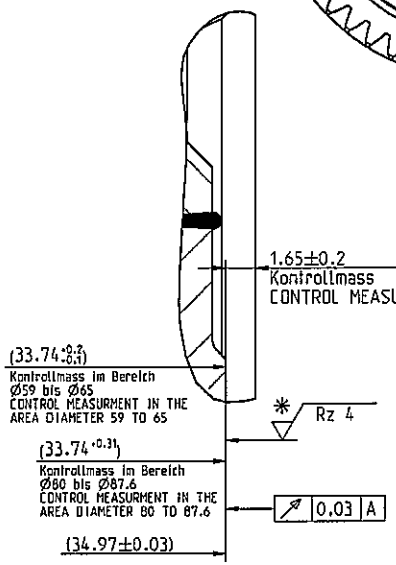
Es gelten die Sauberkeitsanforderungen nach GN 4340-1
CLEANLINESS REQUIREMENTS OF THE GN 4340-1 HAVE TO BE ABIDED

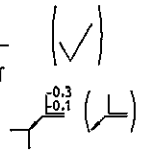
Naehere Angaben zur Verzahnung
siehe Verzahnungsblatt
250.1.4298.00 und 250.1.4220.75
FURTHER GEAR DATA SEE
DATA SHEET NUMBER
250.1.4298.00 AND 250.1.4220.75

Z1
unmassstaeblich
not to scale

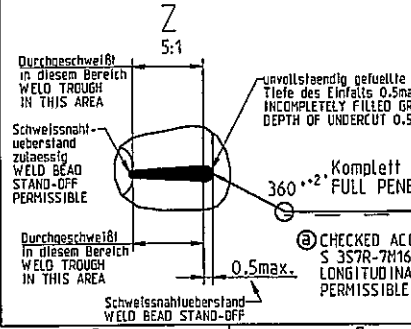


ⓐ CHECKED ACCORDING ENGINEERING SPECIFICATION
S 3S7R-7M161-AA. DEVIATION FROM THIS SPECIFICATION:
LONGITUDINAL MICRO CRACKS IN THE WELDING MATERIAL ARE
PERMISSIBLE TO A TOTAL OF 2% AROUND THE CIRCUMFERENCE.





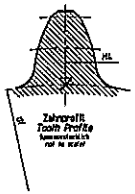
Naehere Angaben zur Verzahnung
siehe Verzahnungsblatt
250.1.4298.00 und 250.1.4220.75
FURTHER GEAR DATA SEE
DATA SHEET NUMBER
250.1.4298.00 AND 250.1.4220.75



ⓐ 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= 0.3min.
M4 (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= 0.3min.
M4 (INSIDE BASE OF TOOTH) : min. 300 HV10



GCG/TS 803001	0	<M>					
	0	▽					
GN 3010	0	<M>					
	0	<C>					
	0	<A>					
CAD Frei/Freigeben	a	3x	35622_1	Z: Bemerkung/NOTE geaendert/CHANGED; Z1: Bemerkung/NOTE geaendert/CHANGED, 3min. war/WAS 2.5min.			20130124
	--	--	35453_2	Spezifikationsreifegrad F erteilt SPECIFICATION MATURITY LEVEL F APPROVED			20120725
Massstab / SCALE M: 1:1 (--)	Buchst. CHANGE INDEX	Anzahl NUMBER	Aend.-Nr. CHANGE REQUEST NO.	Aenderung MODIFICATION	--nur mittels CAD zulaessig: EMEA ueberpruefen-- --ONLY ALLOWED BY CAD; CHECK EMEA--		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

Informationen auf dieser Zeichnung sind ohne Angaben zu Verwendung und Freigabe unverbindlich.
INFORMATION ON THIS DRAWING PROVIDED WITHOUT OBLIGATION IF USAGE AND RELEASE ARE NOT SHOWN.

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 Lageolerierung FORM AND POSITION TOLERANCES EN ISO 1101	Tolerierung TOLERANCING ISO 8015	Oberflaechenangaben SURFACE TEXTURE GN 4005	Werkstueckkanten BREAK EDGES ISO 13715

Werkstoff / MATERIAL -
Halbzeug SEMI-FINISHED -
oelbenetzte Oberflaeche OIL WETTED SURFACE 0 mm²
Gesamtoberflaeche SURFACE AREA 0 mm²
Masse MASS 0.000 kg
Schutzvermerk nach ISO 16016 beachten PROTECTION PER ISO 16016

GETRAG
Getriebe- und Zahnradfabrik Hermann Hagenmeyer GmbH & Cie KG

Benennung / ITEM NAME: Doppelrad 2./ Rw. Gg. vst.
DOUBLE GEAR 2ND / REV CPL.
Artikel-Nr./ ITEM NO.: 2501429777
CAD-Modell: 2501429777
Blatt/SHEET 1 von/OF 1
Reifegrad MATURITY: F
Format SIZE: A2

Ersatz fuer SUBSTITUTE FOR	-		INTRALINK DATA	CHECKED IN BY	CHECKED IN ON: dd.mm.yyyy hh:mm:ss	VERSION
			Zchng / DRW:	Petra.Kaufmann	24.01.2013 07:45:09	1
			MODEL:	Petra.Kaufmann	24.01.2013 07:45:09	1.

Istruzioni di controllo

GETRAG

PP Produzione GPS

Materiale: 2501429777
Descrizione: Doppia ruota dentata libera Stato:Rilasciato Produzione + Calcolo costi
Operazione: 0230 Rettifica denti
Centro di lavoro: SLW14190 RETTIFICA DENTI DG2

Indice del disegno finito: -
Data emissione: 11.11.2014 / Vito Fiore
Data aggiornamento: 09.01.2015 / Rocco Tanzella

n.SAP Dritterno	GN 3010	Caratteristica	Misura nomin.	LTI	LTS	Strumento di controllo	Quantità	Frequenza RK1:	Quantità	Frequenza RK2:	Quantità	Frequenza Sala di misura	Cambio ut.	Metodi di gestione / Documentazione
0004		Controllo 1° pz secondo Gear data 250.1.4220.7X				MVZ-400249 EVOLVENTIMETRO					1	1° pz 2.3.1.1-R 2		Misu: controllo primo pezzo
						MOA-416121 RUGOSIMETRO TIPO PRK					1	1° pz 2.3.1.1-R 2		
						MZA-450311 Calcolatore di misura E9066 Marposs					1	1° pz 2.3.1.1-R 2		
0006	M	Svergolamento evolventi Sr 2				MVZ-400249 EVOLVENTIMETRO					1	Ultimo PZ. prima ravvivatu ra		Misu: diagramma di dentatura
0010	M	Diametro Mdk Sr 2	117,969 mm	117,933	118,006	MZA-450311 Calcolatore di misura E9066 Marposs	3	pz ogni 100 per macchina						CR1: calcolatore di misura
0012	M	Diametro Mdk RW	85,911 mm	85,866	85,957	MZA-450311 Calcolatore di misura E9066 Marposs	3	pz per rack						CR1: calcolatore di misura
0020	M	Evolvente ed elica sec.G.T. Sr 2 con svergolamento				MVZ-400249 EVOLVENTIMETRO					1	pz ogni 100 per macchina		Misu: diagramma di dentatura
0022	M	Evolvente ed elica sec.G.T. RW con svergolamento				MVZ-400249 EVOLVENTIMETRO					1	pz per rack		Misu: diagramma di dentatura
0030	M	Errore globale di divisione Fp Sr 2	0,000 mm	0,000	0,050	MVZ-400249 EVOLVENTIMETRO					1	pz a turno/mac .		Misu: diagramma di dentatura
0032	M	Oscillazione radiale dentat. Fr Sr 2	0,000 mm	0,000	0,032	MVZ-400249 EVOLVENTIMETRO					1	pz a turno/mac .		CR1: diagramma di dentatura Misu: diagramma di dentatura
0034	M	Errore globale di divisione Fp RW	0,000 mm	0,000	0,063	MVZ-400249 EVOLVENTIMETRO					1	pz per rack		Misu: diagramma di dentatura
0036	M	Oscillazione radiale dentat. Fr RW	0,000 mm	0,000	0,045	MVZ-400249 EVOLVENTIMETRO					1	pz per rack		CR1: diagramma di dentatura Misu: diagramma di dentatura

Istruzioni di controllo

GETRAG

PP Produzione GPS

Materiale: 2501429777
Descrizione: Doppia ruota dentata libera Stato:Rilasciato Produzione + Calcolo costi
Operazione: 0230 Rettifica denti
Centro di lavoro: SLW14190 RETTIFICA DENTI DG2

Indice del disegno finito: -
Data emissione: 11.11.2014 / Vito Fiore
Data aggiornamento: 09.01.2015 / Rocco Tanzella

n. SAP Utilizzato	GN 3010	Caratteristica	Misura nomin.	LTI	LTS	Strumento di controllo	Quantità	Frequenza RK1:	Quantità	Frequenza RK2:	Quantità	Frequenza Sala di misura	Cambio ut.	Metodi di gestione / Documentazione
0040	M	rugosità dente Rz	µm	0,0	4,0	MOA-416121 RUGOSIMETRO TIPO PRK					1	1° pz 2.3.1.1-R 2		Misu: controllo primo pezzo
0042	M	Rugosità dente Rmax	µm	0,0	6,3	MOA-416121 RUGOSIMETRO TIPO PRK					1	1° pz 2.3.1.1-R 2		Misu: controllo primo pezzo
0052		Aspetto, privo di bava, senza danni					10	pz per rack						CR1: no documentazione
0060		Superf. dente completamente levigata					10	pz per rack						CR1: no documentazione
0070		Controllo chimico bruciature secondo procedura WTL 3.4.10.01					1	pz cambio mola rettifica						CR1: controllo primo pezzo

Istruzioni di controllo

GETRAG

PP Produzione GPS

Materiale: 2501429777/S
Descrizione: Doppia ruota dentata 2.M/RM Stato:Rilasciato Produzione + Calcolo costi
Operazione: 0030 Dentatura a creatore Z= 43
Centro di lavoro: FRW14160 DENTATURA A CREATORE 250 DG MOZZETTO

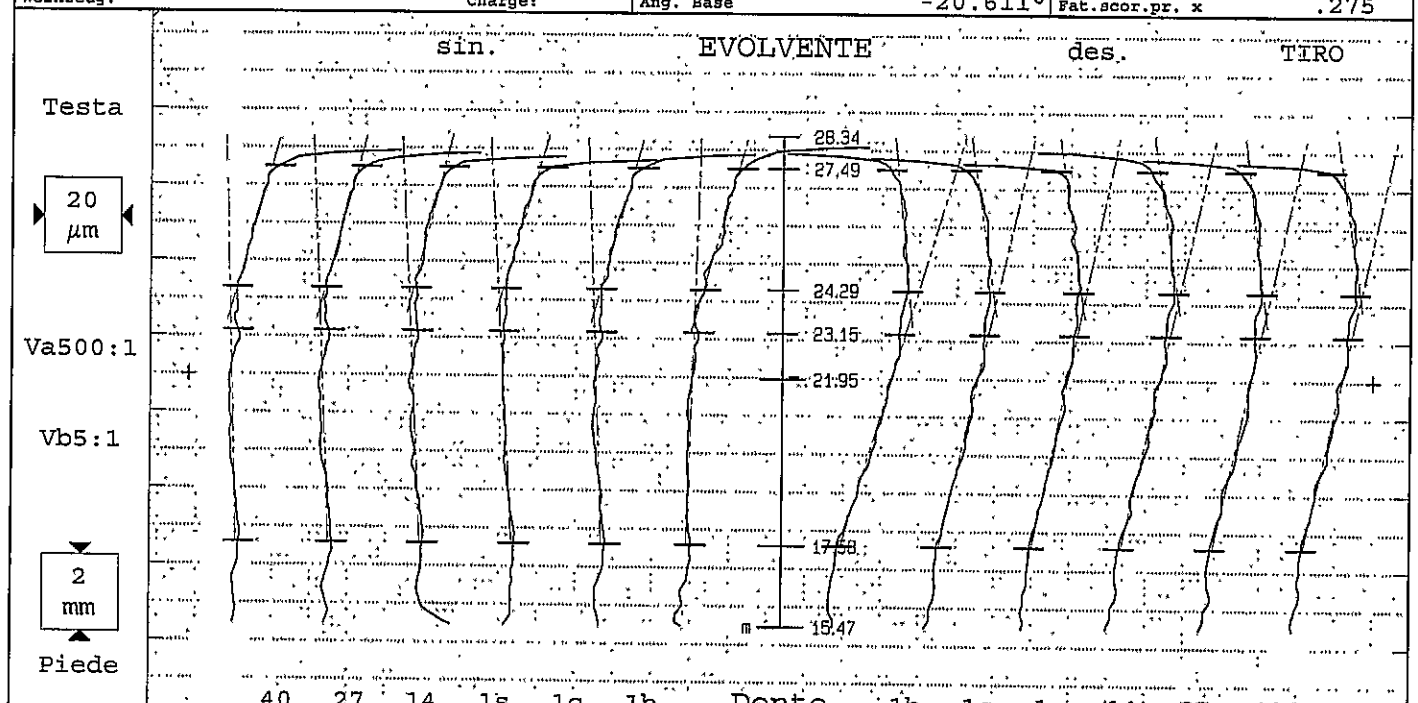
Indice del disegno finito:
Data emissione: 02.10.2012 / Vito Fiore
Data aggiornamento: 02.10.2012 / Vito Fiore

n.Sip Interno	GN 3010	Caratteristica	Misura nomin.	LTI	LTS	Strumento di controllo	Quantità	Frequenza RK1:	Quantità	Frequenza RK2:	Quantità	Frequenza Sala di misura	Cambio ut.	Metodi di gestione / Documentazione
0010		Controllo 1° pz sec. VBZ 200_803243				MVZ-400249 EVOLVENTIMETRO					1	1° pz 2.3.1.1-R 2		Misu: controllo primo pezzo
						MOA-416120 PROFILOMETRO PCV					1	1° pz 2.3.1.1-R 2		
						MZA-401071 CALCOLATORE DI MISURA E9066 MARPOSS					1	1° pz 2.3.1.1-R 2		
0020		Diametro Mdk da correlazione ±0.015	mm	-0,015	0,015	MZA-401071 CALCOLATORE DI MISURA E9066 MARPOSS	1	pz ogni 100 per macchina						CR1: calcolatore di misura
0030		FhB Sx e Dx con svergolamento	mm	-0,008	0,008	MVZ-400249 EVOLVENTIMETRO					1	pz ogni 100 per macchina		Misu: diagramma di dentatura
0032		FHa Sx - Dx + svergolamento	0,000	-0,008	0,008	MVZ-400249 EVOLVENTIMETRO					1	pz ogni 100 per macchina		Misu: protocollo di misura
0040		Diagramma. "evolvente Sinistra su tutti i denti	mm			MVZ-400249 EVOLVENTIMETRO					1	pz a cambio utensile		Misu: Diagramma di Misura
0050		Diametro di fondo 75.65 -0.35	75,650 mm	75,300	75,650	MVZ-400249 EVOLVENTIMETRO					1	pz a cambio utensile		Misu: Diagramma di Misura
0060		Diametro esterno 85,90 -0,16	85,90 mm	85,74	85,90	MVZ-400249 EVOLVENTIMETRO					1	pz a cambio utensile		Misu: Diagramma di Misura
0070		Oscillazione radiale dentat. Fr 0+0.032	0,000 mm	0,000	0,032	MVZ-400249 EVOLVENTIMETRO					1	pz ogni 100 per macchina		Misu: diagramma di dentatura
0080		Pulizia e completezza " assenza di trucioli"					3	pz per rack						
0090		Bava ammessa su profili dente Max 0.05mm (valido solo per ruote non sbavate)	0,000 mm	0,000	0,050	MOA-416120 PROFILOMETRO PCV					1	pz a turno/mac .		Misu: protocollo di misura

GETRAG — Ruota cilindrica Evolvente/Elica

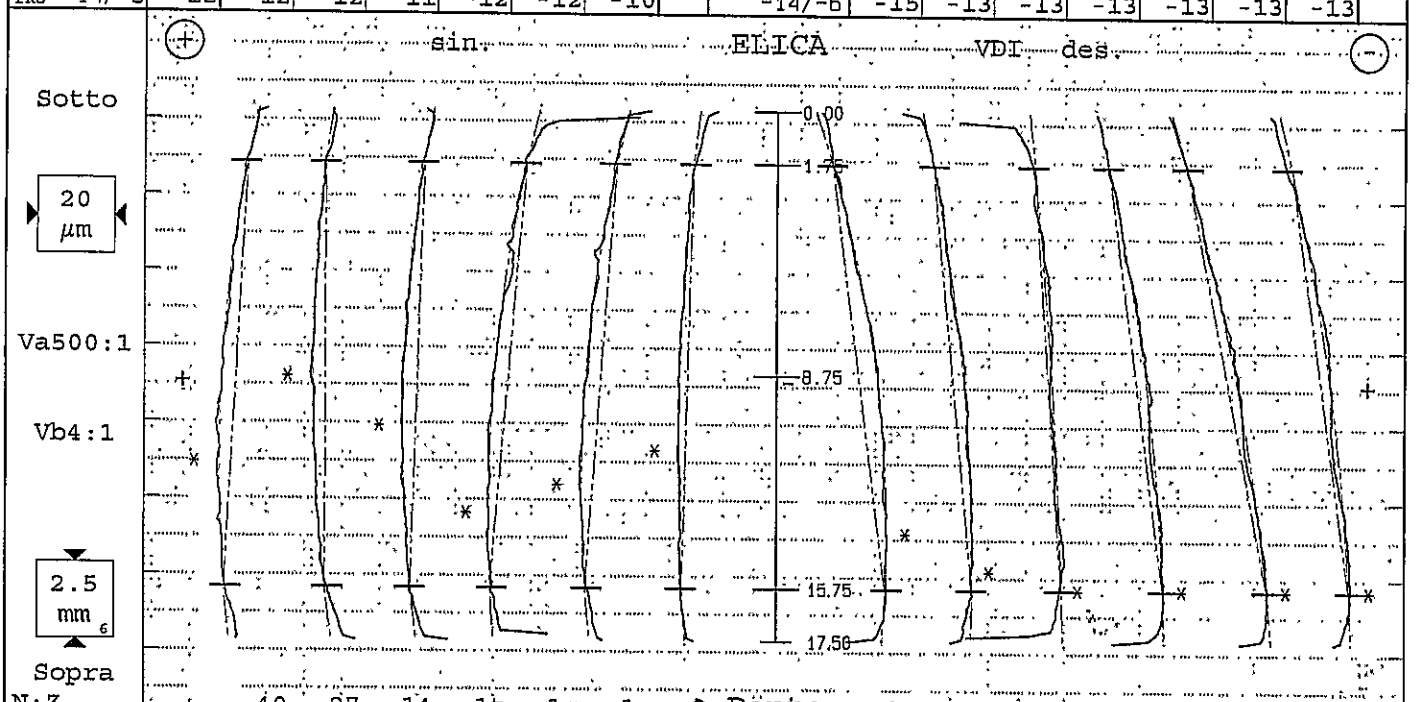
Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore:	TURNO C
Denominazione:	ZR2	Numero denti z	52
Numero disegno.:	250.1.4220.75-IF	Modulo m	2mm
Commessa/serie nr.:	PPAP 1	Angolo pressione	20°
Masch.Nr.:	M001 Spindel: Formmagl	Angolo elica	-22°
Untersuchungszweck:	Laufende Messung	Ø Base db	104.4109mm
Werkzeug:	Charge:	Ang. Base	-20.611°

Data:	10.01.2015 15:16
Largh.fasc.dent. b	17.5mm
Tratto evolv. La	5.57mm
Tratto elica Lß	14mm
Inizio elab. M1	17.58mm
Palpatore Ø	(#1)1mm
Fat.scor.pr. x	.275



40 27 14 1s 1c 1b Dente 1b 1c 1s 14 27 40

Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
		Var 2							12±5	Var 0						13	
fHαm ±5	2																
fHα ±7	2	1	2	3	3	2	-2		12±7	17	13	12	13	13	13	13	
Fα	4	3	4	4	4	4	3			6	2	2	2	3	2	2	
ffα 5	3	3	4	3	2	3	2		5	3	2	2	2	3	2	2	
Cα	3	3	3	2	1	2	2			1	1	1	1	2	1	1	
fKo -14/-6	-12	-12	-12	-11	-12	-12	-10		-14/-6	-15	-13	-13	-13	-13	-13	-13	



40 27 14 1t 1c 1p Dente 1p 1c 1t 14 27 40

fHßm ±6	-6	Var 10							22±6	Var 13						19	
fHß ±13	-6	-8	0	-4	-12	-10	-4		22±13	18	13	9	18	26	19	19	
Fß	5	6	3	4	9	8	4			5	8	10	4	4	3	5	
ffß 5	2	2	1	1	3	3	1		5	1	1	2	2	2	3	2	
Cß 2/5	4	4	3	4	4	4	2		2/5	5	3	1	3	2	2	3	
Bd 10±8	8								10±8							9	

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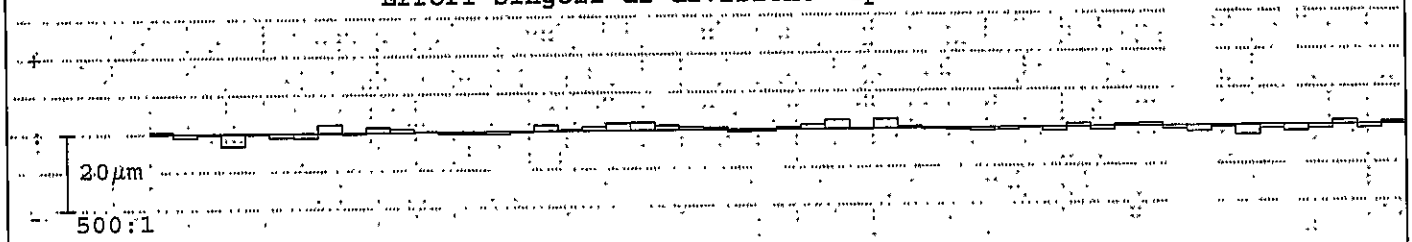
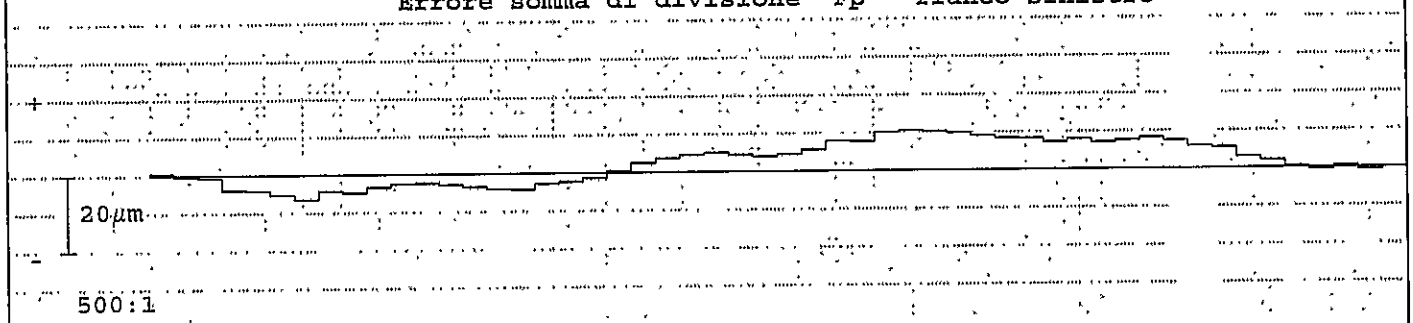
GETRAG — Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 15:16	
Denominazione: ZR2	Numero denti z 52	Angolo pressione 20°	
Numero disegno.: 250.1.4220.75-IF	Modulo m 2mm	Angolo elica -22°	
Commessa/serie nr.: PPAP 1	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formnestzeug		Charge:	

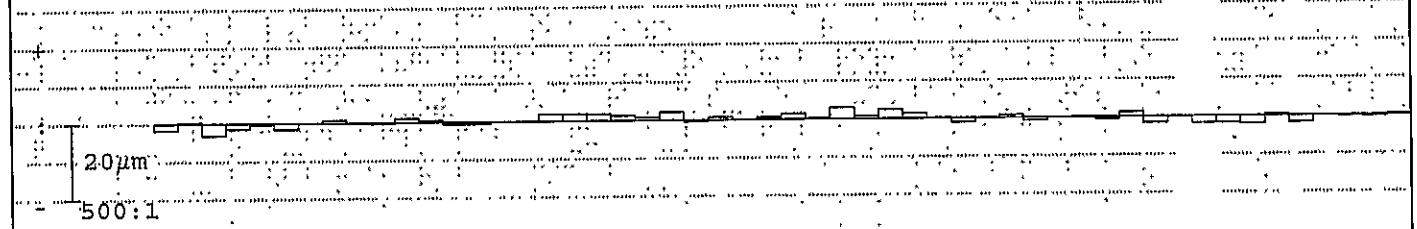
Errori singoli di divisione fp fianco sinistro



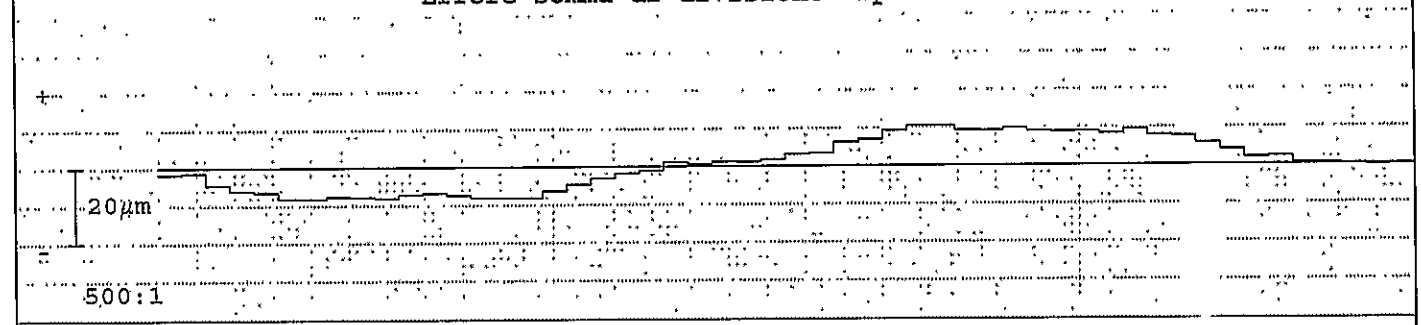
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



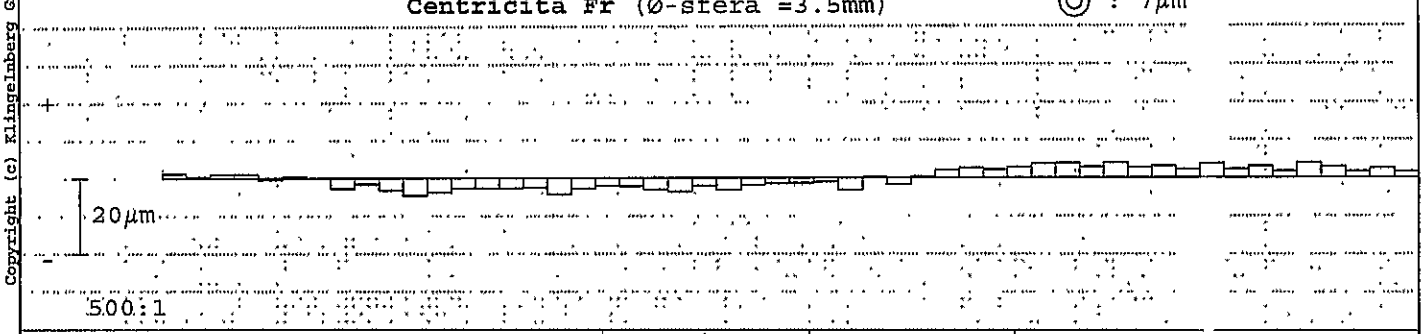
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:113.268 z=8.8mm

		fianco sinistro Val.misur	Qual.	fianco sinistro Val. amm	Qual.	fianco destro / TIRO Val.misur	Qual.	fianco destro / TIRO Val. amm	Qual.
Gr. err. singoli divisione	fp max	3		10		3		10	
Gr. salto di passo	fu max	3		12		4		12	
Scarto di divisione	Rp	5				6			
Err. globale di divisione	Fp	17		50		19		50	
Err. cordale di divisione	Fpz/8	9				9			

Centricità Fr (Ø-sfera =3.5mm) ◎ : 7µm



Err. di concentricitá	Fr	8	32	
Variaz. spessore dente	Rs			

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GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore:	TURNO C	Data:	10.01.2015 15:52
Denominazione:	ZR2	Numero denti z	52	Largh.fasc.dent. b	17.5mm
Numero disegno.:	250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La	5.57mm
Commessa/serie nr.:	45PPAP 1	Angolo pressione	20°	Tratto elica LE	14mm
Masch.Nr.:	M001 Spindel: Formmaster	Angolo elica	-22°	Inizio elab. M1	17.58mm
Untersuchungszweck:	Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø	(#1) 1mm
Werkzeug:	Charge:	Ang. Base	-20.611°	Fat.scor.pr. x	.275

TIRO

Piede-Ø: 107.233mm [107.12/107.42]

Testa-Ø: 118.712mm [118.6/118.8]

VDI:

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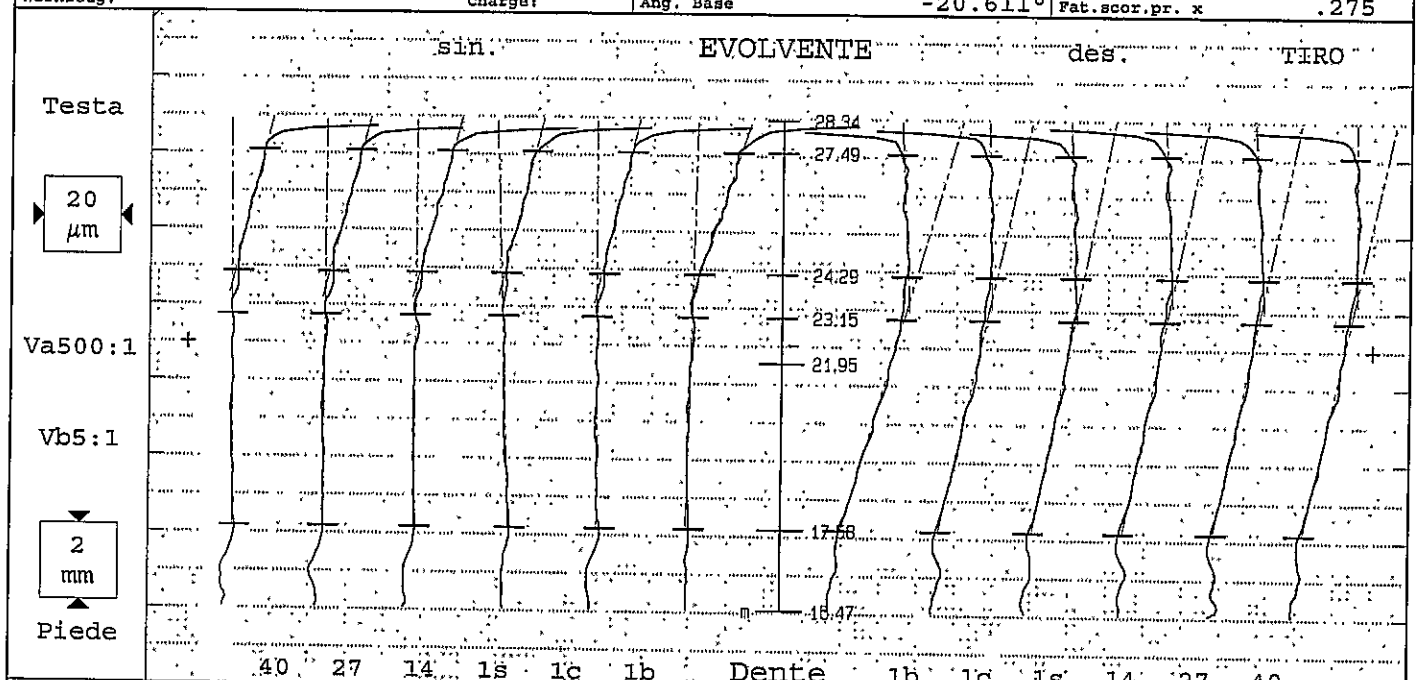
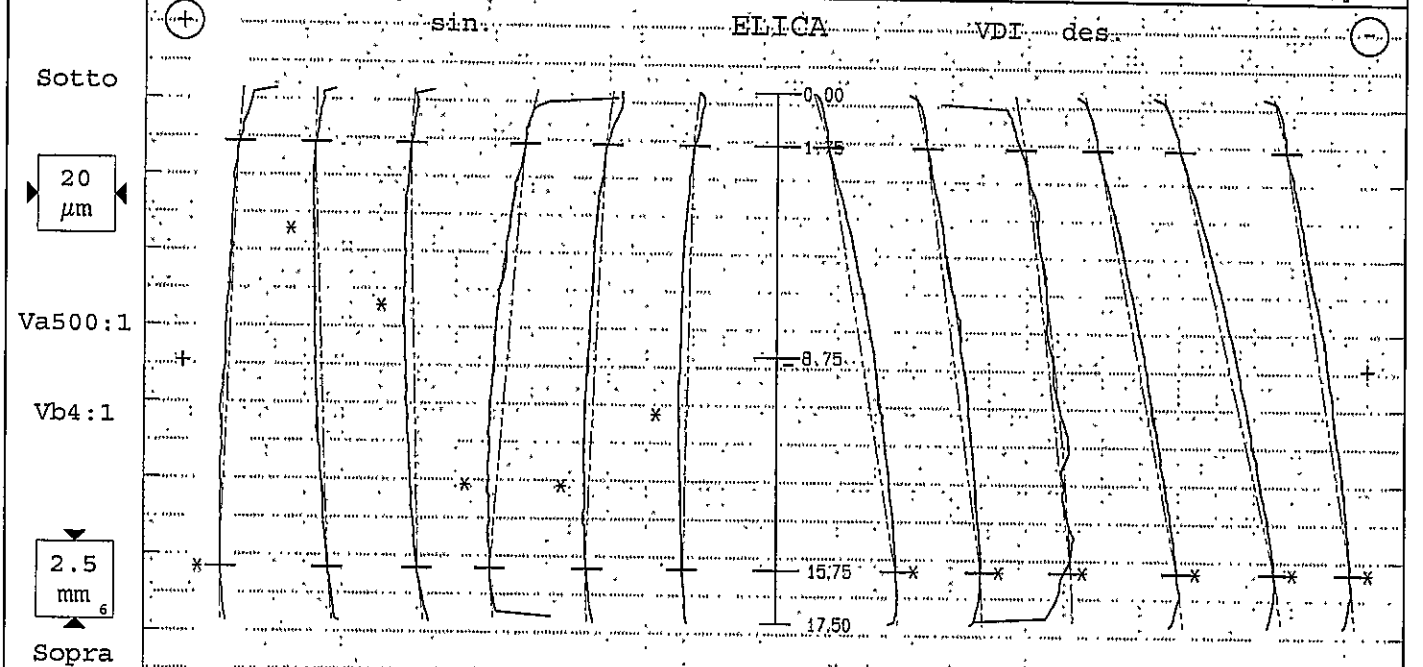
GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 15:29
Denominazione:	ZR2	Numero denti z 52	Largh.fasc.dent. b 17.5mm
Numero disegno.:	250.1.4220.75-IF	Modulo m 2mm	Tratto evolv. La 5.57mm
Commessa/serie nr.:	PPAP 2	Angolo pressione 20°	Tratto elica Lß 14mm
Masch.Nr.:	M001 Spindel: Formnestola	Angolo elica -22°	Inizio elab. M1 17.58mm
Untersuchungszweck:	Laufende Messung	Ø Base db 104.4109mm	Palpatore Ø (#1)1mm
Werkzeug:	Charge:	Ang. Base -20.611°	Fat.scor.pr. x .275



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm ±5	0	Var 0							12±5	Var 2						12	
fHα ±7	0	0	0	0	2	0	-1		12±7	16	13	11	11	12	13	12	
Fα	2	1	1	2	2	2	2			5	2	2	2	1	2	2	
ffα 5	1	1	1	1	1	2	1		5	1	2	2	2	1	2	2	
Cα	1	1	1	1	1	1	1			1	1	1	1	1	1	1	
fKo -14/-6	-9	-9	-9	-10	-10	-9	-12		-14/-6	-13	-9	-10	-9	-10	-9	-9	
P/T-φ[mm]	107.385	[107.12/107.42]								118.736	[118.6/118.8]						



fHßm ±6	-1	Var 10							22±6	Var 13						24	
fHß ±13	-1	-6	4	3	-11	-6	-3		22±13	23	18	16	26	31	22	24	
Fß	4	5	4	3	9	5	3			2	4	7	4	8	1	4	
ffß 5	1	1	1	1	1	1	1		5	1	2	4	1	1	1	1	
Cß 2/5	2	1	2	2	4	2	2		2/5	3	2	2	2	2	2	2	
Bd 10±8	8								10±8							7	

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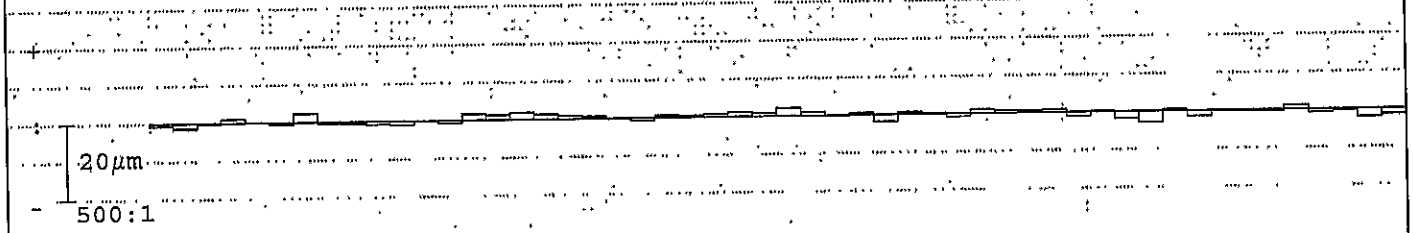
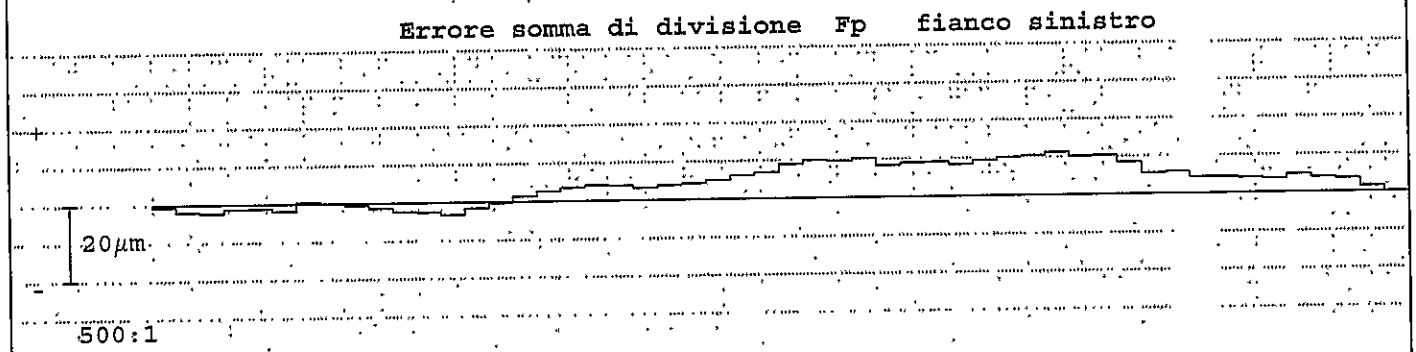
GETRAG — Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 15:29	
Denominazione: ZR2	Numero denti z 52	Angolo pressione 20°	
Numero disegno.: 250.1.4220.75-IF	Modulo m 2mm	Angolo elica -22°	
Commessa/serie nr.: PPAP 2	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmaßzeug	Charge:		

Errori singoli di divisione fp fianco sinistro

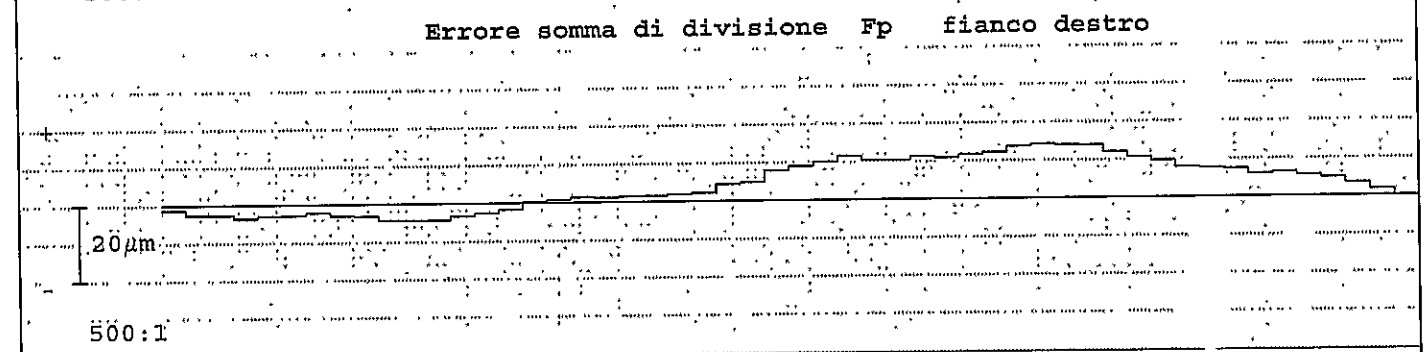


Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

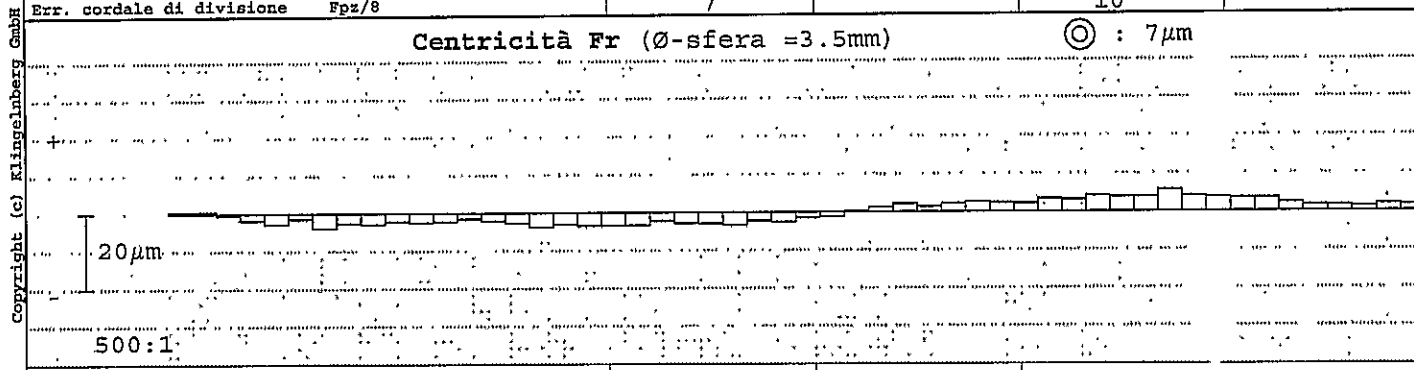
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:113.268 z=8.8mm

		fianco sinistro Val.misur	Qual.	fianco sinistro Val. amm	Qual.	fianco destro / TIRO Val.misur	Qual.	fianco destro / TIRO Val. amm	Qual.
Gr. err. singoli divisione	fp max	3		10		3		10	
Gr. salto di passo	fu max	3		12		3		12	
Scarto di divisione	Rp	5				5			
Err. globale di divisione	Fp	14		50		19		50	
Err. cordale di divisione	Fpz/8	7				10			

Centricità Fr (Ø-sfera =3.5mm) ◎ : 7µm



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

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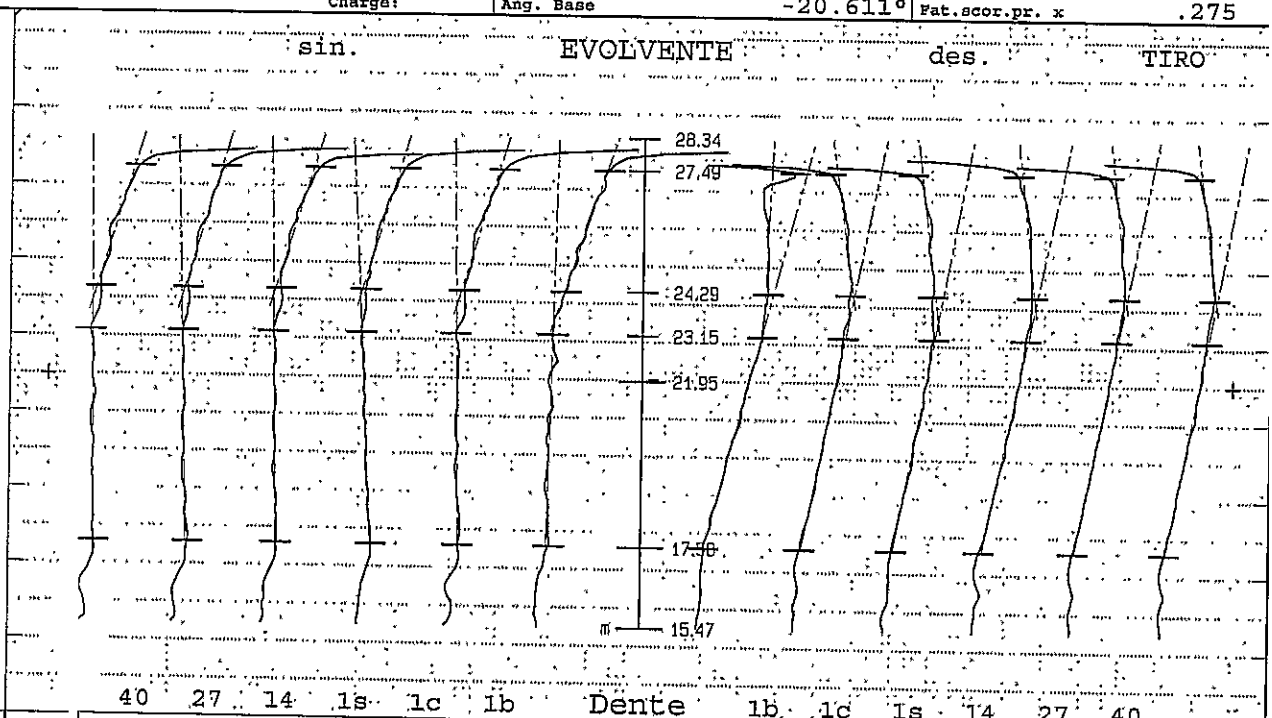
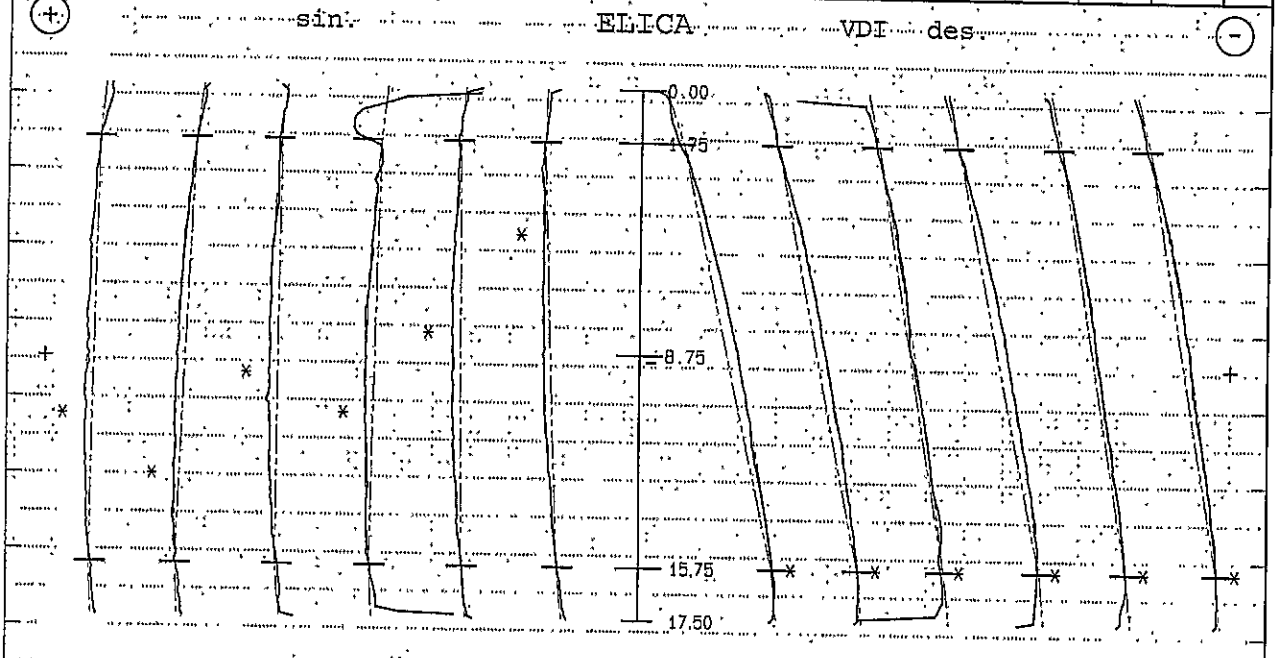
GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data:	10.01.2015 15:43
Denominazione: ZR2	Numero denti z	52	Largh.fasc.dent. b 17.5mm
Numero disegno.: 250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La 5.57mm
Commessa/serie nr.: PPAP 3	Angolo pressione	20°	Tratto elica Lß 14mm
Masch.Nr.: M001 Spindel: Formmaster	Angolo elica	-22°	Inizio elab. M1 17.58mm
Untersuchungszweck: Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø (#1) 1mm
Werkzeug: Charge:	Ang. Base	-20.611°	Fat.scor.pr. x .275



40 27 14 1s 1c 1b Dente 1b 1c 1s 14 27 40

Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual
		Var 0								Var 1							
fHαm ±5	1								12±5							11	
fHα ±7	1	1	1	1	3	1	-1		12±7	15	11	11	12	11	11	11	
Fα	2	2	2	1	3	2	3			3	2	2	2	1	2	2	
ffα 5	1	1	1	1	1	1	2		5	1	1	1	2	1	1	1	
Cα	1	0	1	0	0	1	1			0	0	1	1	0	1	1	
fKo -14/-6	-11	-11	-11	-11	-12	-11	-13		-14/-6	-9	-11	-12	-11	-10	-11	-11	



N:Z 40 27 14 1t 1c 1p ○ Dente 1p 1c 1t 14 27 40

fHßm ±6	-2	Var 7							22±6	Var 5						25	
fHß ±13	-2	-3	-6	-1	-3	1	5		22±13	30	27	22	27	22	23	25	
Fß	3	3	5	2	9	2	5			8	5	3	5	1	2	3	
ffß 5	1	1	1	1	5	1	1		5	1	1	2	1	1	2	1	
Cß 2/5	2	2	2	2	2	2	2		2/5	3	2	1	3	1	2	2	
Bd 10±8	8								10±8							8	

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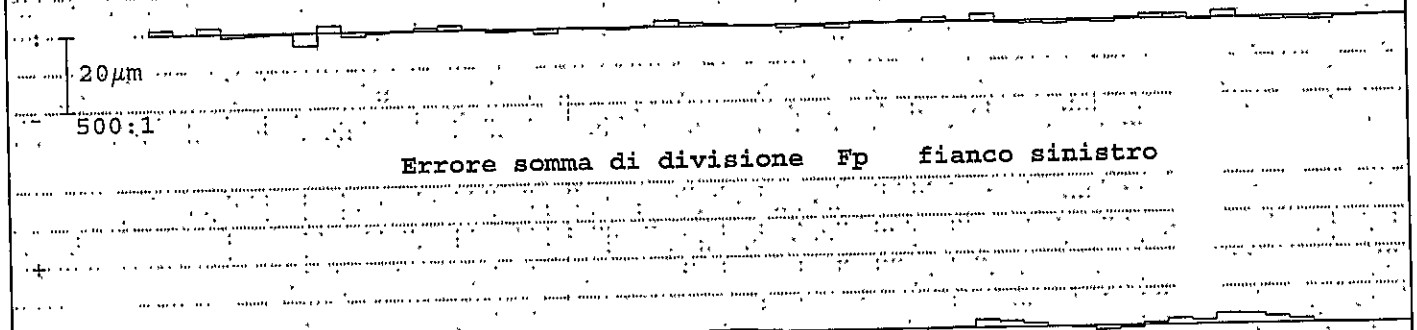
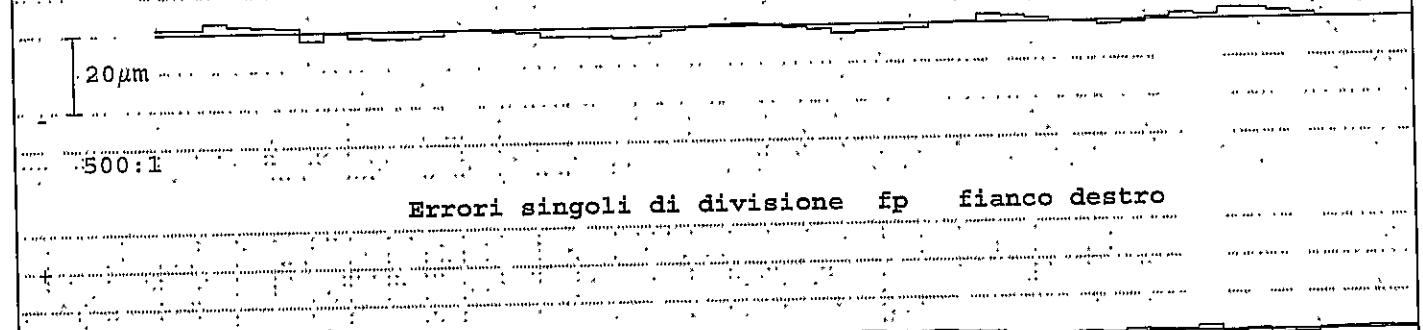
GETRAG — Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 15:43	
Denominazione: ZR2	Numero denti z 52	Angolo pressione 20°	
Numero disegno.: 250.1.4220.75-IF	Modulo m 2mm	Angolo elica -22°	
Commessa/serie nr.: PPAP 3	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmesszeug:	Charge:		

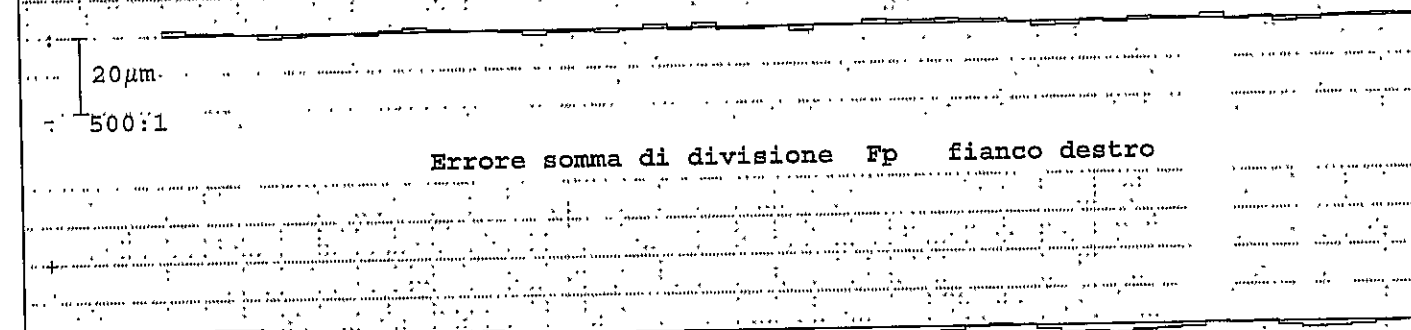
Errori singoli di divisione fp fianco sinistro



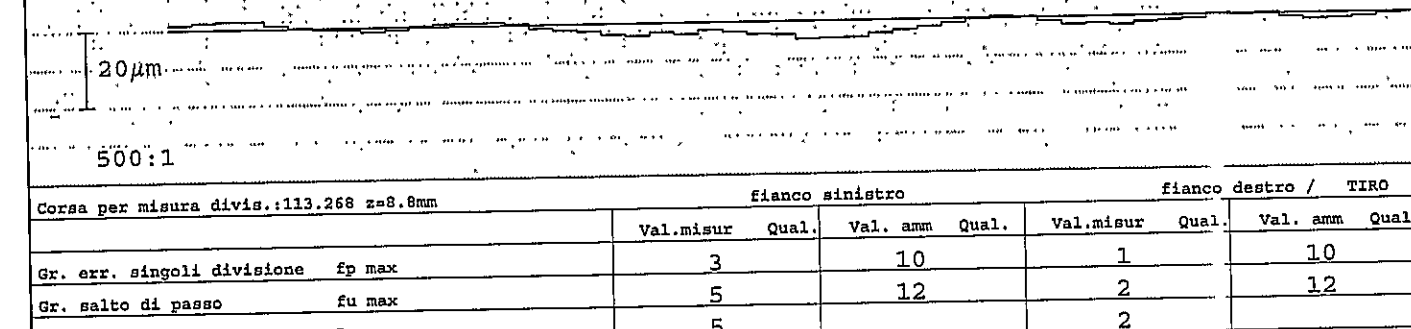
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

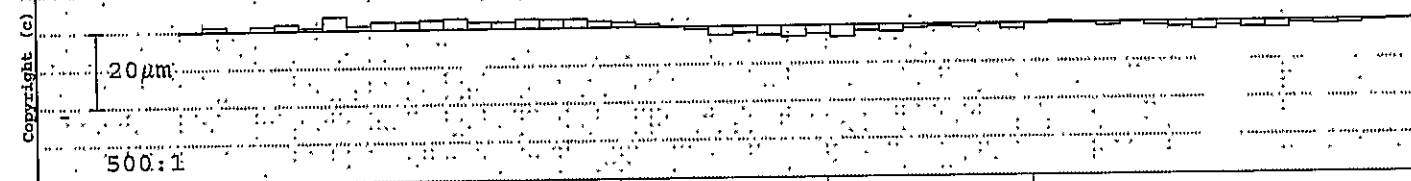


Errore somma di divisione Fp fianco destro



Corsa per misura divis.:113.268 z=8.8mm		fianco sinistro		fianco destro / TIRO	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	3	10	1	10
Gr. salto di passo	fu max	5	12	2	12
Scarto di divisione	Rp	5		2	
Err. globale di divisione	Fp	5	50	7	50
Err. cordale di divisione	Fpz/8	5		5	

Centricità Fr (Ø-sfera =3.5mm) ◎ : 3µm



Err. di concentricitá	Fr	7	32	
Variaz. spessore dente	Rs			

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GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore:	TURNO C	Data:	10.01.2015 15:51
Denominazione:	ZR2	Numero denti z	52	Largh.fasc.dent. b	17.5mm
Numero disegno.:	250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La	5.57mm
Commessa/serie nr.:	45PPAP 3	Angolo pressione	20°	Tratto elica Lß	14mm
Masch.Nr.:	M001 Spindel: Formnestl	Angolo elica	-22°	Inizio elab. M1	17.58mm
Untersuchungszweck:	Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø	(#1) 1mm
Werkzeug:	Charge:	Ang. Base	-20.611°	Fat.scor.pr. x	.275

TIRO

Piede-Ø: 107.233mm [107.12/107.42]

Testa-Ø: 118.699mm [118.6/118.8]

VDI

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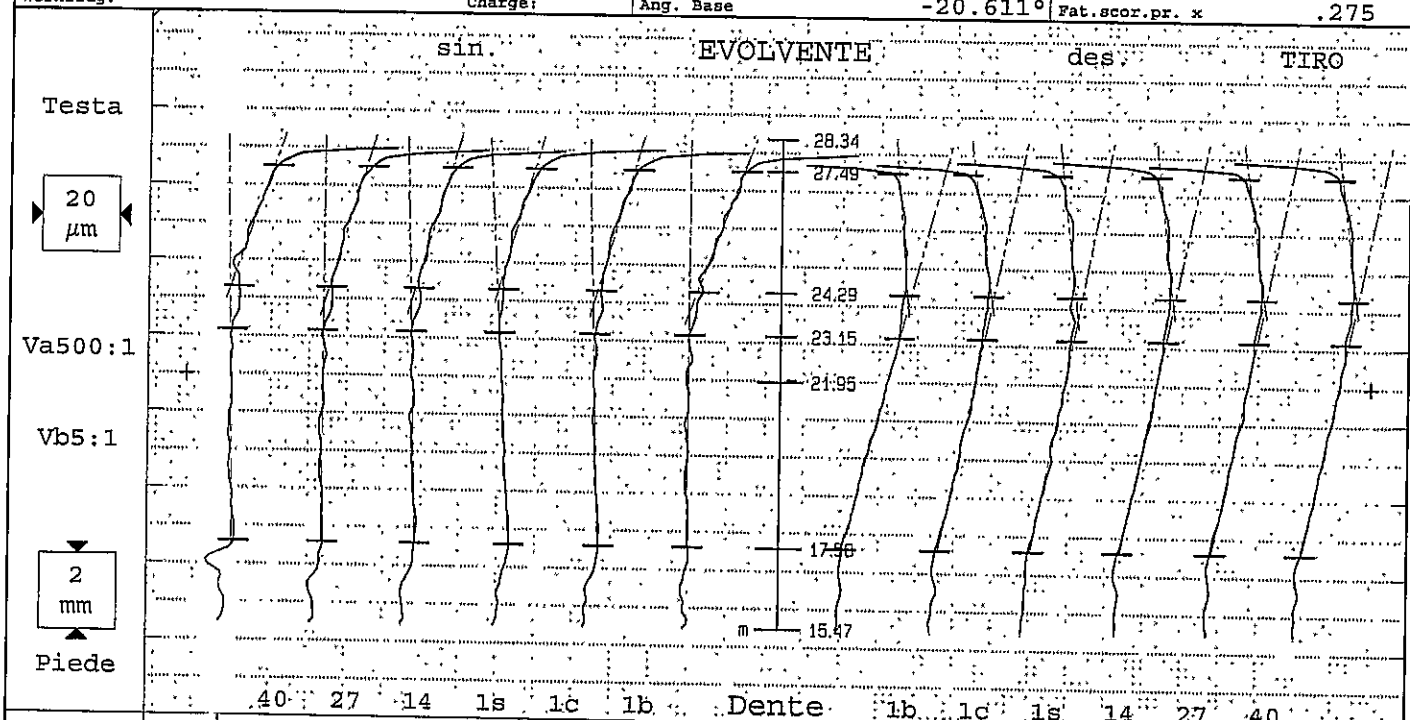
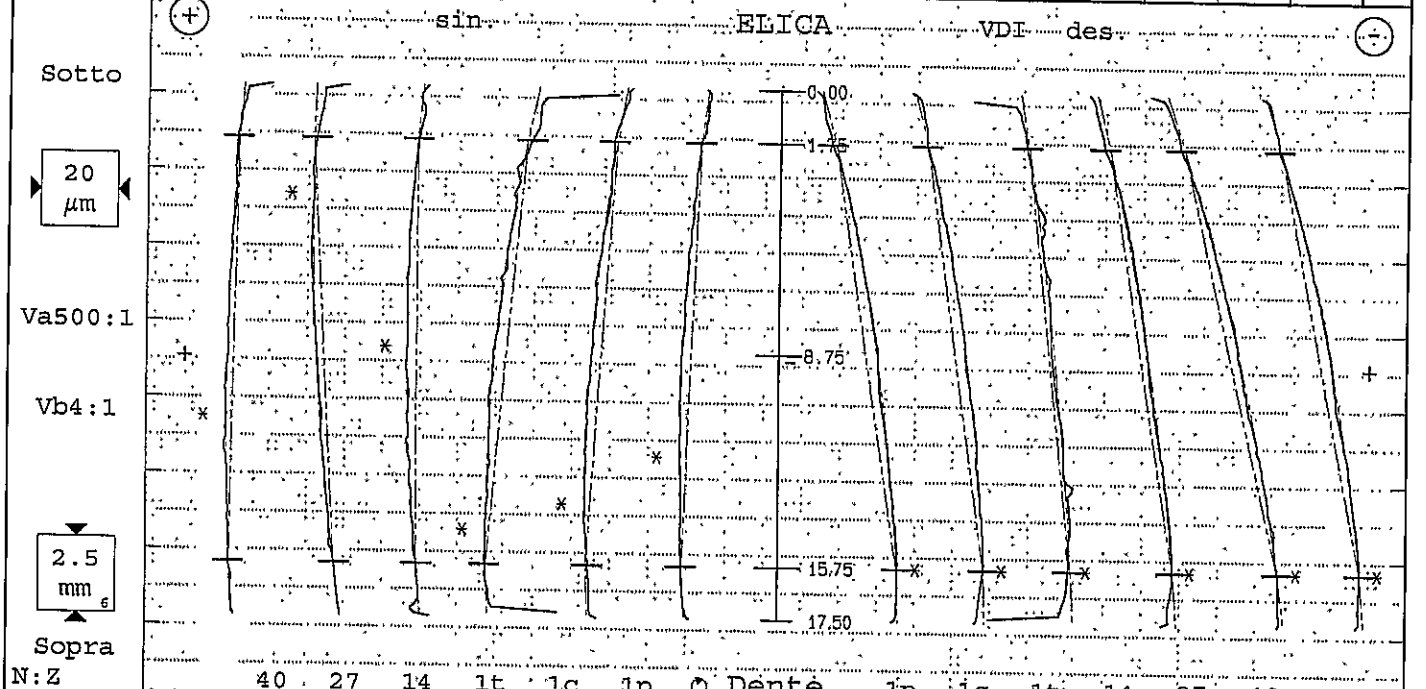
GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C		Data: 10.01.2015 15:56
Denominazione: ZR2	Numero denti z	52	Largh.fasc.dent. b 17.5mm
Numero disegno.: 250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La 5.57mm
Commessa/serie nr.: 45PPAP 4	Angolo pressione	20°	Tratto elica Lß 14mm
Masch.Nr.: M001 Spindel: Formmaschine	Angolo elica	-22°	Inizio elab. M1 17.58mm
Untersuchungszweck: Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø (#1) 1mm
Werkzeug: Charge:	Ang. Base	-20.611°	Fat.scor.pr. x .275



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
		Var 2							12±5	Var 0						12	
fHαm ±5	1																
fHα ±7	1	1	0	1	3	2	0		12±7	15	12	11	12	12	12	12	
Fα	2	2	2	2	3	2	2			3	1	2	1	2	1	1	
ffα 5	2	2	2	1	1	1	2		5	1	1	1	1	2	1	1	
Cα	1	1	1	1	0	1	1			0	1	1	1	1	1	1	
fKo -14/-6	-12	-12	-11	-12	-11	-11	-14		-14/-6	-12	-12	-12	-11	-12	-11	-12	



			Var 16							Var 13							
fHßm ±6	-1								22±6							25	
fHß ±13	-1	-3	7	0	-13	-9	-6		22±13	21	19	15	22	32	27	25	
Fß	5	3	6	3	12	7	5			2	3	7	2	9	5	5	
ffß 5	2	2	1	1	3	2	1		5	2	1	3	2	2	1	2	
Cß 2/5	3	2	2	3	3	3	2		2/5	3	3	1	2	2	3	3	
Bd 10±8	7								10±8							6	

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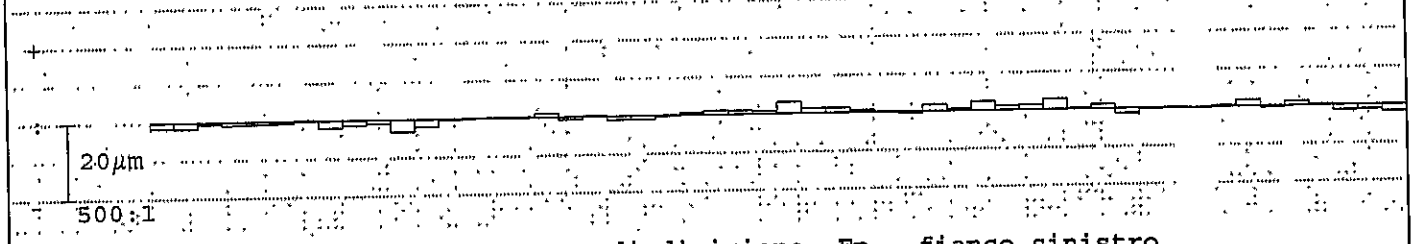
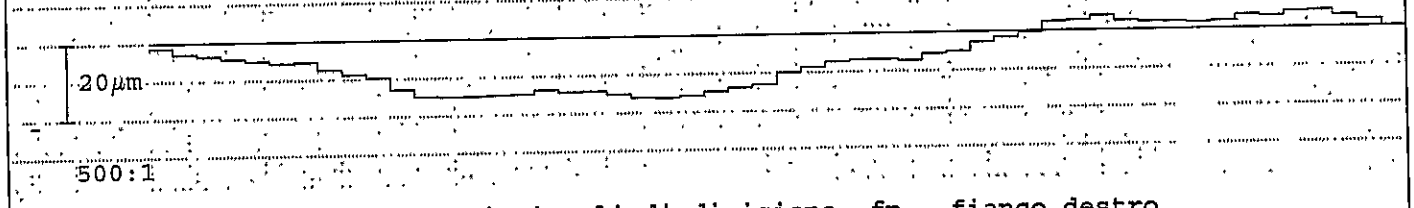
GETRAG — Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 15:56	
Denominazione: ZR2	Numero denti z 52	Angolo pressione 20°	
Numero disegno.: 250.1.4220.75-IF	Modulo m 2mm	Angolo elica -22°	
Commessa/serie nr.: 45PPAP 4	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formnestzeug:	Charge:		

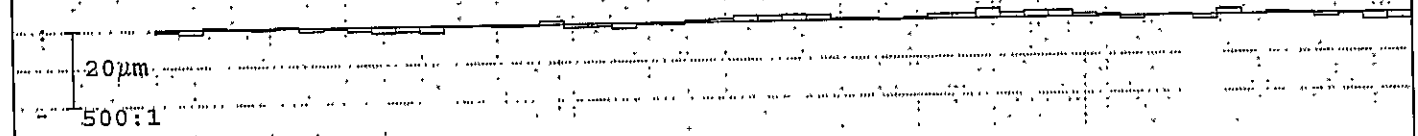
Errori singoli di divisione fp fianco sinistro



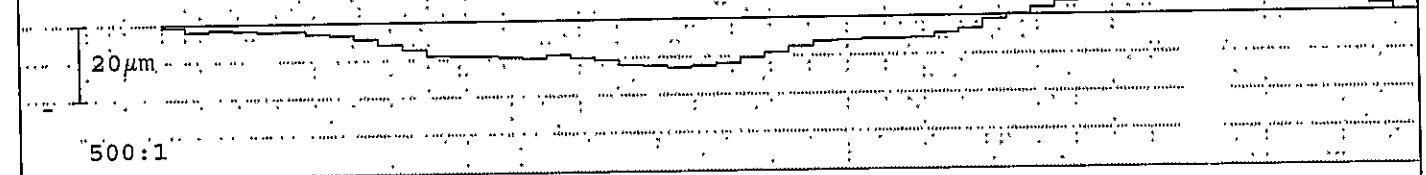
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

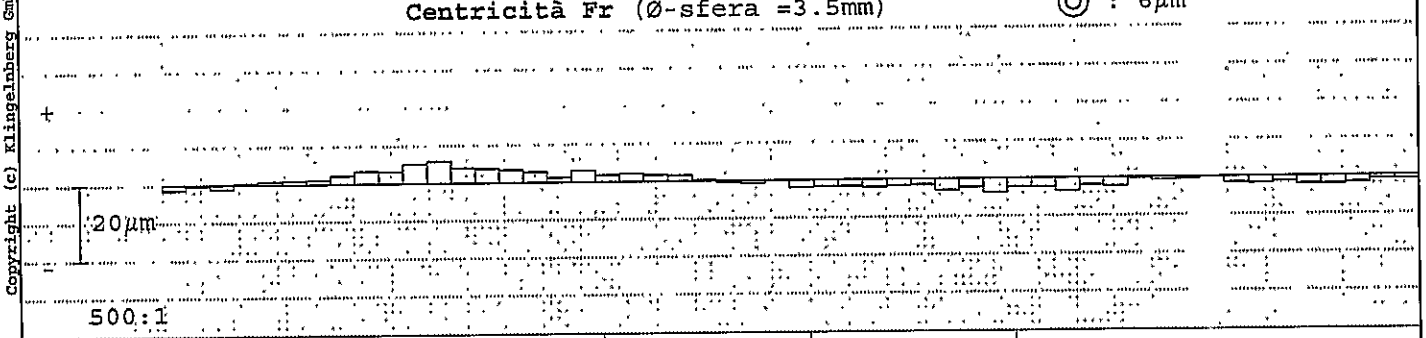


Errore somma di divisione Fp fianco destro



Corsa per misura divis.:113.268 z=8.8mm		fianco sinistro		fianco destro / TIRO	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	3	10	2	10
Gr. salto di passo	fu max	2	12	2	12
Scarto di divisione	Rp	6		4	
Err. globale di divisione	Fp	21	50	18	50
Err. cordale di divisione	Fpz/8	10		10	

Centricità Fr (Ø-sfera =3.5mm) ◎ : 6µm



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

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GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore:	TURNO C	Data:	10.01.2015 15:54
Denominazione:	ZR2	Numero denti z	52	Largh.fasc.dent. b	17.5mm
Numero disegno.:	250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La	5.57mm
Commessa/serie nr.:	45PPAP 4	Angolo pressione	20°	Tratto elica Lß	14mm
Masch.Nr.:	M001 Spindel: Formnest	Angolo elica	-22°	Inizio elab. M1	17.58mm
Untersuchungszweck:	Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø	(#1) 1mm
Werkzeug:	Charge:	Ang. Base	-20.611°	Fat.scor.pr. x	.275

TIRO

Piede-Ø: 107.233mm [107.12/107.42]

Testa-Ø: 118.715mm [118.6/118.8]

VDI

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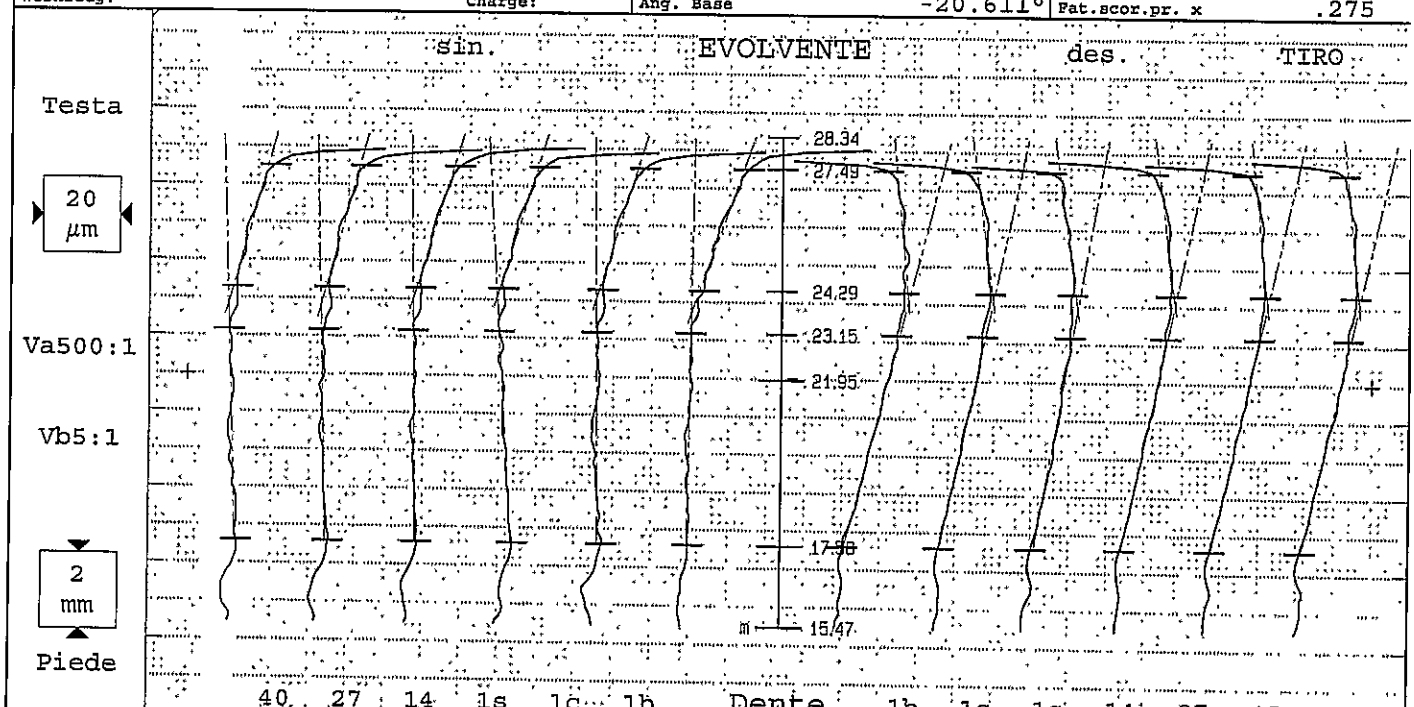
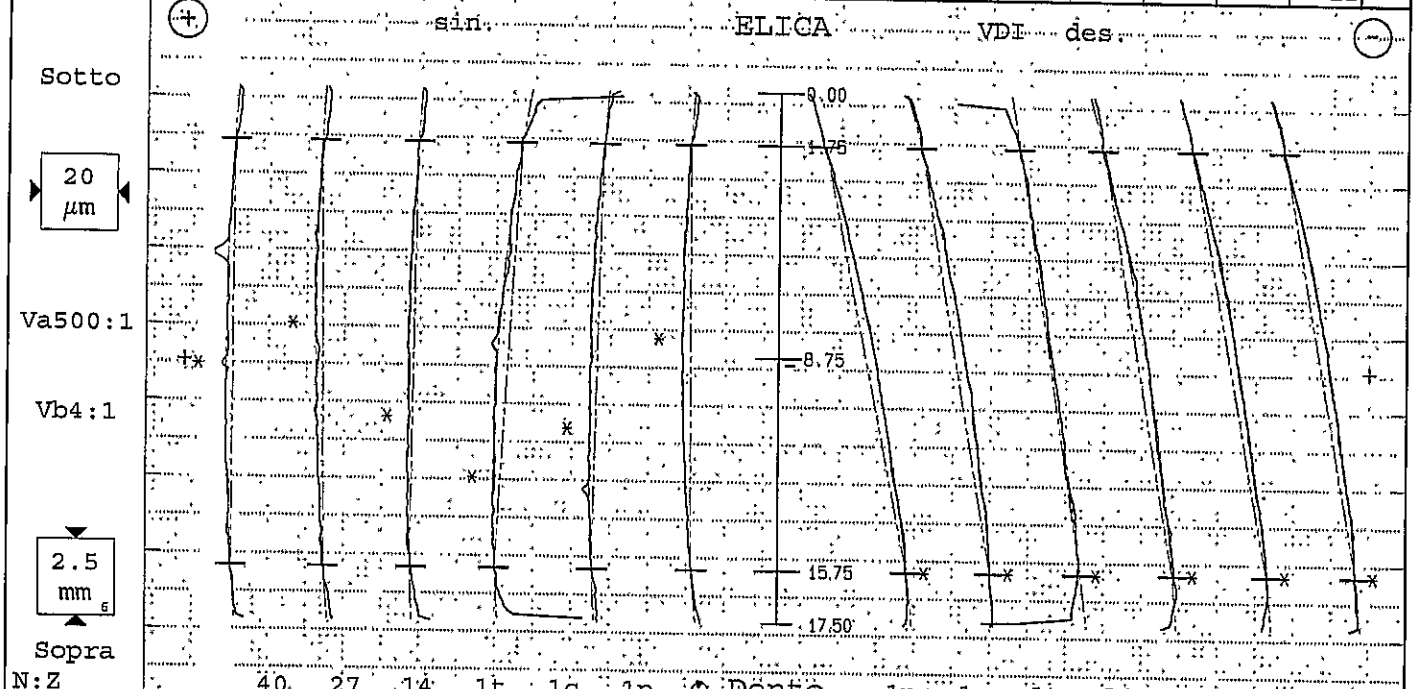
GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO c		Data: 10.01.2015 16:02
Denominazione: ZR2	Numero denti z	52	Largh.fasc.dent. b 17.5mm
Numero disegno.: 250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La 5.57mm
Commessa/serie nr.: 45PPAP 5	Angolo pressione	20°	Tratto elica Lß 14mm
Masch.Nr.: M001 Spindel: Formmaschine	Angolo elica	-22°	Inizio elab. M1 17.58mm
Untersuchungszweck: Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø (#1)1mm
Werkzeug: Charge:	Ang. Base	-20.611°	Fat.scor.pr. x .275



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



			Var 4							22±6	Var 2						24	
fHßm	±6	-1																
fHß	±13	-1	0	1	-2	-8	-3	1		22±13	28	24	21	23	25	25	24	
Fß		3	5	2	2	7	4	2			5	2	2	3	3	3	3	
ffß	5	3	5	2	1	3	3	1		5	1	1	1	2	1	1	1	
Cß	2/5	2	2	2	1	3	2	2		2/5	2	3	1	2	2	2	2	
Bd	10±8	9								10±8							7	

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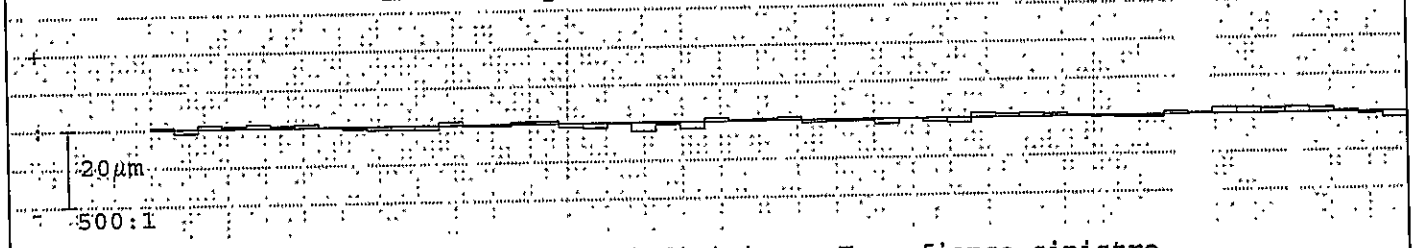
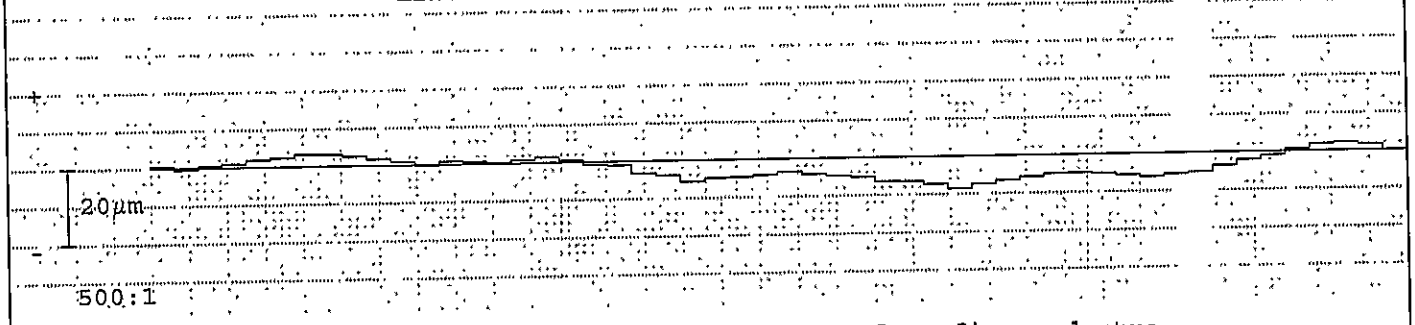
GETRAG — Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 PNC35 B4784	Controllore: TURNO C	Data: 10.01.2015 16:02	
Denominazione: ZR2	Numero denti z 52	Angolo pressione 20°	
Numero disegno.: 250.1.4220.75-IF	Modulo m 2mm	Angolo elica -22°	
Commessa/serie nr.: 45PPAP 5	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formnestzeug:	Charge:		

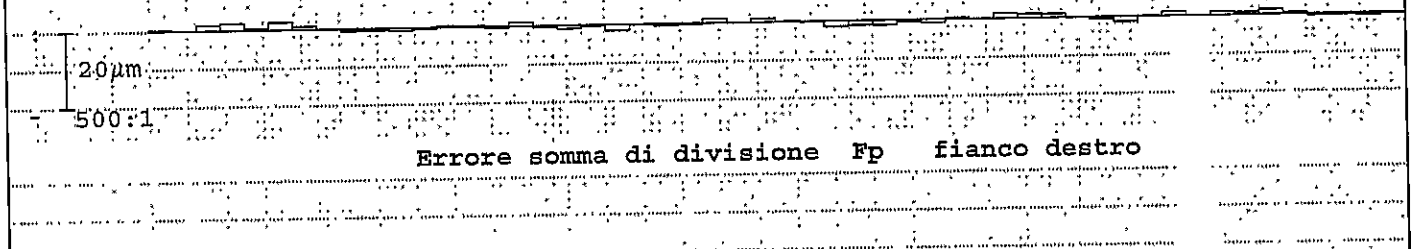
Errori singoli di divisione fp fianco sinistro



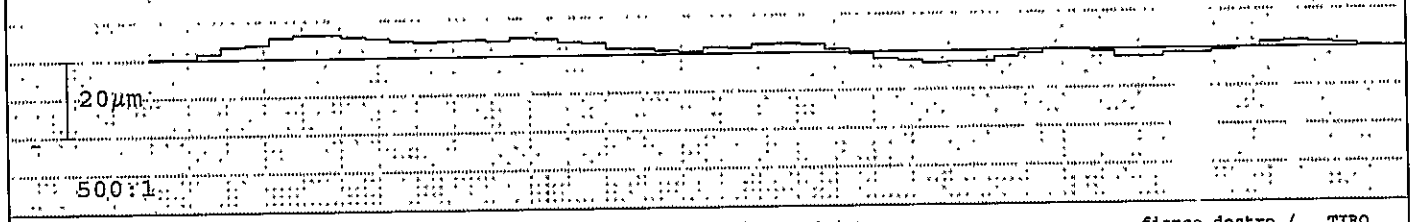
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

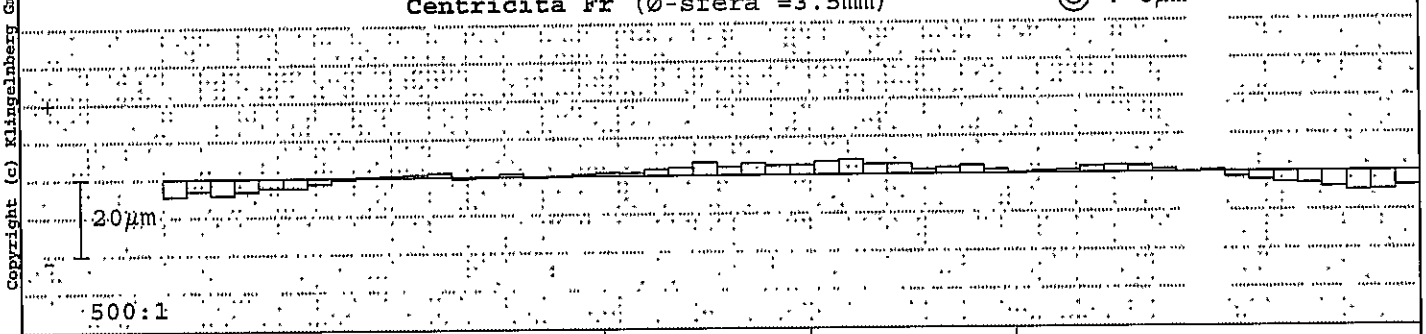


Errore somma di divisione Fp fianco destro



Corsa per misura divis.:113.268 z=8.8mm		fianco sinistro		fianco destro / TIRO	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	2	10	2	10
Gr. salto di passo	fu max	3	12	1	12
Scarto di divisione	Rp	4		4	
Err. globale di divisione	Fp	12	50	9	50
Err. cordale di divisione	Fpz/8	8		6	

Centricità Fr (Ø-sfera =3.5mm) ◎ : 6µm



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

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GETRAG — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 PNC35 B4784	Controllore:	TURNO C	Data:	10.01.2015 16:19
Denominazione:	ZR2	Numero denti z	52	Largh.fasc.dent. b	17.5mm
Numero disegno.:	250.1.4220.75-IF	Modulo m	2mm	Tratto evolv. La	5.57mm
Commessa/serie nr.:	45PPAP 5	Angolo pressione	20°	Tratto elica LE	14mm
Masch.Nr.:	M001 Spindel: Formmaschine	Angolo elica	-22°	Inizio elab. M1	17.58mm
Untersuchungszweck:	Laufende Messung	Ø Base db	104.4109mm	Palpatore Ø	(#1)1mm
Werkzeug:	Charge:	Ang. Base	-20.611°	Fat.scor.pr. x	.275

TIRO

Piede-Ø: 107.221mm [107.12/107.42]

Testa-Ø: 118.693mm [118.6/118.8]

VDI

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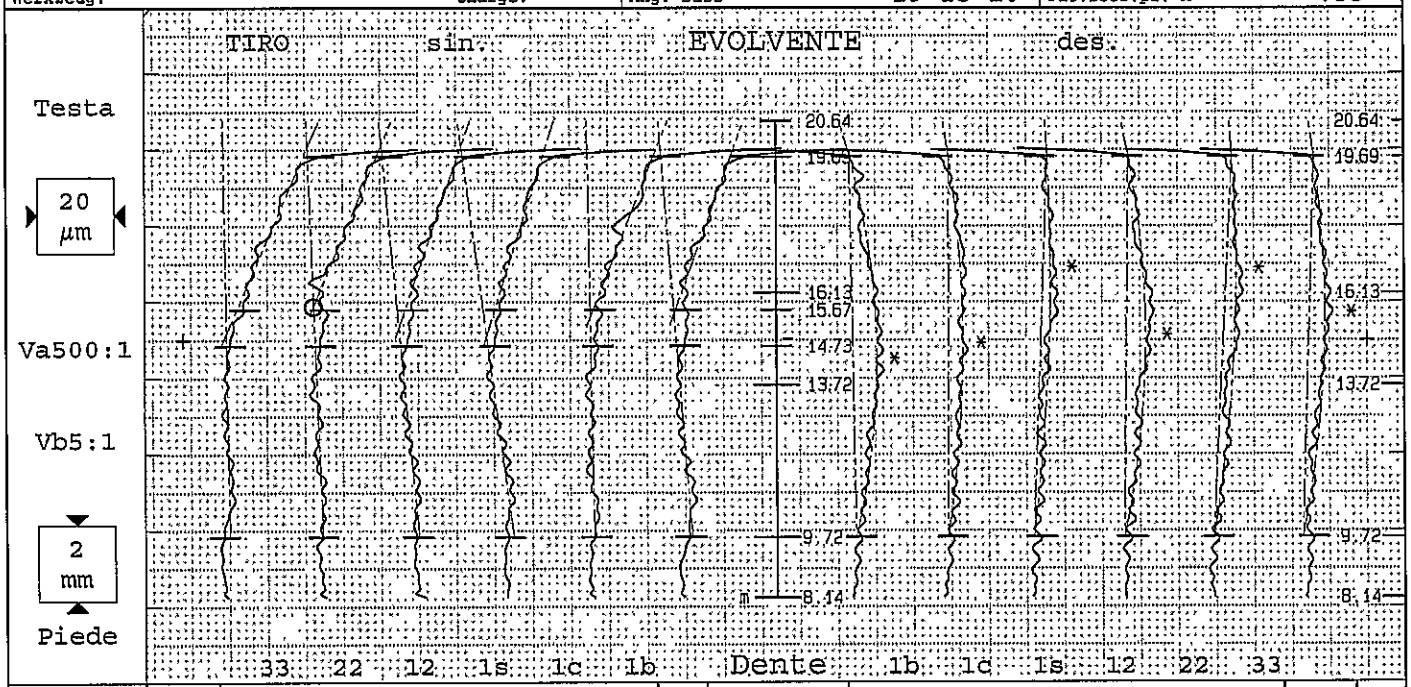
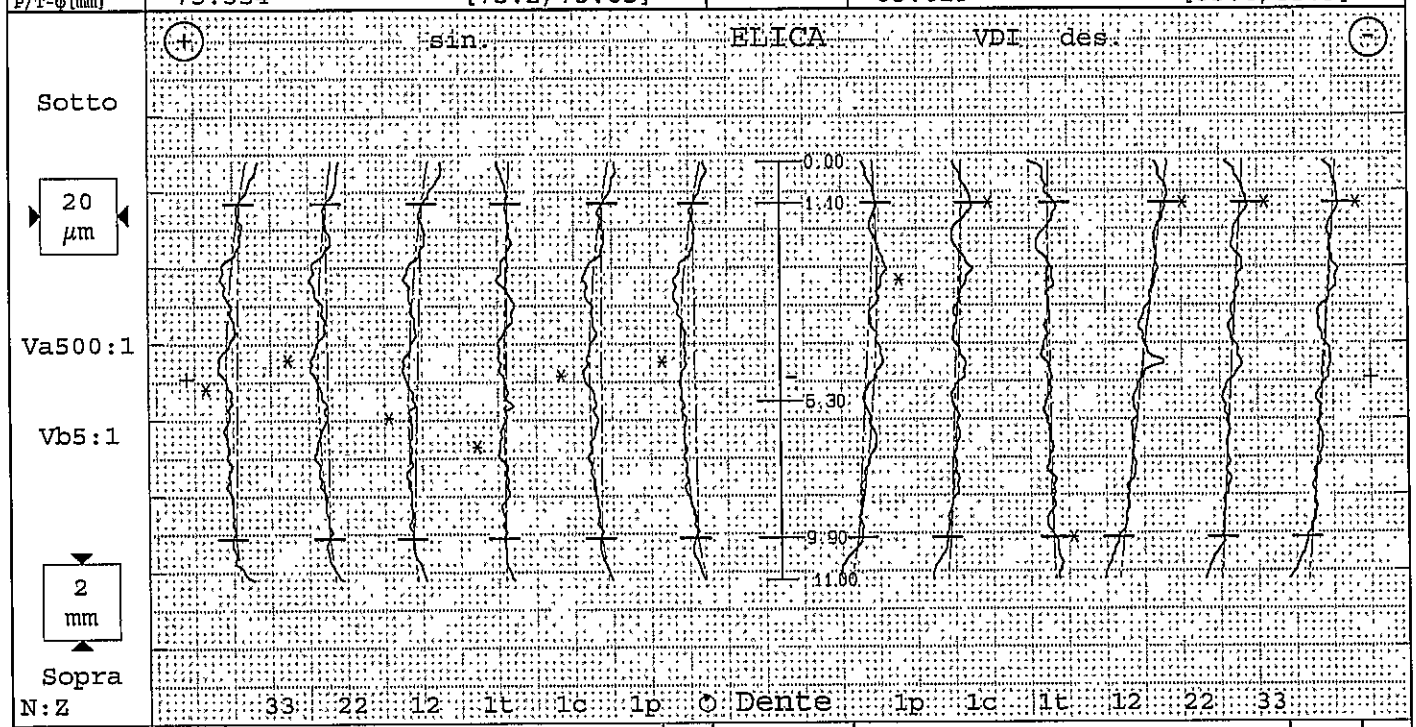
GETRAG B7590 — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 07:43
Denominazione:	Double-G 2-Rw	Numero denti z 43	Largh.fasc.dent. b 11mm
Numero disegno.:	250.1.4219.02-FNL	Modulo m 1.6mm	Tratto evolv. La 5.01/9.97mm
Commessa/serie nr.:	PPAP N 1	Angolo pressione 17°30'00"	Tratto elica LE 8.8mm
Masch.Nr.:	M001 Spindel: Formnestl	Angolo elica -31°00'00"	Inizio elab. M1 9.72mm
Untersuchungszweck:	Laufende Messung	Ø Base db 75.3298mm	Palpatore Ø (#3E) 1mm
Werkzeug:	Charge:	Ang. Base -29°25'10"	Fat.scor.pr. x .33



Tolerance		Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual
			Var 4								Var 5							
fHαm	±10	2								±10							2	
fHα	±18	2	1	2	5	7	1	4		±18	-1	0	4	1	5	3	2	
Fα		5	4	5	6	8	4	6		22	10	8	7	8	9	8	8	
ffα	22	3	3	3	3	4	4	4		22	4	5	4	4	5	5	5	
Cα	0/5	1	0	1	0	-1	2	1		0/5	6	4	2	5	3	4	4	
fKo	-22/-14	-19	-21	-18	-20	-21	-17	-18			0	0	0	0	0	0	0	
P/T-φ [mm]		75.354	[75.2/75.65]								85.629	[85.6/85.9]						



fHßm	±10	-1	Var 4							±10	Var 9						-8	
fHß	±25	-1	-2	1	-3	-1	0	1		±25	-6	-4	1	-13	-6	-7	-8	
Fß	28	6	7	6	6	5	6	7		28	8	7	6	13	7	9	9	
ffß	14	5	5	5	5	5	5	5		14	5	6	5	9	5	5	6	
Cß	0/5	3	3	3	2	1	3	4		0/5	2	1	-1	0	0	0	0	
Bd		2															-7	

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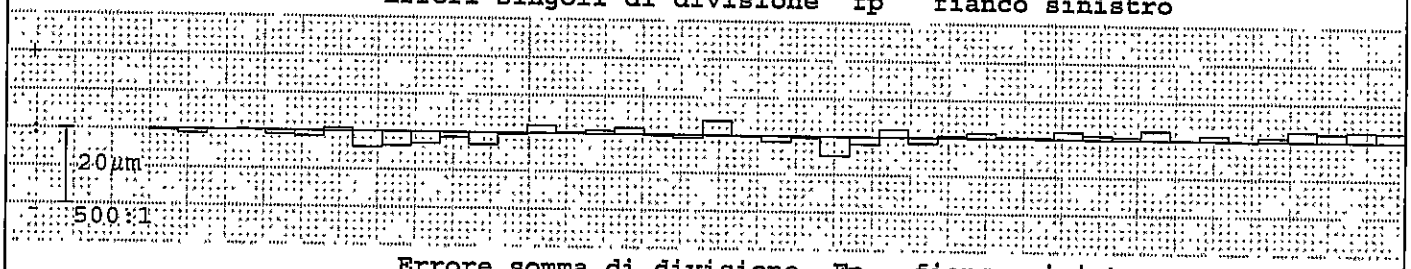
GETRAG B7590

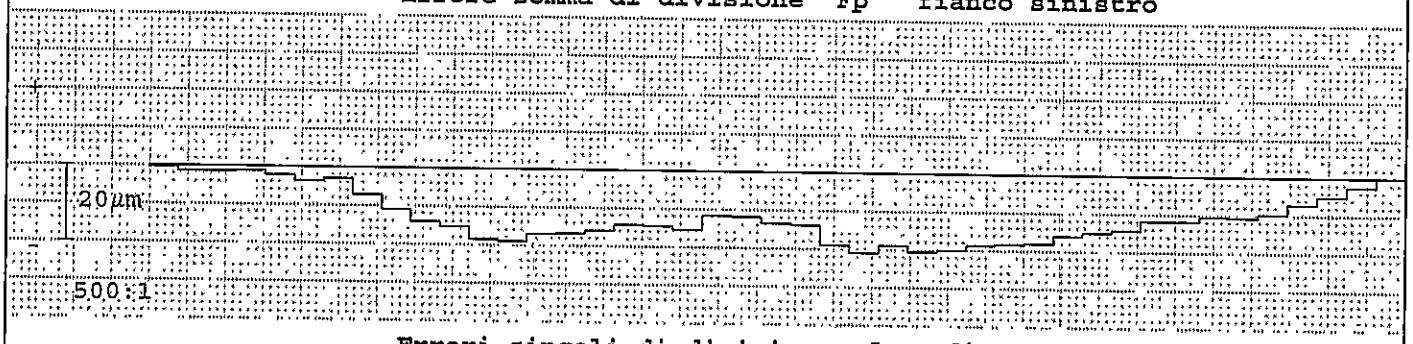
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590		Controllore: TURNO C	Data: 13.01.2015 07:43
Denominazione: Double-G 2-Rw		Numero denti z 43	Angolo pressione 17°30'00"
Numero disegno.: 250.1.4219.02-FNL		Modulo m 1.6mm	Angolo elica -31°00'00"
Commessa/serie nr.: PPAP N 1		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formmesswerkzeug:		Charge:

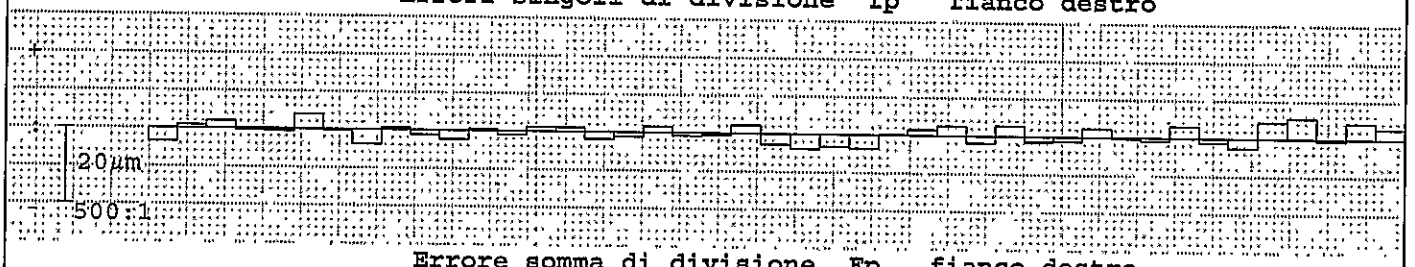
Errori singoli di divisione fp fianco sinistro



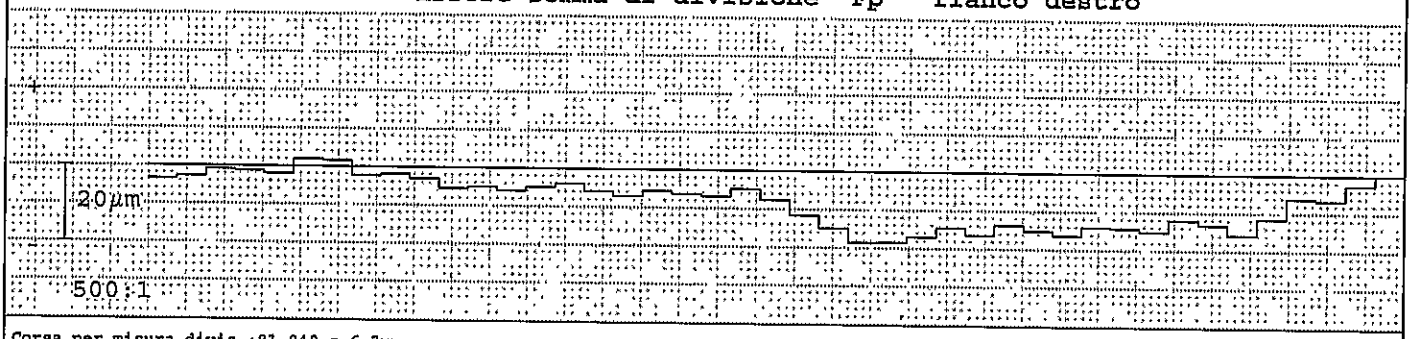
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



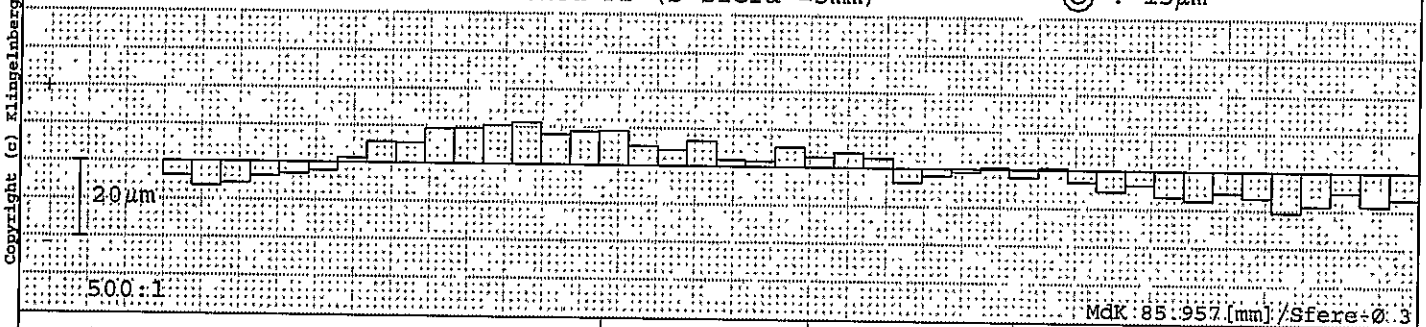
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:81.949 z=6.3mm

		fianco sinistro / TIRO		fianco destro	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	5	20	5	20
Gr. salto di passo	fu max	5	25	7	25
Scarto di divisione	Rp	9		9	
Err. globale di divisione	Fp	21	63	20	63
Err. cordale di divisione	Fpz/8	16		16	

Centricità Fr (Ø-sfera =3mm) ◎ : 15µm



MdK:85.957[mm]/Sfere-Ø 3

Err. di concentricitá	Fr	22	56	Val. amm
Variaz. spessore dente	Rs			Val. 85.939 85.948 85.932

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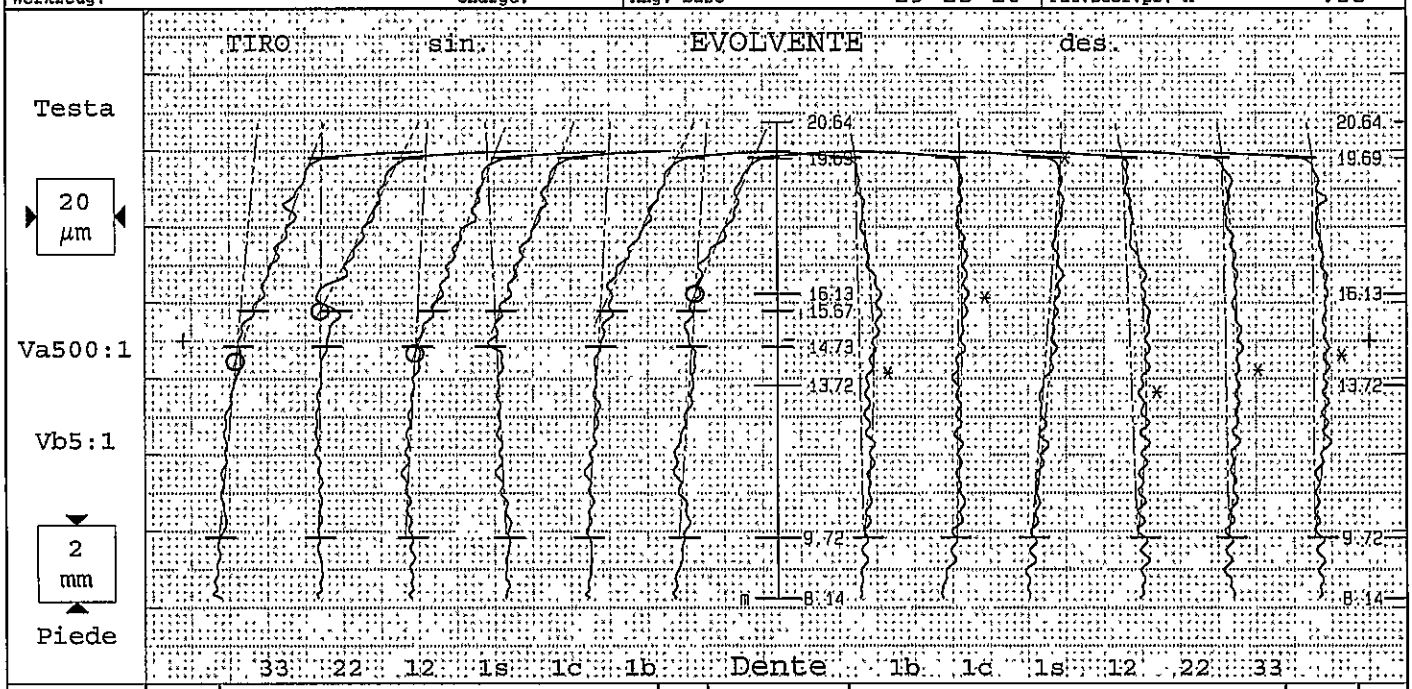
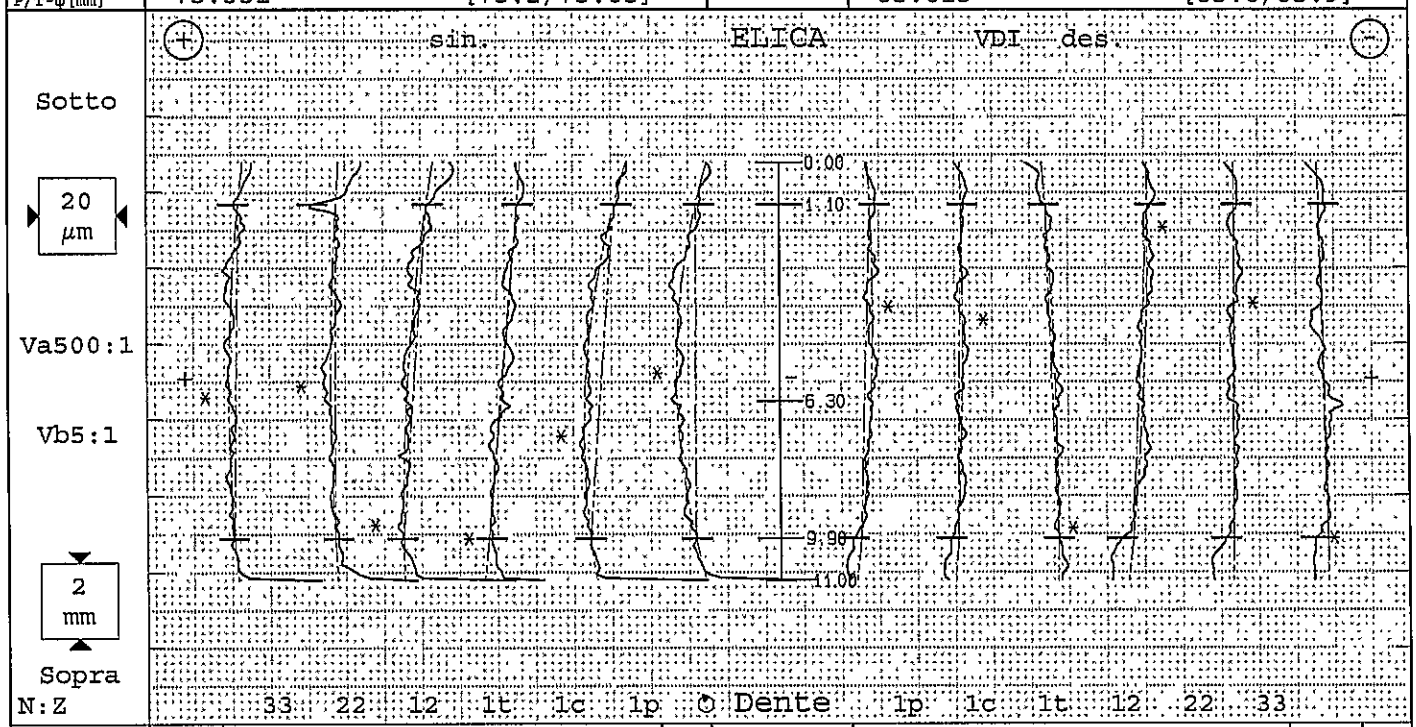
GETRAG B7590 — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 P26 B7590	Controllore: TURNO c	Data: 13.01.2015 07:56
Denominazione:	Double-G 2-Rw	Numero denti z 43	Largh.fasc.dent. b 11mm
Numero disegno.:	250.1.4219.02-FNL	Modulo m 1.6mm	Tratto evolv. La 5.01/9.97mm
Commessa/serie nr.:	PPAP N 2	Angolo pressione 17°30'00"	Tratto elica LS 8.8mm
Masch.Nr.:	M001 Spindel: Formnestolelica	Angolo elica -31°00'00"	Inizio elab. M1 9.72mm
Untersuchungszweck:	Laufende Messung	ø Base db 75.3298mm	Palpatore ø (#3E)1mm
Werkzeug:	Charge:	Ang. Base -29°25'10"	Fat.scor.pr. x .33



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm ±10	-3	Var 5							±10	Var 5						-1	
fHα ±18	-3	-5	0	-3	2	-3	-3		±18	-2	1	8	-4	-1	-1	-1	
Fα	5	6	3	5	6	4	6		22	10	5	9	7	8	8	7	
ffα 22	3	3	3	4	4	3	5		22	5	5	6	4	4	6	5	
Cα 0/5	1	2	1	2	2	0	3		0/5	4	1	1	4	3	3	3	
fKo -22/-14	-18	-15	-21	-18	-19	-18	-13			0	0	0	0	0	0	0	
P/T-φ [mm]	75.351	[75.2/75.65]								85.613	[85.6/85.9]						



fHßm ±10	-5	Var 7							±10	Var 8						-1	
fHß ±25	-5	-1	-1	-8	-10	-8	0		±25	-3	-1	4	-5	0	3	-1	
Fß 28	9	6	9	10	8	10	8		28	7	5	5	9	5	9	7	
ffß 14	6	5	10	5	5	4	5		14	4	4	3	6	4	8	6	
Cß 0/5	2	2	1	2	0	4	5		0/5	2	1	1	1	0	0	1	
Bd	10															-7	

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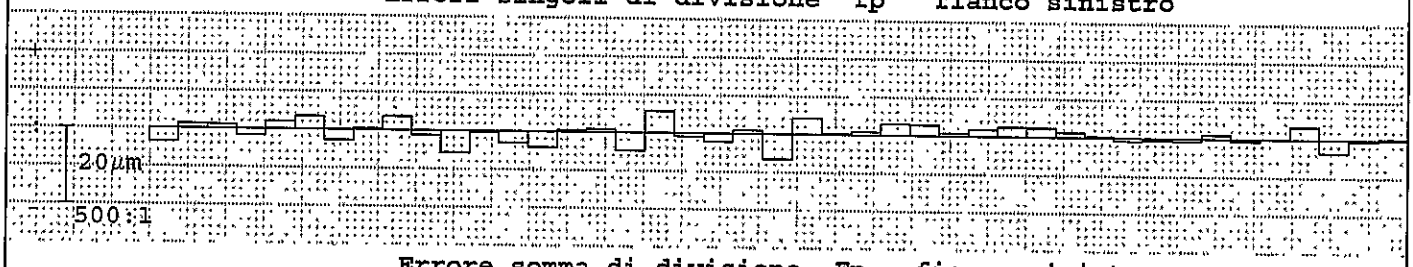
GETRAG B7590

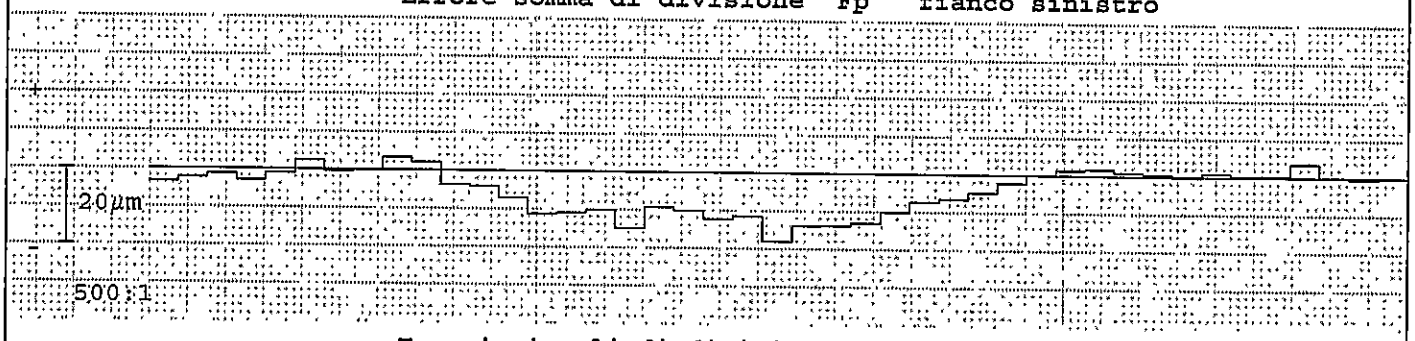
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 07:56
Denominazione: Double-G 2-Rw	Numero denti z 43	Angolo pressione 17°30'00"
Numero disegno.: 250.1.4219.02-FNL	Modulo m 1.6mm	Angolo elica -31°00'00"
Commessa/serie nr.: PPAP N 2	Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001 Spindel: Formnestzeug:		Charge:

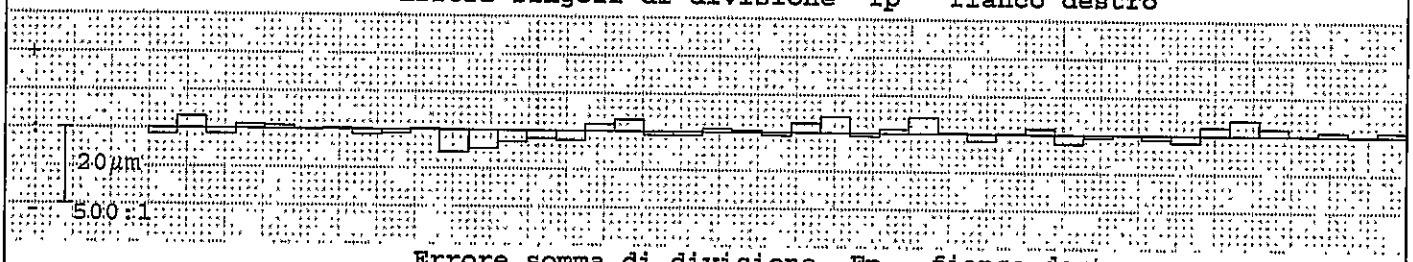
Errori singoli di divisione fp fianco sinistro



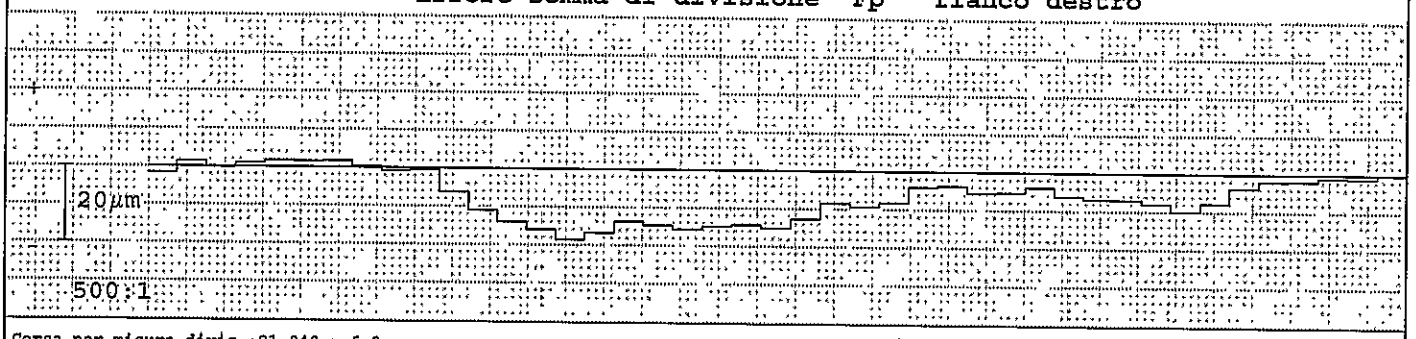
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



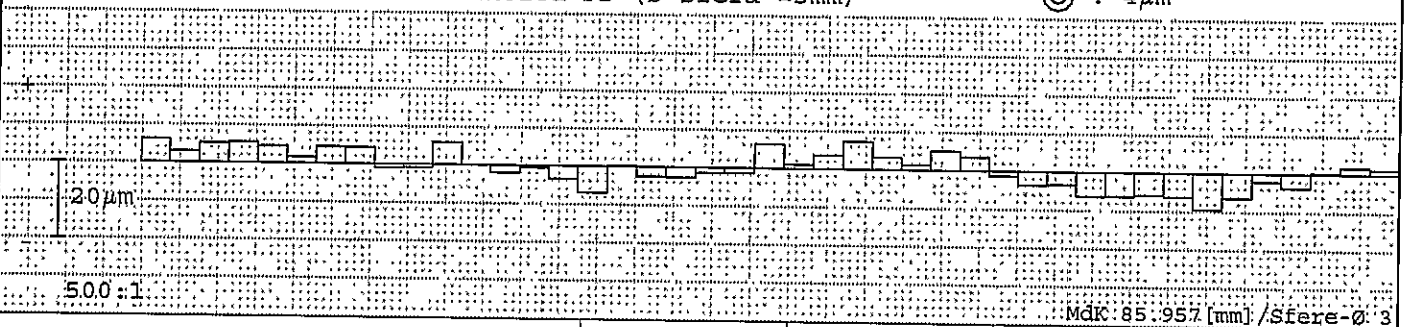
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:81.949 z=6.3mm

		fianco sinistro / TIRO		fianco destro	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	7	20	6	20
Gr. salto di passo	fu max	11	25	6	25
Scarto di divisione	Rp	13		10	
Err. globale di divisione	Fp	22	63	20	63
Err. cordale di divisione	Fpz/8	15		18	

Centricità Fr (Ø-sfera =3mm) ◎ : 4µm



MdK:85.957 [mm] /Sfere-Ø 3

Err. di concentricità	Fr	17	56	Val. amm
Variaz. spessore dente	Rs			Val. 85.928 85.941 85.912

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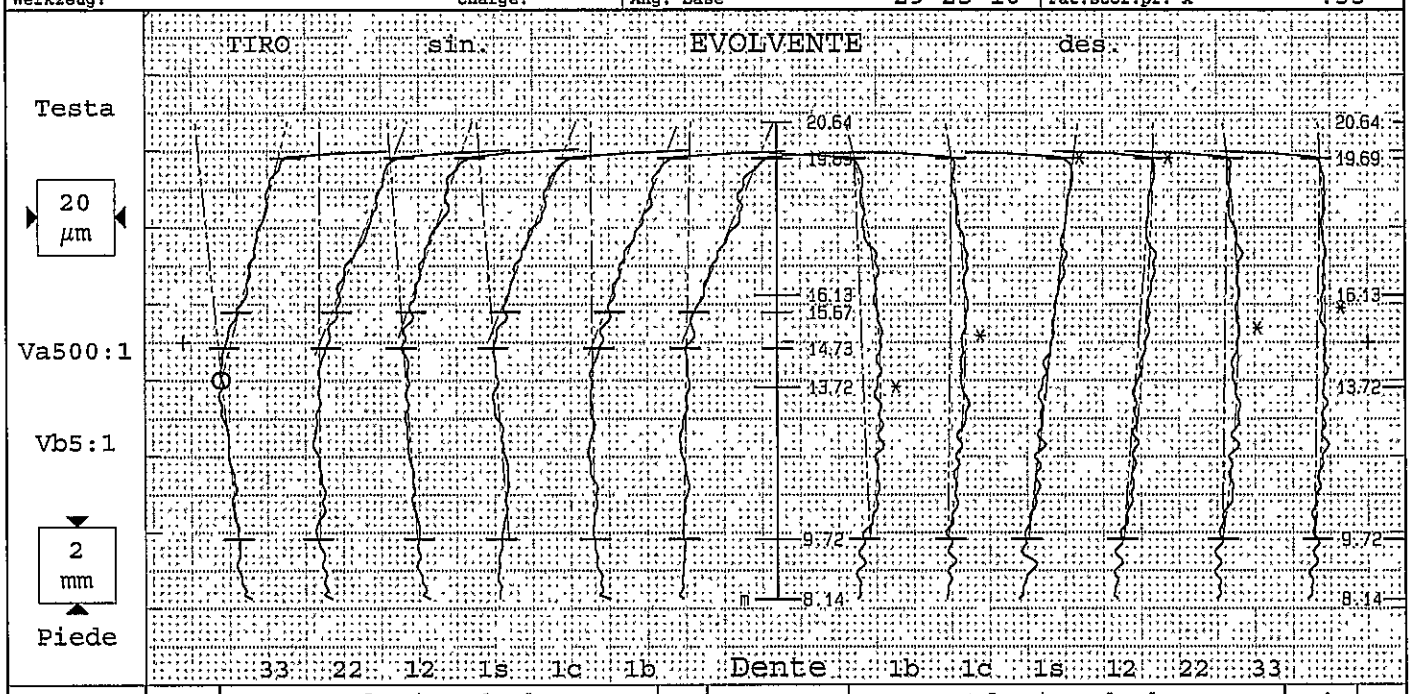
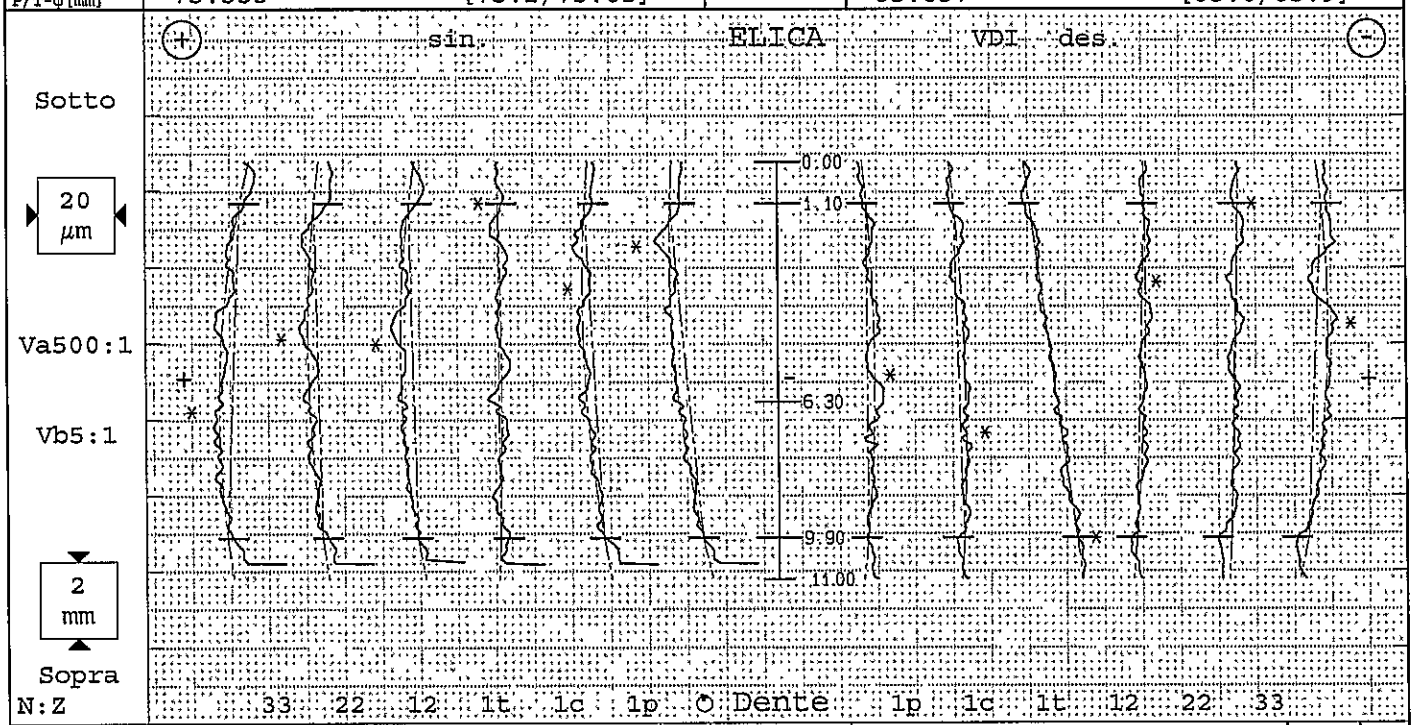
GETRAG B7590 — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 P26 B7590	Controllore:	TURNO C
Data:	13.01.2015 08:12		
Denominazione:	Double-G 2-Rw	Numero denti z	43
Largh.fasc.dent. b	11mm		
Numero disegno.:	250.1.4219.02-FNL	Modulo m	1.6mm
Tratto evolv. La	5.01/9.97mm		
Commessa/serie nr.:	PPAP N 3	Angolo pressione	17°30'00"
Tratto elica Lß	8.8mm		
Masch.Nr.:	M001	Spindel:	Formnestl
Angolo elica	-31°00'00"		
Inizio elab. M1	9.72mm		
Untersuchungszweck:	Laufende Messung	Ø Base db	75.3298mm
Palpatore Ø	(#3E)1mm		
Werkzeug:		Charge:	
Ang. Base	-29°25'10"		
Fat.scor.pr. x	.33		



Tolerance		Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual
fHαm	±10	2	Var 5							±10	Var 7						3	
fHα	±18	2	5	0	3	4	0	-1		±18	-4	1	12	8	2	2	3	
Fα		4	5	3	5	4	3	3		22	9	7	13	10	7	5	7	
ffα	22	3	3	3	2	3	3	3		22	4	3	5	4	4	4	4	
Cα	0/5	1	1	1	1	-1	1	1		0/5	5	4	0	2	3	2	3	
fKo	-22/-14	-19	-21	-19	-18	-21	-19	-18			0	0	0	0	0	0	0	
P/T-φ [mm]		75.353	[75.2/75.65]								85.637					[85.6/85.9]		



fHßm	±10	2	Var 10							±10	Var 8						-2	
fHß	±25	2	-4	2	3	0	6	10		±25	0	3	15	-3	-3	-5	-2	
Fß	28	8	8	8	7	6	8	13		28	6	6	14	6	7	11	8	
ffß	14	5	5	6	5	6	5	7		14	5	5	4	4	6	8	6	
Cß	0/5	3	4	3	3	-1	2	3		0/5	2	2	0	1	0	3	2	
Bd		10															-15	

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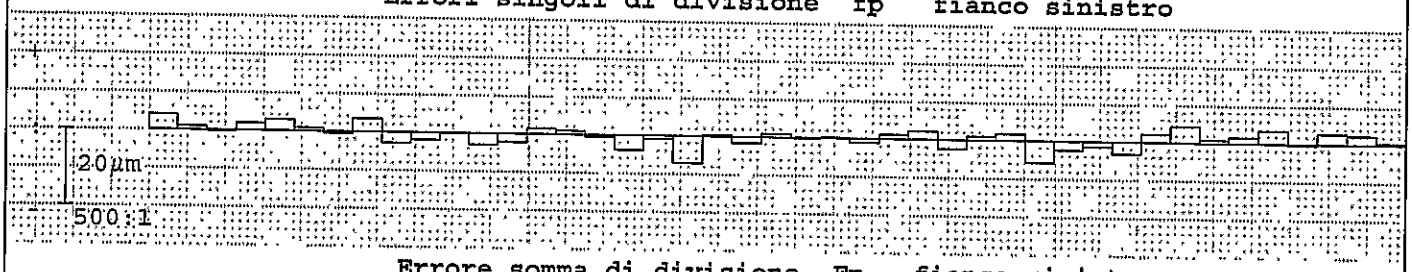
GETRAG B7590

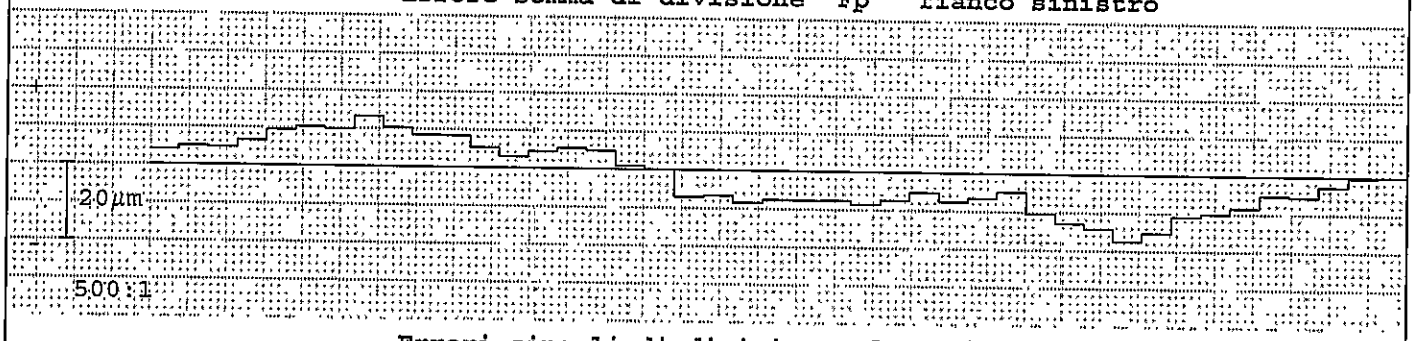
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 08:12
Denominazione: Double-G 2-Rw	Numero denti z 43	Angolo pressione 17°30'00"
Numero disegno.: 250.1.4219.02-FNL	Modulo m 1.6mm	Angolo elica -31°00'00"
Commessa/serie nr.: PPAP N 3	Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001 Spindel: Formmaschine	Werkzeug:	Charge:

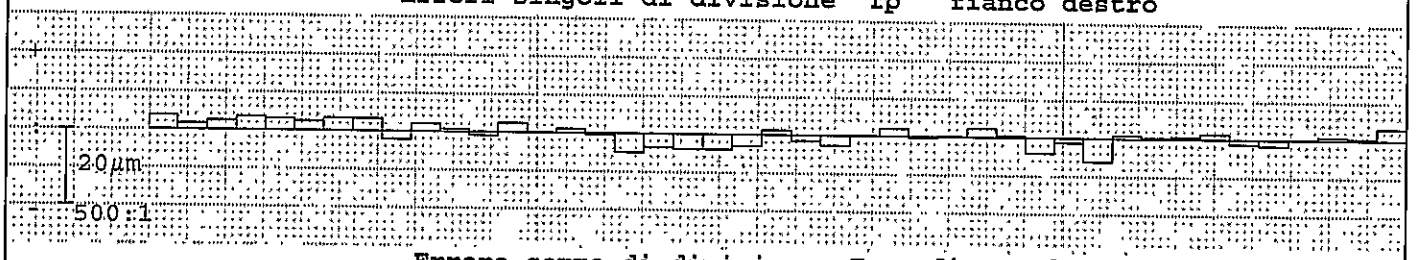
Errori singoli di divisione fp fianco sinistro



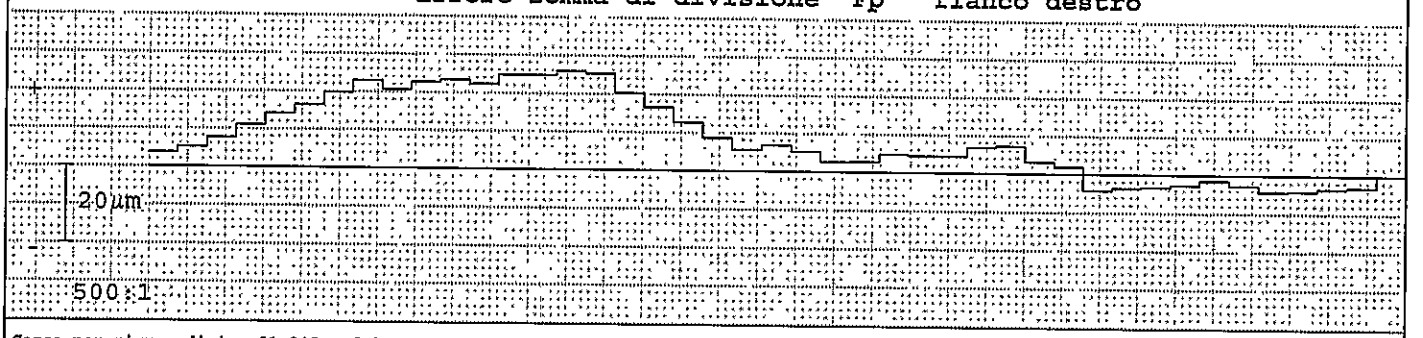
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



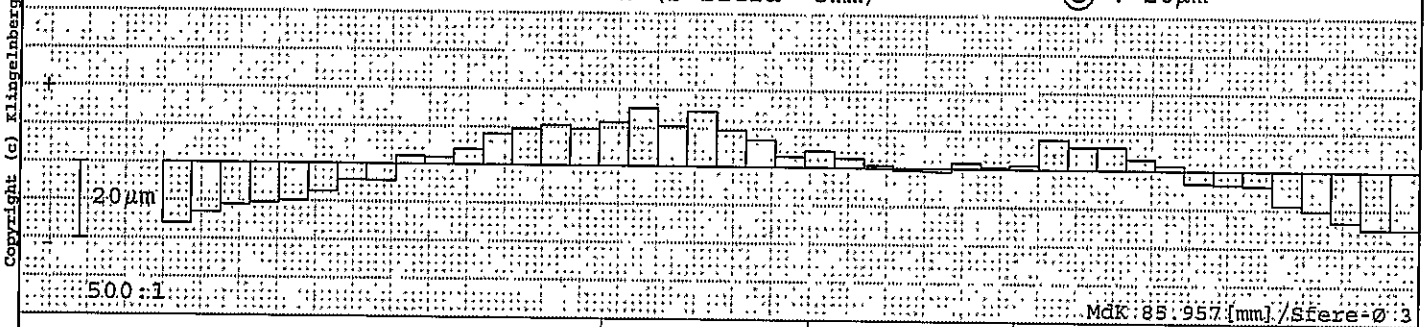
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:81.949 z=6.3mm

		fianco sinistro / TIRO		fianco destro	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	7	20	6	20
Gr. salto di passo	fu max	7	25	7	25
Scarto di divisione	Rp	11		10	
Err. globale di divisione	Fp	31	63	30	63
Err. cordale di divisione	Fpz/8	13		20	

Centricità Fr (Ø-sfera =3mm) ◎ : 20µm



Err. di concentricitá	Fr	31	56	Val. amm
Variaz. spessore dente	Rs			Val. 85.935 85.948 85.921

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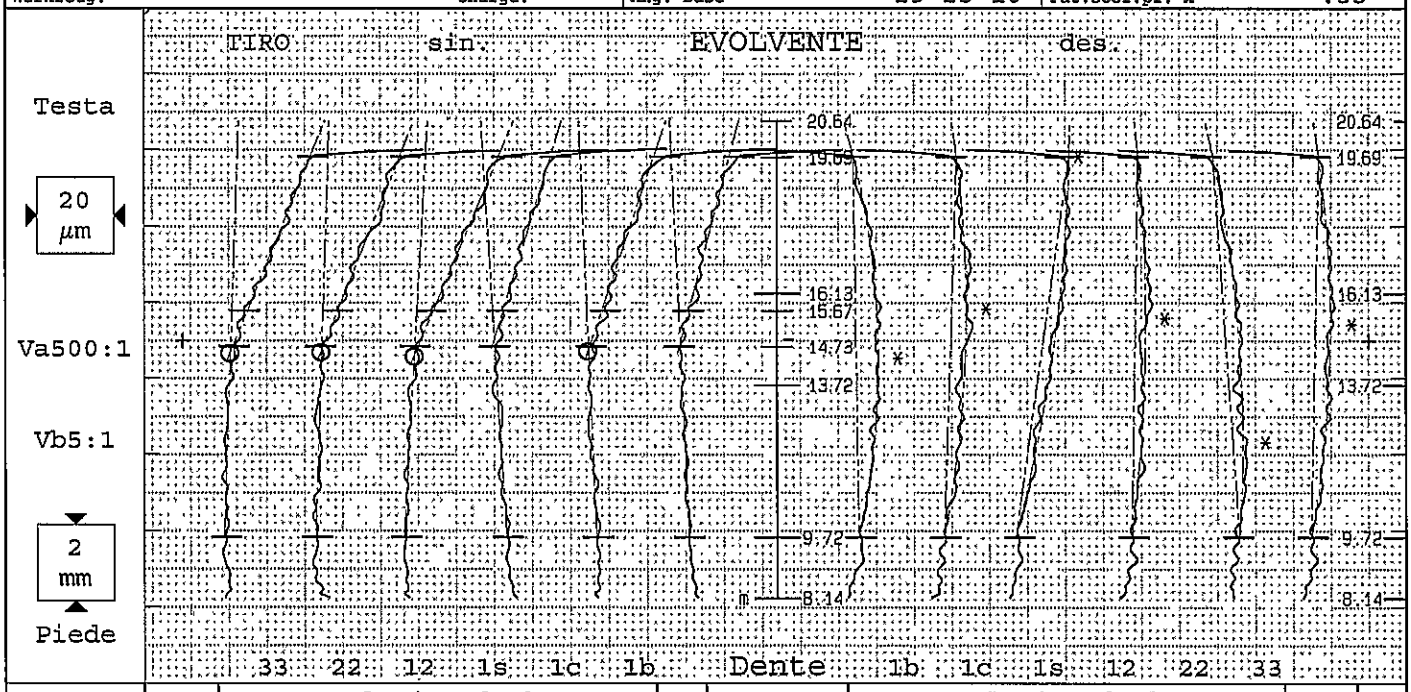
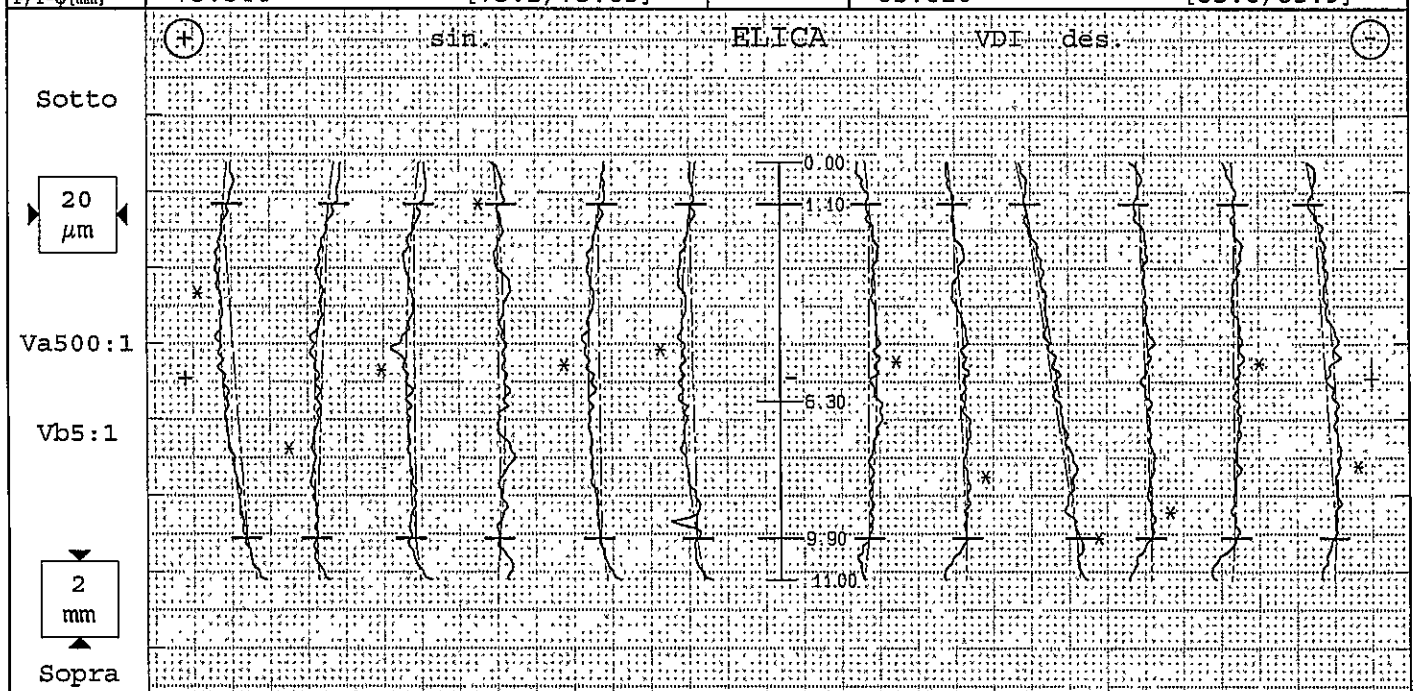
GETRAG B7590 — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 P26 B7590	Controllore:	TURNO C
Denominazione:	Double-G 2-Rw	Numero denti z	43
Numero disegno.:	250.1.4219.02-FNL	Modulo m	1.6mm
Commessa/serie nr.:	PPAP N 4	Angolo pressione	17°30'00"
Masch.Nr.:	M001 Spindel: Formmaschine	Angolo elica	-31°00'00"
Untersuchungszweck:	Laufende Messung	Ø Base db	75.3298mm
Werkzeug:	Charge:	Ang. Base	-29°25'10"

Data:	13.01.2015 08:20
Largh.fasc.dent. b	11mm
Tratto evolv. La	5.01/9.97mm
Tratto elica Lß	8.8mm
Inizio elab. M1	9.72mm
Palpatore Ø	(#3E) 1mm
Fat.scor.pr. x	.33



	Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual
			Var 5							±10	Var 10						0	
fHαm	±10	-1																
fHα	±18	-1	-2	-2	-3	3	2	2		±18	-1	3	14	2	-7	2	0	
Fα		4	4	3	4	5	3	3		22	8	8	14	6	11	7	8	
ffα	22	3	2	2	3	2	3	2		22	3	4	4	3	4	3	4	
Cα	0/5	1	2	0	1	1	1	0		0/5	6	4	3	3	3	4	4	
fKo	-22/-14	-19	-19	-19	-19	-18	-19	-15			0	0	0	0	0	0	0	
P/T-φ [mm]		75.344	[75.2/75.65]								85.620	[85.6/85.9]						



fHßm	±10	1	Var 12							±10	Var 7						4	
fHß	±25	1	8	-4	0	1	1	2		±25	-1	4	16	4	0	7	4	
Fß	28	7	8	7	8	5	6	8		28	4	5	15	6	4	9	6	
ffß	14	4	3	4	6	5	4	8		14	4	4	5	4	3	4	4	
Cß	0/5	3	3	2	2	-2	3	3		0/5	2	1	1	1	1	2	1	
Bd		1															-17	

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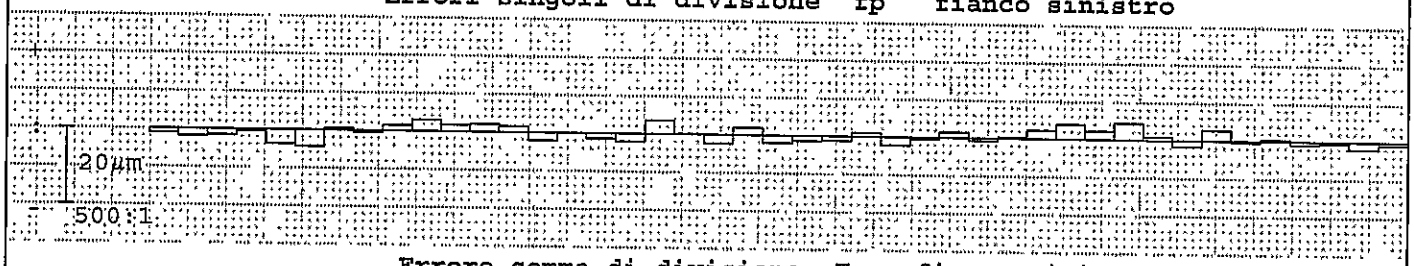
GETRAG B7590

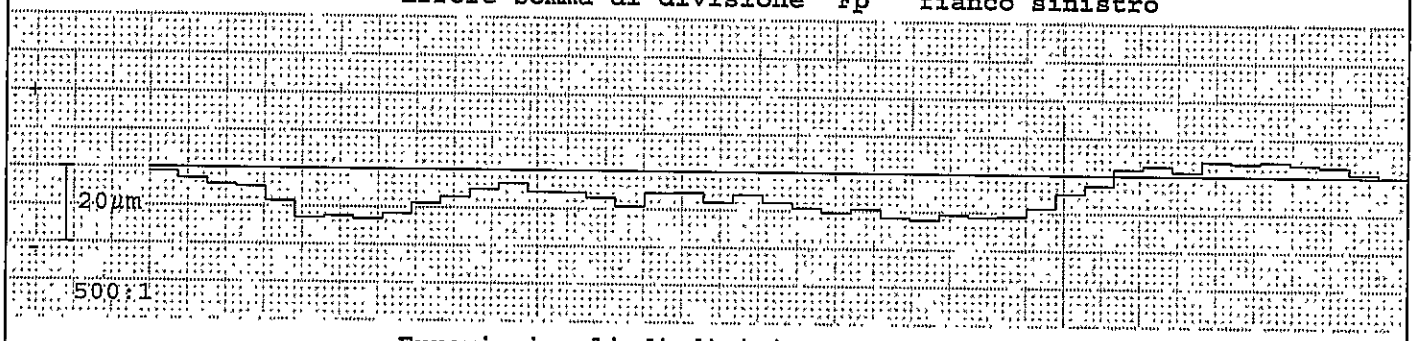
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 08:20
Denominazione: Double-G 2-Rw	Numero denti z 43	Angolo pressione 17°30'00"
Numero disegno.: 250.1.4219.02-FNL	Modulo m 1.6mm	Angolo elica -31°00'00"
Commessa/serie nr.: PPAP N 4	Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001 Spindel: Formmesstg.	Werkzeug:	Charge:

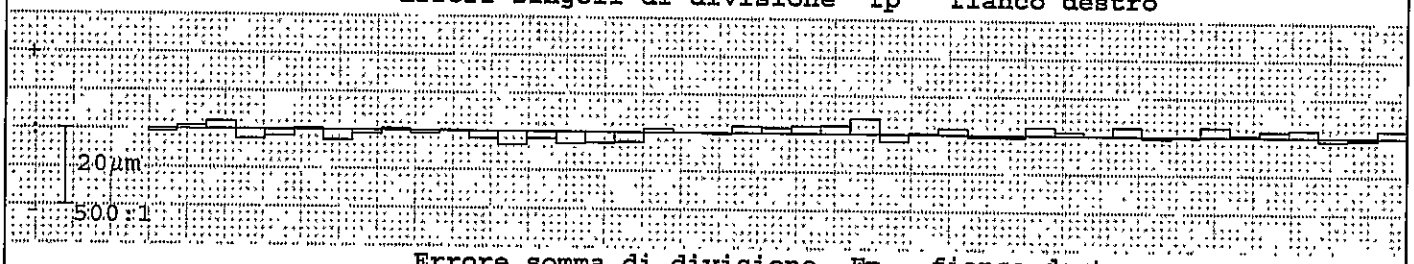
Errori singoli di divisione fp fianco sinistro



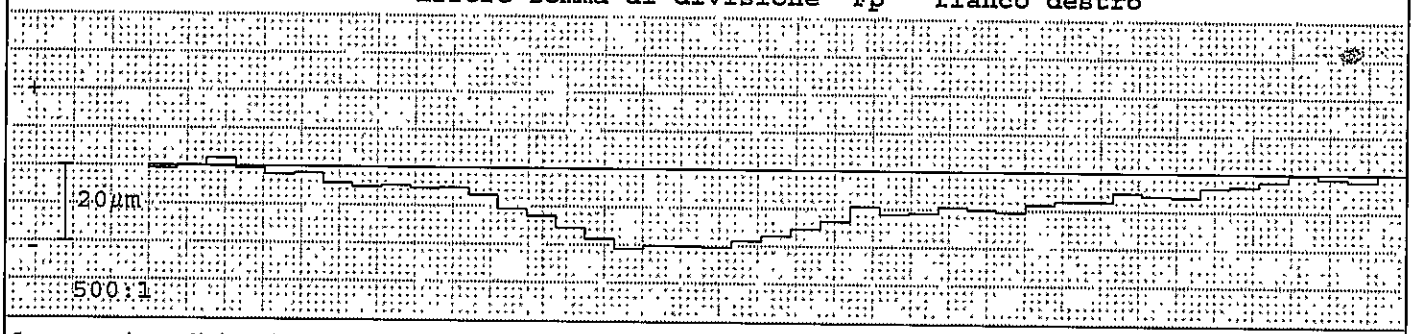
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



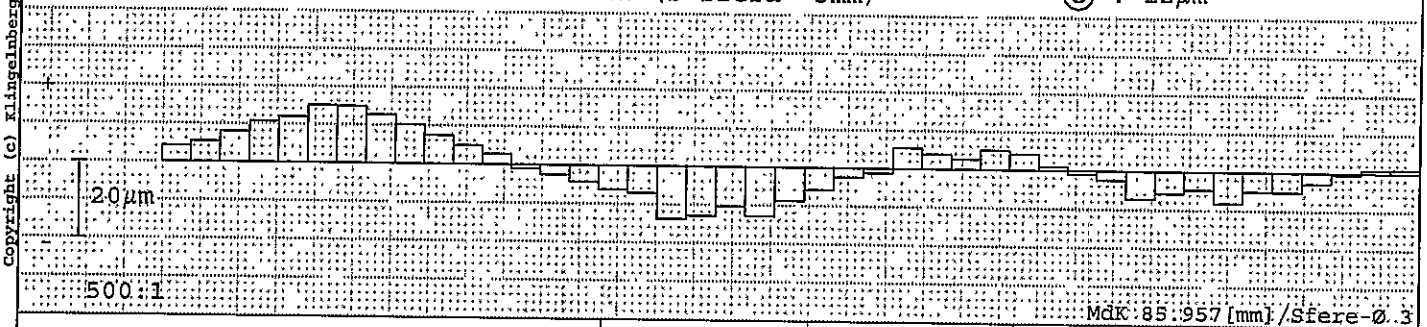
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:81.949 z=6.3mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	4		20		4		20	
Gr. salto di passo	fu max	6		25		6		25	
Scarto di divisione	Rp	8				8			
Err. globale di divisione	Fp	17		63		23		63	
Err. cordale di divisione	Fpz/8	14				14			

Centricità Fr (Ø-sfera =3mm) ◎ : 12µm



Err. di concentricitá	Fr	29	56	Val. amm		
Variaz. spessore dente	Rs			Val.	85.924	85.944	85.905

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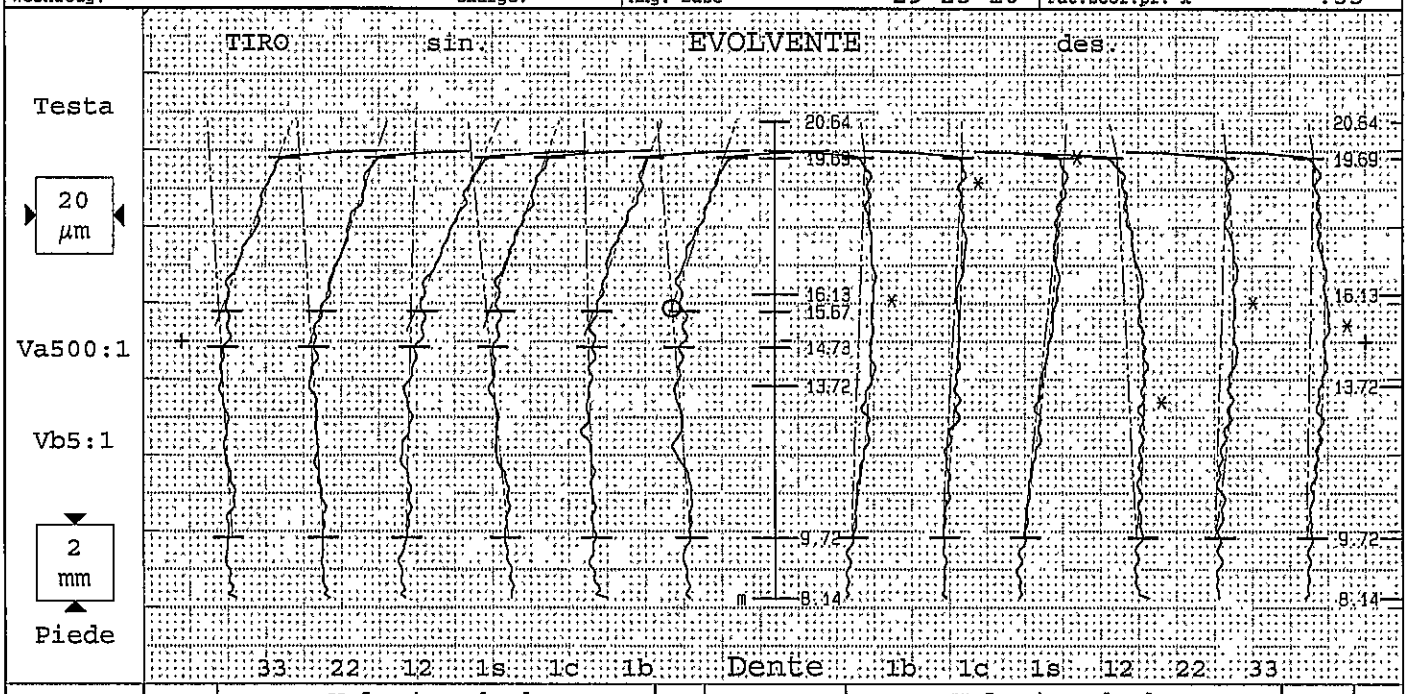
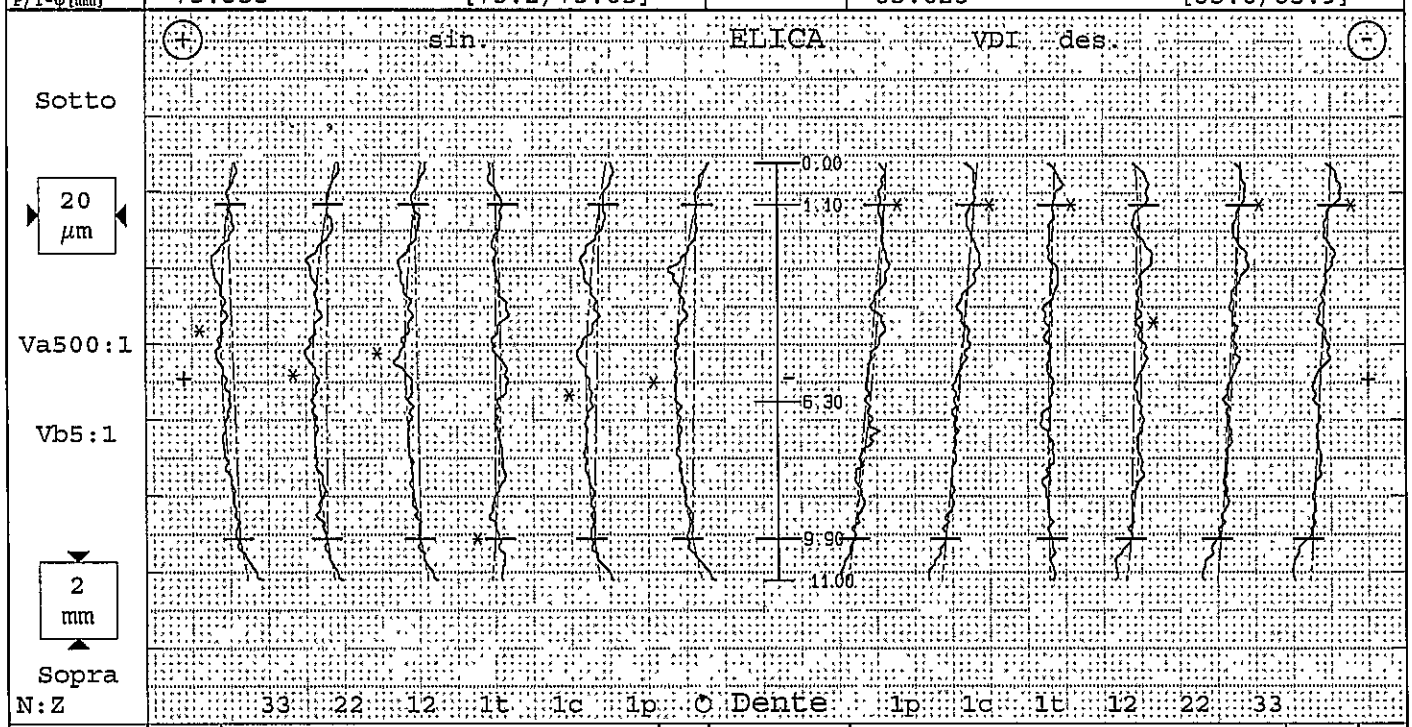
GETRAG B7590 — Ruota cilindrica Evolvente/Elica

Nr. prog.:	STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 08:44
Denominazione:	Double-G 2-Rw	Numero denti z 43	Largh.fasc.dent. b 11mm
Numero disegno.:	250.1.4219.02-FNL	Modulo m 1.6mm	Tratto evolv. La 5.01/9.97mm
Commessa/serie nr.:	PPAP N 5	Angolo pressione 17°30'00"	Tratto elica Lß 8.8mm
Masch.Nr.:	M001 Spindel: Formnestl	Angolo elica -31°00'00"	Inizio elab. M1 9.72mm
Untersuchungszweck:	Laufende Messung	Ø Base db 75.3298mm	Palpatore Ø (#3E) 1mm
Werkzeug:	Charge:	Ang. Base -29°25'10"	Fat.scor.pr. x .33



Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual
fHαm ±10	2	Var 4							±10	Var 10						1	
fHα ±18	2	3	3	-1	5	1	4		±18	4	5	11	-5	3	2	1	
Fα	4	4	5	4	6	4	5		22	6	6	12	11	6	6	7	
ffα 22	4	3	3	4	3	5	5		22	3	3	3	4	3	3	3	
Cα 0/5	1	0	1	2	1	2	2		0/5	4	2	1	4	3	4	3	
fKo -22/-14	-18	-18	-20	-18	-20	-17	-17			0	0	0	0	0	0	0	
P/T-φ [mm]	75.353	[75.2/75.65]								85.623	[85.6/85.9]						



fHßm ±10	1	Var 6							±10	Var 7						-6
fHß ±25	1	4	0	2	0	-2	-2		±25	-11	-10	-2	-3	-6	-6	-6
Fß 28	8	7	8	7	6	8	8		28	11	10	5	7	9	8	9
ffß 14	6	6	6	5	5	6	7		14	6	6	4	5	5	5	5
Cß 0/5	3	3	4	3	-1	3	5		0/5	1	0	-1	2	1	0	1
Bd	-2															-9

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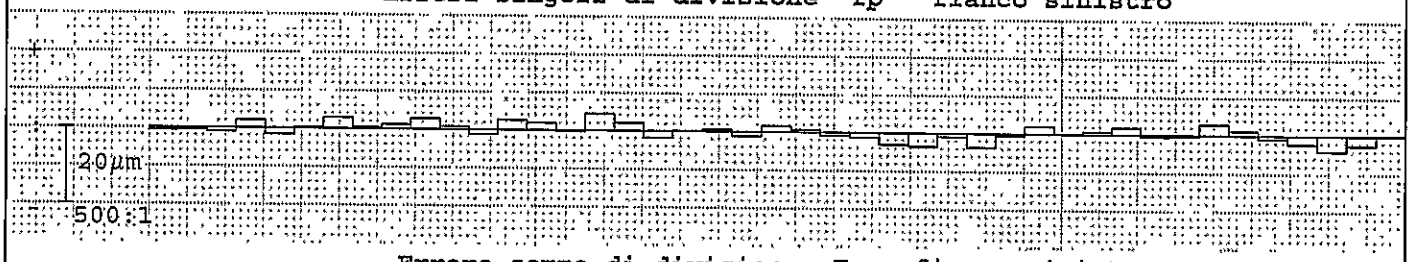
GETRAG B7590

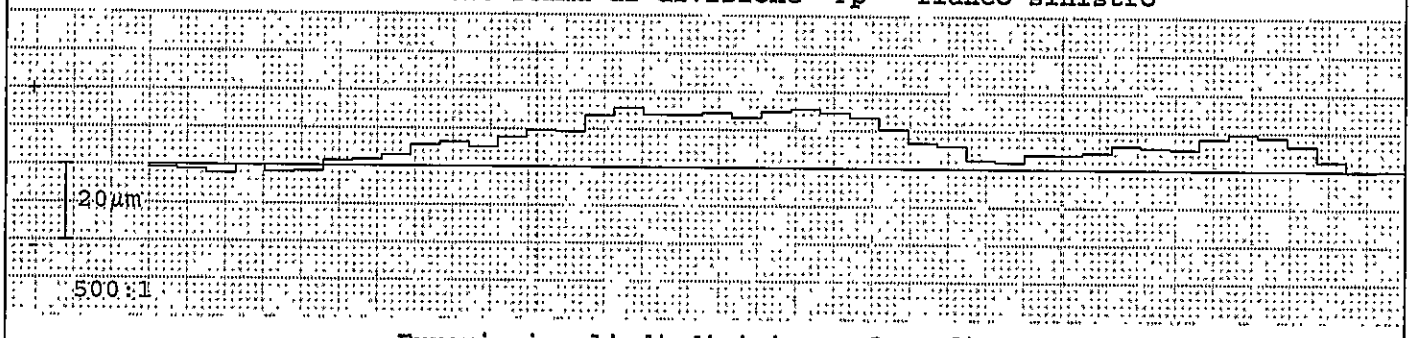
Ruota cilindrica Divisione

Nr. prog.: STI0410o05 0 P26 B7590	Controllore: TURNO C	Data: 13.01.2015 08:44	
Denominazione: Double-G 2-Rw	Numero denti z 43	Angolo pressione 17°30'00"	
Numero disegno.: 250.1.4219.02-FNL	Modulo m 1.6mm	Angolo elica -31°00'00"	
Commessa/serie nr.: PPAP N 5	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmesszeug		Charge:	

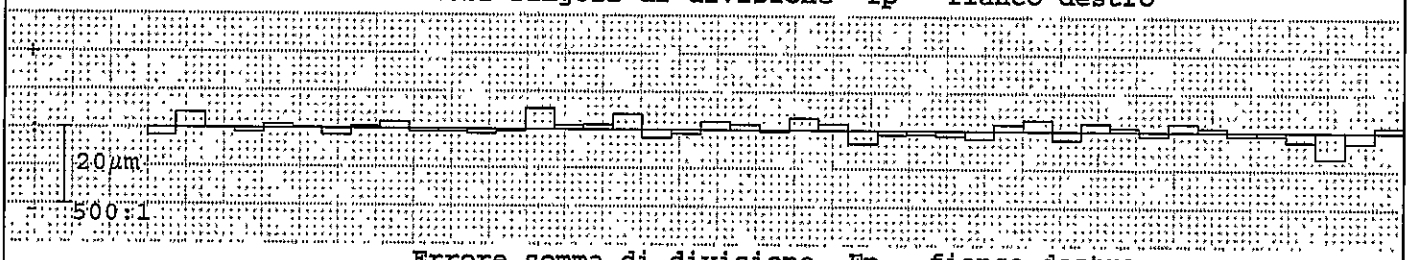
Errori singoli di divisione fp fianco sinistro



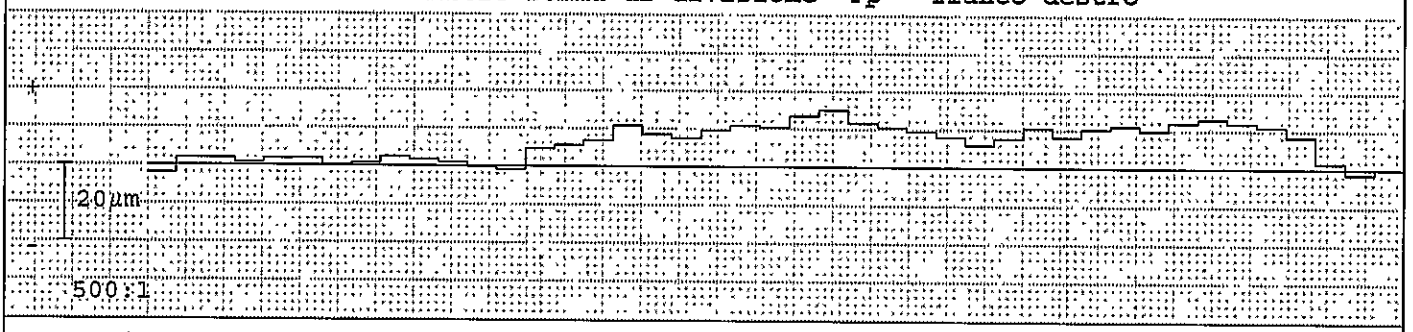
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



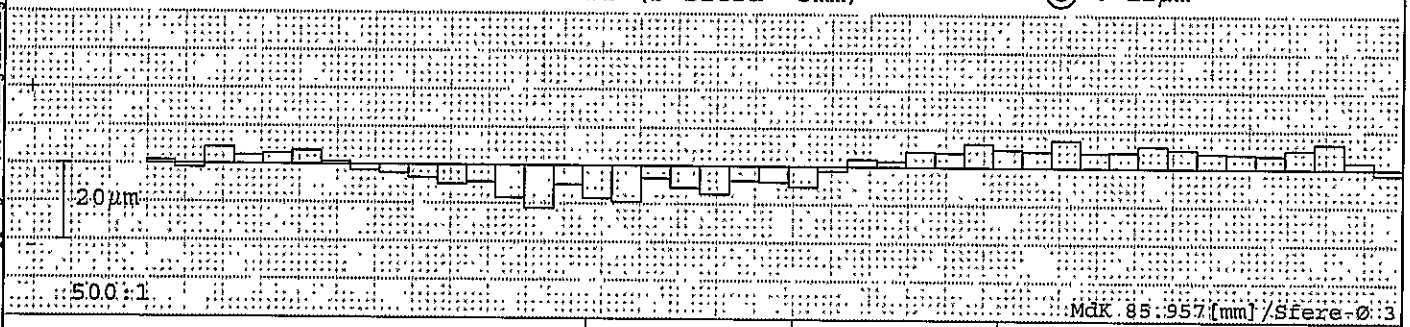
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:81.949 z=6.3mm

		fianco sinistro / TIRO		fianco destro	
		Val.misur Qual.	Val. amm Qual.	Val.misur Qual.	Val. amm Qual.
Gr. err. singoli divisione	fp max	4	20	7	20
Gr. salto di passo	fu max	5	25	6	25
Scarto di divisione	Rp	8		12	
Err. globale di divisione	Fp	18	63	17	63
Err. cordale di divisione	Fpz/8	12		14	

Centricità Fr (Ø-sfera =3mm) ◎ : 12µm



MdK 85.957[mm]/Sfere-Ø 3

Err. di concentricitá	Fr	19	56	Val. amm
Variaz. spessore dente	Rs			Val. 85.937 85.945 85.93

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Point	Caractheristic	Tolerance	Part 1	Part 2	Part 3	Part 4	Part 5
4	MDK	118,006/117,945	117,972	117,988	117,866	117,967	117,985
4A	MDK	85,957/85,866	85,951	85,95	85,955	85,952	85,945

Manual measures by Marposs

DG 2501 4297 77

09,Jan ,2015

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