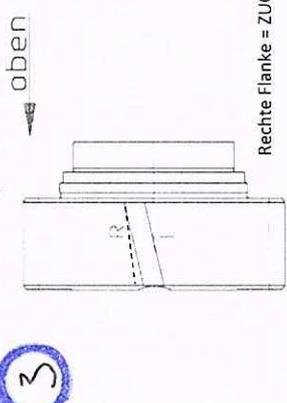


STIRNRAD GEAR		external außenverzahnt	(7)	
Zähnezahl Number of teeth	z	37	linke Fl. left flank	rechte Fl. right flank
Modul Normal module	m_h	2.350000	0.005	0.010
Eingriffswinkel Normal pressure angle	α_n	20° 0' 0"		0.010
Schrägungswinkel Helix angle	β	31° 0' 0"	0.000 ± 0.008	0.012
Steigungsrichtung Hand of helix		LINKS	0.000 ± 0.008	0.012
Profilverchiebungsfaktor Addendum modification coef.	x	0.226	0.000 ± 0.008	0.028
Teilkreisdurchmesser Pitch diameter	d	101.439	0.000 ± 0.008	0.032
Kopfkreisdurchmesser Outside diameter	d_a	108.20 -0.26	0.005	0.014
Kopfnutzkreis, theo. max. d_{ha} Tip diam. usable theo.	d_{ha}	107.75	0.036	20.90
Kopfnutzkreis, theo. min. d_{ha} Tip diam. usable theo.	d_{ha}	107.37		
Fußkreisdurchmesser Root diameter	d_f	94.30 -0.30		
Fußnutzkreisdurchmesser Root diameter usable	d_{fr}	97.89		
Grundkreisradius Base circle radius	r_b	46.685		
Grundkreisdurchmesser Base diameter	d_b	93.370		
Normalzahnstärke Normal tooth thickness	max. s_n	4.005		
Normalzahnstärke Normal tooth thickness	min. s_n	3.980		
Meßzähnezahl Number of teeth spanned	k	7		
Zahnweite Base tangent length	max. W_k	47.274		
Zahnweite Base tangent length	min. W_k	47.250		
Meßkugeldurchmesser Ball diameter	D_M	3.0000		
Diam. Zweikugelmaß max. M_{gk} Measurement o. balls	max. M_{gk}	103.832		
Diam. Zweikugelmaß min. M_{gk} Measurement o. balls	min. M_{gk}	103.762		
Verdrehtflankenspiel Circumferential backlash	theo.	0.063		
		0.175		



Bezugsprofil-Schleifscheibe
Grinding tool data
Schleifscheibenkopfhöhe $h_{p,POS} = 4.000$
Grinding wheel tip height
Schleifscheibenkopfradius $\rho_{p,POS} = 0.556$
Grinding wheel tip radius
Schleifdurchmesser = $96.44_{-0.30} \approx 12.07$
grinding diameter

linke Flanke left flank	Profil Profile	rechte Flanke right flank
26.89	$C_r = 0.003 \pm 0.002$	26.89
26.51		26.51
23.10		23.10
21.90		21.90
14.70		14.70
$f_{HtL} = 0.000 \pm 0.005$		$f_{HtR} = 0.000 \pm 0.005$
Mittelwerte		Mittelwerte

linke Flanke left flank	Flankenlinie Tooth trace	rechte Flanke right flank
	Längsbälligkeit: $0.001_{+0.004} (0.8^*b)$	
$f_{HtL} = 0.000 \pm 0.004$		$f_{HtR} = -0.010 \pm 0.004$
Mittelwerte		Mittelwerte

* Schreibbeginn
Start of checking $\varnothing = 96.44_{-0.30} \approx 12.07$

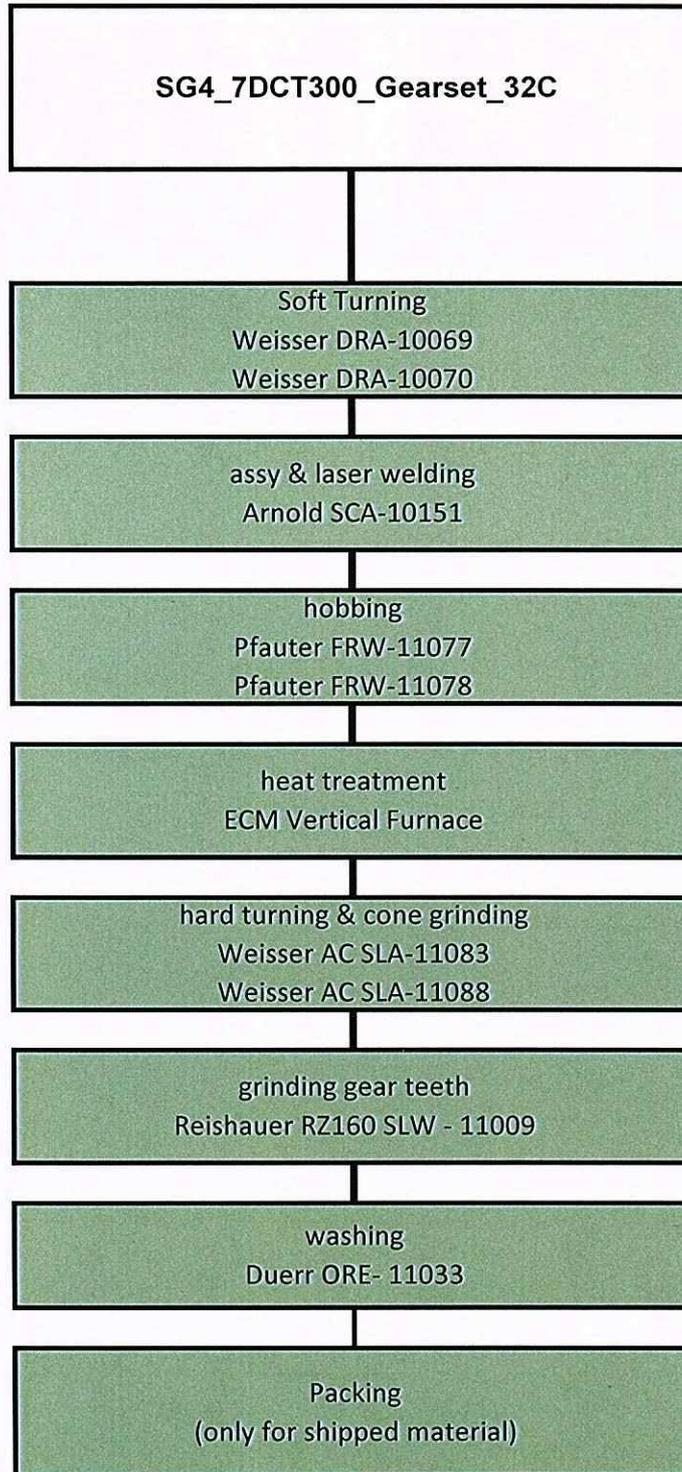
* f_{Ht} (zwischen dnf und dem Schreibbeginn ds) max $f_{Ht}/2$, jedoch 0.003 zulässig
* f_{Ht} (between dnf and start of checking ds) max $f_{Ht}/2$, 0.003 allowable.

Profil- und Flankenliniennormung nach G_808006 und VDI/VDE 2612
Flankenlinienprüfbereich $L_f = 0.8^*b$ hochgerechnet auf 1.0^*b
Begriffe für Stirnräder nach DIN 868, 3960, 3998

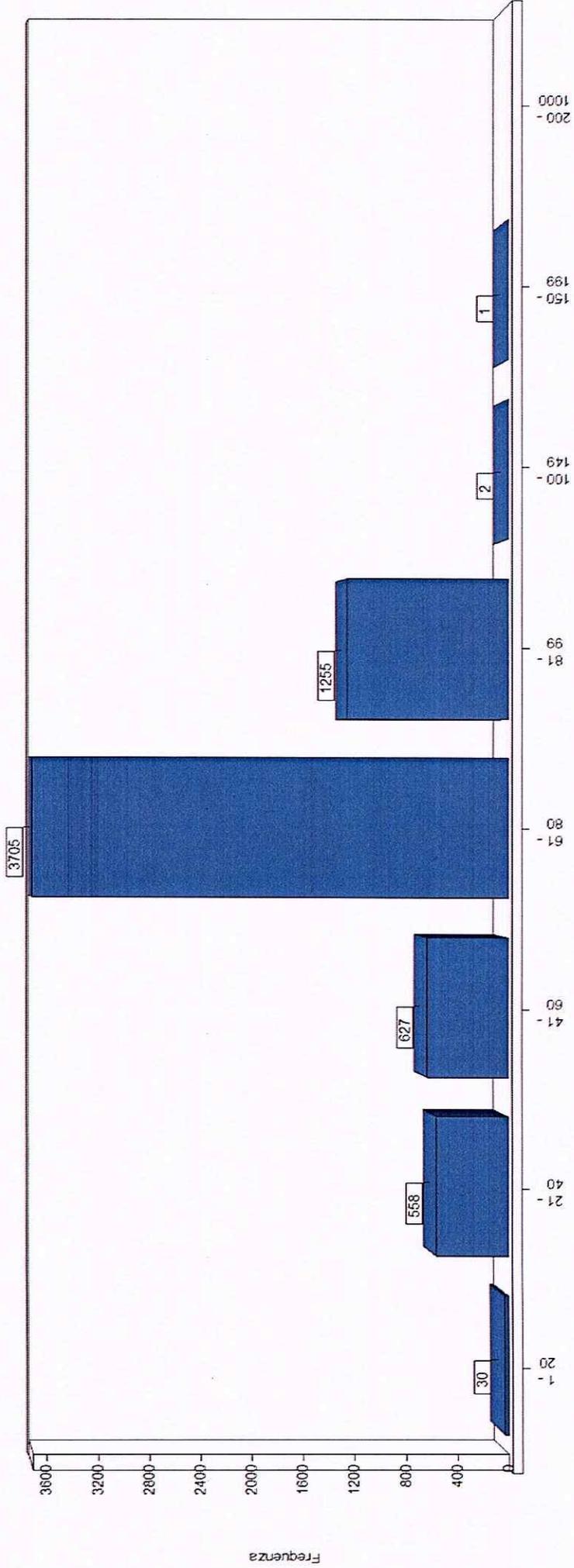
#Waviness evaluation (fitted sine) in profile and helix direction until 4th gear order to be documented according to G_00_05_S_0012
Order referenced to the considered gear

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		Eingriffsteilungs-Abweich. Normal pitch error		Teilungs-Einzelabweichung Adjacent pitch error		Teilungssprung Diff. bet. adjacent pitches		Teilungs-Summenabweich. Cumulative circ. pitch error		Rundlaufabweichung Radial run-out		Zahndickenschwankung Range of tooth thckn. error		Zweifl.-Wälzabweichung Radial composite error		Zweifl.-Wälz sprung Radial tooth to tooth comp. err.		Meßkreis Krümmungsradius ρ_{Mk} Radius of curvature meas. diam.		
linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	linke Fl. left flank	rechte Fl. right flank	
0.005	0.010	0.005	0.010	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.005	0.036	0.005	0.036	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008	0.000 ± 0.008

Verzahnungsdaten siehe Verzahnungsblatt For pre-machining dimensions, see gear data sheet same number		Verzahnungsblatt Endkontrolle Final Check Gear Data	
Benennung: Naming:		Benennung: Naming:	
251.1.1250.50		251.1.1250.50	
Schaltrad 4.Gg.		Schaltrad 4.Gg.	
Verzahnungsdaten siehe Verzahnungsblatt For pre-machining dimensions, see gear data sheet same number		Verzahnungsdaten siehe Verzahnungsblatt For pre-machining dimensions, see gear data sheet same number	
Benennung: Naming:		Benennung: Naming:	
251.1.1250.50		251.1.1250.50	
Schaltrad 4.Gg.		Schaltrad 4.Gg.	



		FMEA Processo		Numero: Pagina:	1.2.1.1.1.1
Tipo/Modello/Produzione/Lotto: 7DCT300		Numero Disegno: Gearset 1A + 21A + 21H + 32C Stato modifica:	Responsabile: Getrag Ditta: Getrag	Emesso: 31/08/2015	
FMEA/Elemento: GEARSET 7DCT300		Codice dell'operazione: Tutte Stato modifica:	Responsabile: Papagna, Oscuro, Nitti, Cicirelli, Tanzi T., Terlizze, Landriscina, Guerra, Simbaldi, Caponio, Vicenti, Picerno, Pierro, Cacciapaglia, Sisto. Ditta:	Emesso: Modificato 13/01/2017 14/05/2018	



Record Owner: Vicenti D.	Date Issued: 06.03.2017	GIS1 Item Number: 28.04	Page: 1 / 2
Dept.: WLP	Date Revised: 14.05.2018	GIS2 Classification: Confidential	Retention Start Date (Year): 2017

Actions ongoing for RPN > 100:

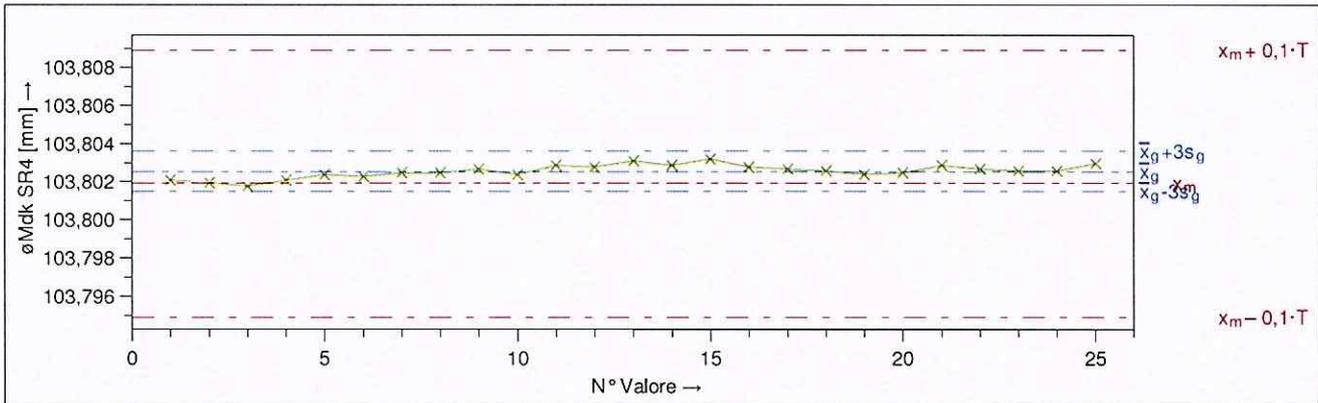
Chr. Classification	Project	Component	Operation	Chr. Description	Actual RPN			Action	Resp.	Due date	Min. RPN expected				
					S	O	D				RPN	S	O	D	RPN
<M>	DCT300	SG1	Hard Turning	Clutch body Height	7	4	4	112	Final drawing tolerance review + Dogbody height review on EP	Pierro	31-May-18	7	2	5	(70)
<M>	DCT300	SGRv	Hard Turning	Clutch body Height	7	3	5	105	Final drawing tolerance review + Dogbody height review on EP (100% Check --> Sampling check)	Pierro	30-Jun-18	7	2	5	(70)
std	DCT300	IS2	Diam. Grinding	Spline Fr	8	6	4	192	New operation implementation in order to ground new clamping surface for Diam. grinding operation (100% Check --> Sampling check)	Cacciapaglia	31-Jul-18	8	3	5	(120)
									New machine Junker implementation for Diam. grinding operation		31-Aug-18	8	2	5	(80)

Record Owner: Vicenti D.	Date Issued: 06.03.2017	GIS1 Item Number: 28.04	Page: 2 / 2
Dept.: WLP	Date Revised: 14.05.2018	GIS2 Classification: Confidential	Retention Start Date (Year): 2017



Capacità strumenti di misura

Data/ora	24/04/2018	Nome oper.	mario.bozza	Reparto/Area/Prod.	WLQ	Posto di prova	Rettifica denti SR4
Calibro		Master			Caratteristica		
Desc. calibro	Banchetto in acciaio	Desc. mast.	SR4	Desc. Car.	øMdk SR4		
N° calibro	MVZ 406001 020	N° master	MVZ 400654 002	N° Caratt.	2511125050_32C		
Ris. calibro	0,0001	Valore reale mast.	103,802	Val. Nom.	103,7970 LSS	103,832	$\hat{\Delta} = 0,0350$
Caus. Pr.	Cg CgK	Unità di misura	mm	Unità di rr mm	LSI	103,762	$\hat{\Delta} = -0,0350$
Nota							



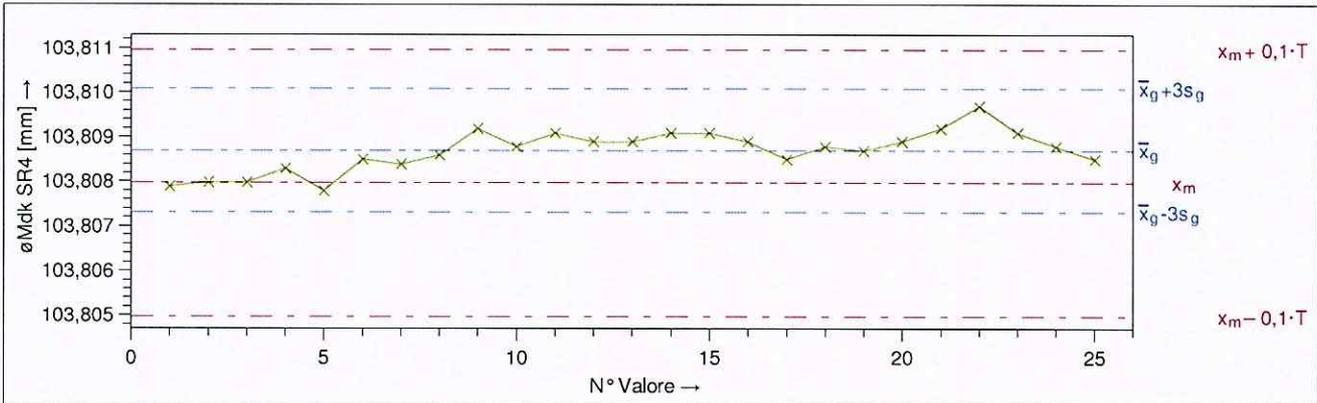
i	x _i	i	x _i	i	x _i	i	x _i	i	x _i
1	103,8021	6	103,8023	11	103,8029	16	103,8028	21	103,8029
2	103,8020	7	103,8025	12	103,8028	17	103,8027	22	103,8027
3	103,8018	8	103,8025	13	103,8031	18	103,8026	23	103,8026
4	103,8021	9	103,8027	14	103,8029	19	103,8024	24	103,8026
5	103,8024	10	103,8024	15	103,8032	20	103,8025	25	103,8030

Valori a disegno		Valori Calcolati		Statistiche	
x _m +0,1·T	= 103,809000	x _{maxg}	= 103,8032	$\bar{x}_g + 3s_g$	= 103,803619
x _m	= 103,802000	x _{ming}	= 103,8018	\bar{x}_g	= 103,802580
x _m -0,1·T	= 103,795000	R _g	= 0,0014	$\bar{x}_g - 3s_g$	= 103,801541
0,2·T	= 0,014000	n _{tot}	= 25	6s _g	= 0,002078
T	= 0,0700			s _g	= 0,000346
Unità di misura	= mm			Bi	= 0,00058000
				n _{eff}	= 25
Test per Bias				Risultati del test : significativo (α ≤ 0,1%)	
Bias		=	0,83%		
Minimo riferimento per sistema di misura capace					
Risoluzione	%RE =	0,14%		T _{min} (%RE)	= 0,00200
$C_g = \frac{0,2 \cdot T}{4 \cdot s_g}$	=	7,26 ≤ 10,10 ≤ 12,94		T _{min} (C _g)	= 0,00922
$C_{gk} = \frac{0,1 \cdot T - \bar{x}_g - x_m }{2 \cdot s_g}$	=	6,64 ≤ 9,27 ≤ 11,89		T _{min} (C _{gk})	= 0,0150
Sistema di misura capace (%RE,min,C _g ,C _{gk})					
☐ GETRAG MSA 2017: Capability of measuring system (Type-1 Study)					



Capacità strumenti di misura

Data/ora	11/06/2018	Nome oper.	mario.bozza	Reparto/Area/Prod.	WLQ	Posto di prova	Dentatura SR4
Calibro		Master			Caratteristica		
Desc. calibro	Banchetto in acciaio	Desc. mast.	SR4	Desc. Car.	øMdk SR4		
N° calibro	MVZ 406001 017	N° master	MVZ 400654 001	N° Caratt.	2511125050_32C		
Ris. calibro	0,0001	Valore reale mast.	103,808	Val. Nom.	104,4300 LSS	104,445	$\hat{\Delta} = 0,0150$
Caus. Pr.	Cg CgK	Unità di misura	mm	Unità di r	mm LSI	104,415	$\hat{\Delta} = -0,0150$
Nota							



i	x _i	i	x _i	i	x _i	i	x _i	i	x _i
1	103,8079	6	103,8085	11	103,8091	16	103,8089	21	103,8092
2	103,8080	7	103,8084	12	103,8089	17	103,8085	22	103,8097
3	103,8080	8	103,8086	13	103,8089	18	103,8088	23	103,8091
4	103,8083	9	103,8092	14	103,8091	19	103,8087	24	103,8088
5	103,8078	10	103,8088	15	103,8091	20	103,8089	25	103,8085

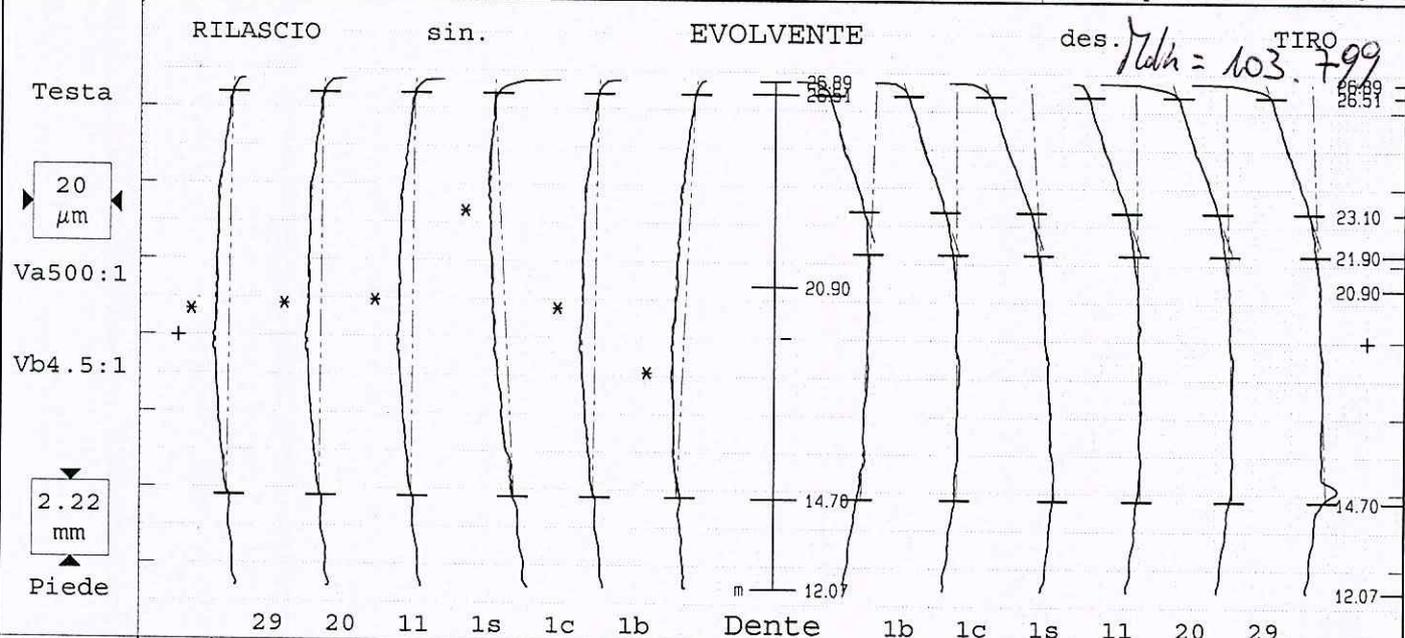
Valori a disegno		Valori Calcolati		Statistiche	
$x_{m+0,1\cdot T}$	= 103,811000	$x_{max\ g}$	= 103,8097	$\bar{x}_g + 3s_g$	= 103,810096
x_m	= 103,808000	$x_{min\ g}$	= 103,8078	\bar{x}_g	= 103,808708
$x_{m-0,1\cdot T}$	= 103,805000	R_g	= 0,0019	$\bar{x}_g - 3s_g$	= 103,807320
$0,2\cdot T$	= 0,006000	n_{lot}	= 25	$6s_g$	= 0,002776
T	= 0,0300			s_g	= 0,000463
Unità di misura	= mm			$ Bi $	= 0,00070800
				n_{eff}	= 25
Test per Bias				Risultati del test : significativo ($\alpha \leq 0,1\%$)	
Bias		=	2,36%		
Minimo riferimento per sistema di misura capace					
Risoluzione	%RE =	0,33%		$T_{min} (\%RE)$	= 0,00200
$C_g = \frac{0,2\cdot T}{4\cdot s_g}$	=	$2,33 \leq 3,24 \leq 4,15$		$T_{min} (C_g)$	= 0,0123
$C_{gk} = \frac{0,1\cdot T - \bar{x}_g - x_m }{2\cdot s_g}$	=	$1,76 \leq 2,48 \leq 3,19$		$T_{min} (C_{gk})$	= 0,0194
Sistema di misura capace (%RE,min,C _g ,C _{gk})					
<input type="checkbox"/> GETRAG MSA 2017: Capability of measuring system (Type-1 Study)					

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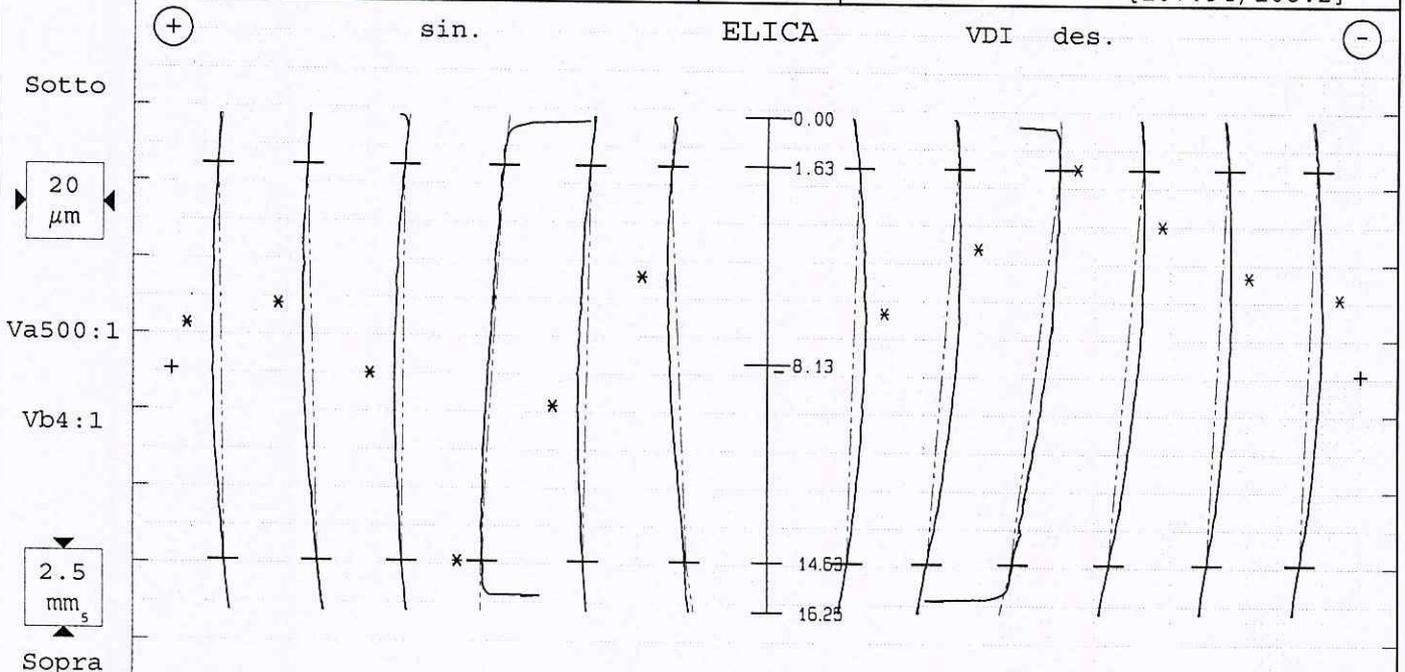
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 12:11
Denominazione: SR4		Numero denti z 37	Largh.fasc.dent. b 16.25mm
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Tratto evolv. La 11.81/7.2mm
Comessa/serie nr.: 4 - 1		Angolo pressione 20°00'00"	Tratto elica Ls 13mm
Masch.Nr.: M001	Spindel: Formantico	Angolo elica -31°00'00"	Inizio elab. Ml 14.7mm
Untersuchungszweck: Laufende Messung		Ø Base db 93.37mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -28°56'44"	Fat.scor.pr. x .226



Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual	
fH _{am}	±5	-0.8	Var a 0.8							±5	Var a 3.4						-2.1	
fH _a	±8	-0.8	-1.2	-0.7	-0.4	5.4	-0.9	-4.4		±8	3.6	-0.5	-6.4	-1.7	-2.2	-3.9	-2.1	
F _a		2.1	2.4	2.0	2.0	5.2	2.1	4.5			3.1	1.9	4.3	2.2	2.3	6.1	3.1	
ff _a	5	1.2	1.4	1.2	1.1	1.4	1.2	1.4		5	1.7	1.7	1.1	1.7	1.8	4.2	2.4	
ca	3±2	3.7	3.7	3.6	3.8	3.2	3.6	2.9			1.0	1.1	0.5	1.2	1.0	-0.4	0.7	
Ca										-16/-8	-12.5	-12.9	-11.1	-12.6	-12.8	-11.2	-12.4	
ffa _f	3	1.6	1.6	2.0	1.7	1.8	1.3	0.5		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-Ø [mm]		94.187 [94/94.3]								108.049 [107.94/108.2]								



N:Z		29	20	11	1t	1c	1p	Ø Dente	1p	1c	1t	11	20	29			
fH _{βm}	±4	0.7	Var β 5.9							-10±4	Var β 5.7						-8.4
fH _β	±8	0.7	2.1	3.5	-0.6	-7.4	-2.4	5.2		±8	-3.9	-10.2	-15.9	-11.2	-6.8	-5.5	-8.4
F _β		2.5	2.2	3.1	2.2	5.8	2.3	3.9			5.3	2.7	4.9	2.9	3.3	4.2	3.3
ff _β	5	0.6	0.5	0.6	0.5	0.9	0.6	1.0		5	0.5	0.5	1.3	0.5	0.6	0.6	0.6
c _β	1/5	2.3	2.3	2.4	2.3	1.0	2.2	2.4		1/5	3.0	3.4	2.8	3.2	3.0	3.2	3.2
FV		-12.6															

GCG 808006

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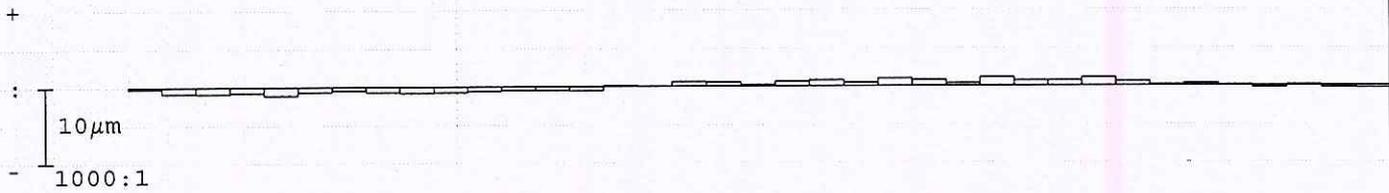


Ruota cilindrica Divisione

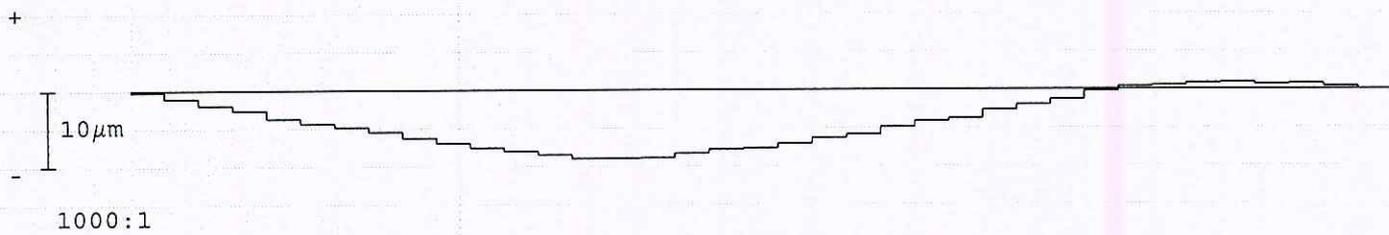


Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 12:11
Denominazione: SR4		Numero denti z 37	Angolo pressione 20°00'00"
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Angolo elica -31°00'00"
Comessa/serie nr.: 4		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formelwerkzeug	Charge:	

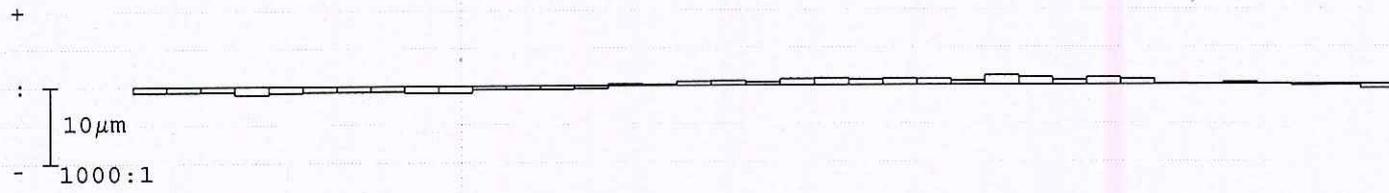
Errori singoli di divisione fp fianco sinistro



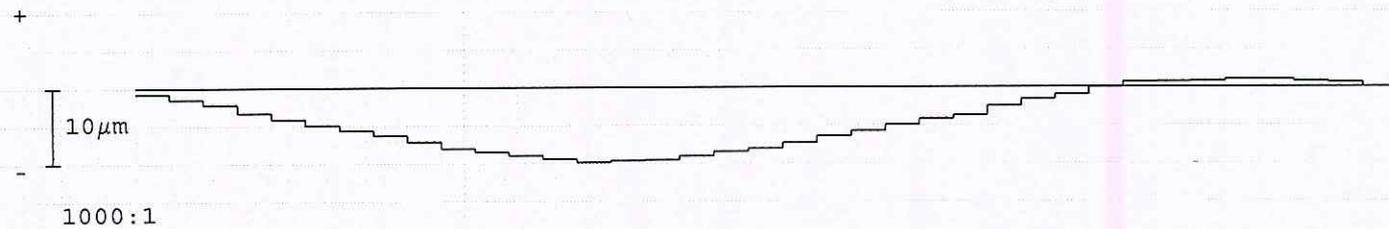
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



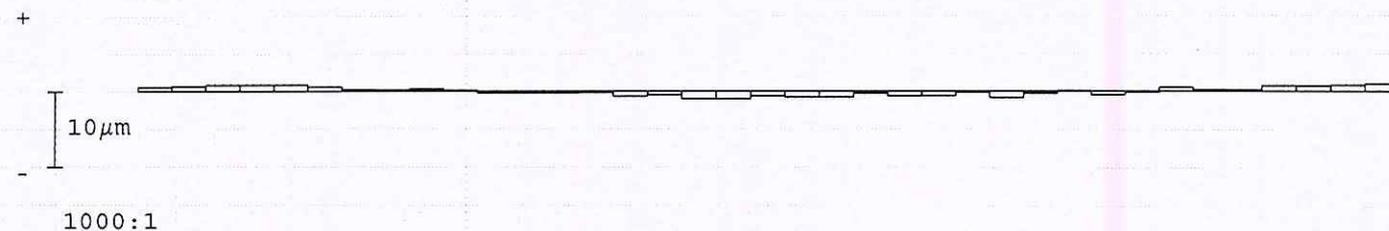
Errore somma di divisione Fp fianco destro



Corsa per misura divis.: 102.3 z=8.1mm	fianco sinistro / RILASCIO				fianco destro / TIRO			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	1.1		10.0		1.2		10.0	
Gr. salto di passo fu max	0.8		12.0		0.7		12.0	
Scarto di divisione Rp	2.2				2.3			
Err. globale di divisione Fp	9.9		36.0		10.8		36.0	
Err. cordale di divisione Fpz/8	4.2				4.3			

Centricità Fr (Ø-sfera = 3.5mm)

⊙ : 1.5µm



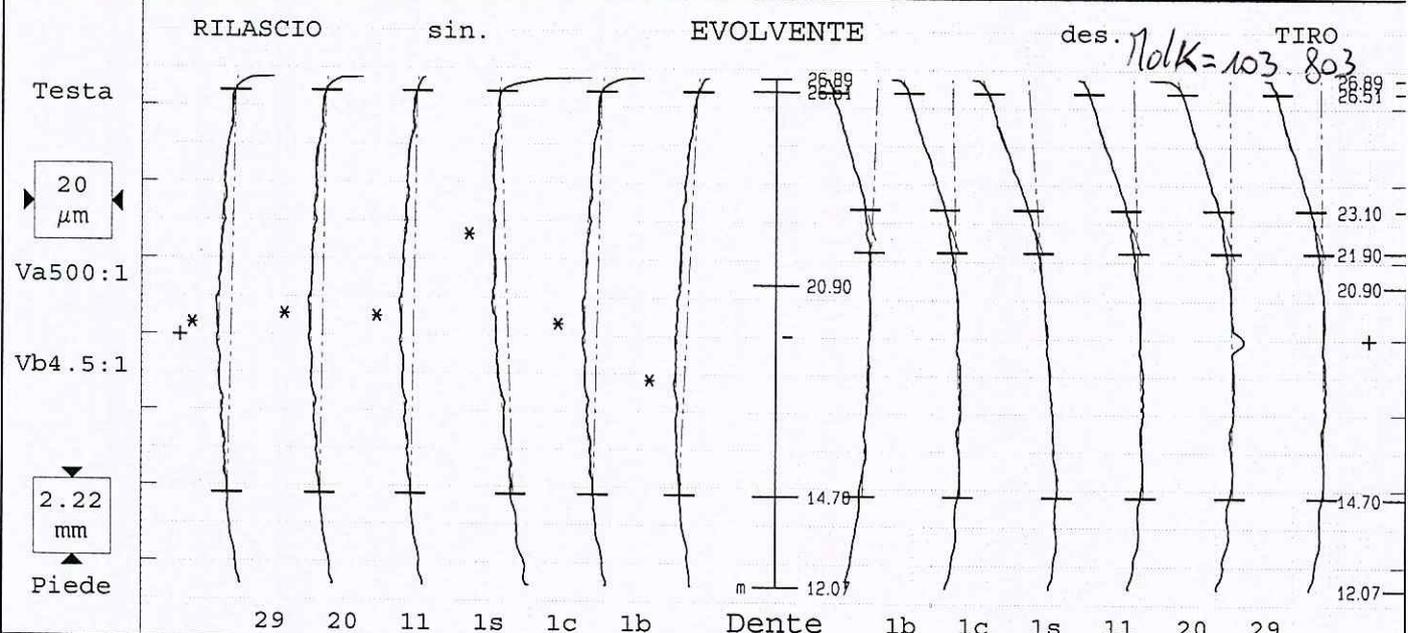
Err. di concentricità Fr	2.0	28.0	
Variab. spessore dente Rs			

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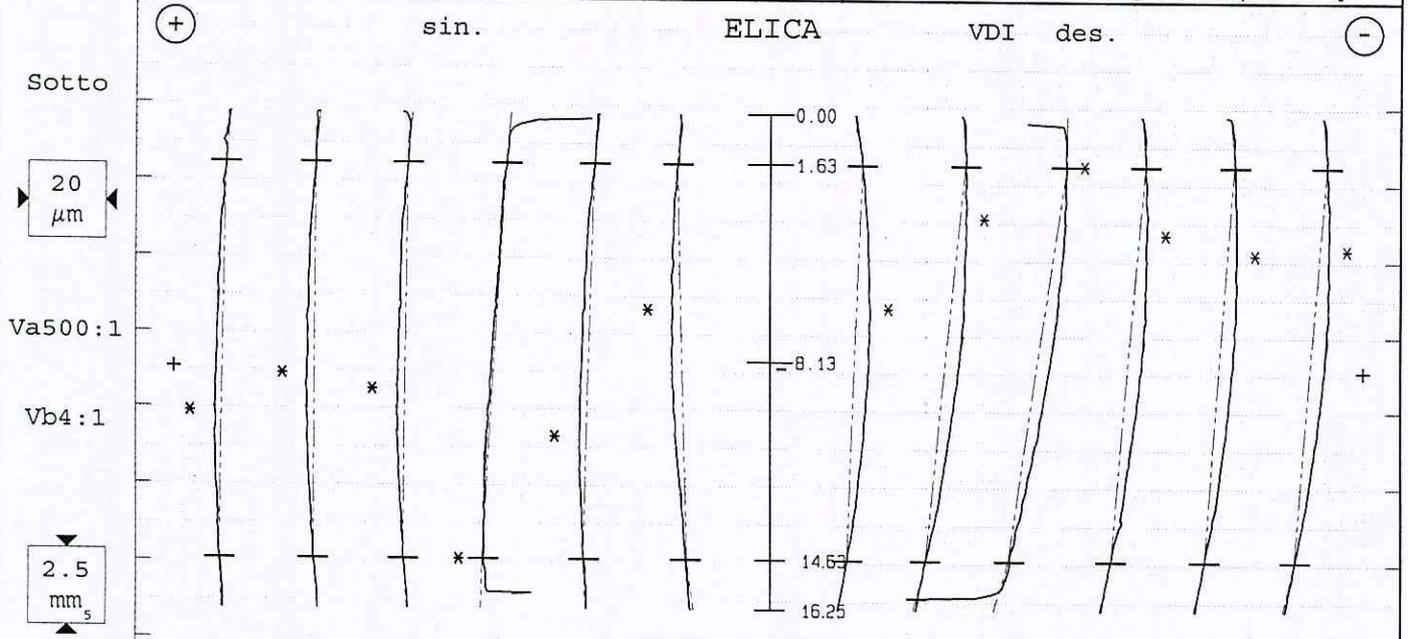
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 12:03
Denominazione: SR4		Numero denti z 37	Largh.fasc.dent. b 16.25mm
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Tratto evol. La 11.81/7.2mm
Comessa/serie nr.: 5-2		Angolo pressione 20°00'00"	Tratto elica LS 13mm
Masch.Nr.: M001	Spindel: Formnest	Angolo elica -31°00'00"	Inizio elab. M1 14.7mm
Untersuchungszweck: Laufende Messung		Ø Base db 93.37mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -28°56'44"	Fat.scor.pr. x .226



Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual	
fH _{am}	±5	-1.7	Var a 0.7							±5	Var a 1.7						-1.8	
fH _a	±8	-1.7	-1.9	-1.3	-1.4	3.8	-2.0	-4.6		±8	3.7	-2.2	-7.7	-2.8	-1.1	-1.2	-1.8	
F _a		2.3	2.5	1.9	2.0	4.1	2.6	4.6			3.0	2.4	5.2	2.6	4.6	2.1	2.9	
ff _a	5	1.5	1.6	1.5	1.5	1.5	1.4	1.1		5	1.5	1.7	1.1	1.7	4.4	1.7	2.4	
ca	3±2	3.2	3.3	3.2	3.1	3.2	3.3	2.7			1.0	1.1	0.4	1.2	1.7	1.1	1.3	
Ca										-16/-8	-11.7	-11.9	-11.0	-11.9	-12.6	-12.0	-12.1	
ff _{af}	3	0.6	0.6	0.5	0.6	1.3	0.7	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-Ø [mm]		94.208 [94/94.3]								108.071 [107.94/108.2]								



N:Z		sin.						Qual	ELICA VDI des.						Qual			
fH _{βm}	±4	-2.0	Var β 2.9							-10±4	Var β 3.4						-11.2	
fH _β	±8	-2.0	-2.2	-0.7	-1.4	-7.8	-3.6	3.2		-10±8	-5.0	-13.1	-19.3	-11.2	-9.7	-10.7	-11.2	
F _β		2.2	2.1	1.5	2.0	6.2	3.2	2.9			5.1	4.3	7.5	3.4	2.6	3.2	3.4	
ff _β	5	0.6	0.6	0.5	0.8	0.9	0.6	0.7		5	0.4	0.5	0.6	1.0	0.6	0.5	0.7	
c _β	1/5	1.9	1.7	1.9	1.9	0.7	1.9	2.4		1/5	3.7	3.6	3.4	3.5	3.5	3.7	3.6	
FV		-11.0								-14.3								

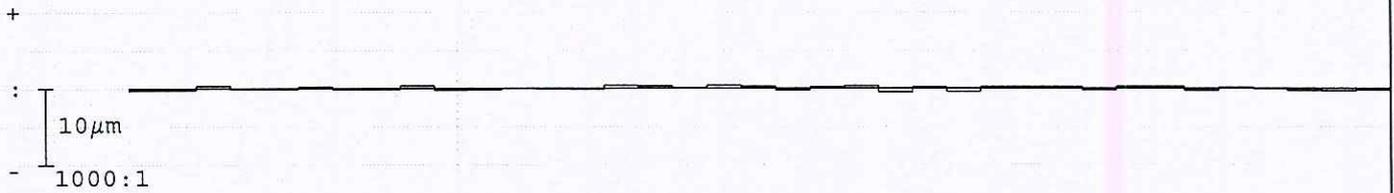


Ruota cilindrica Divisione

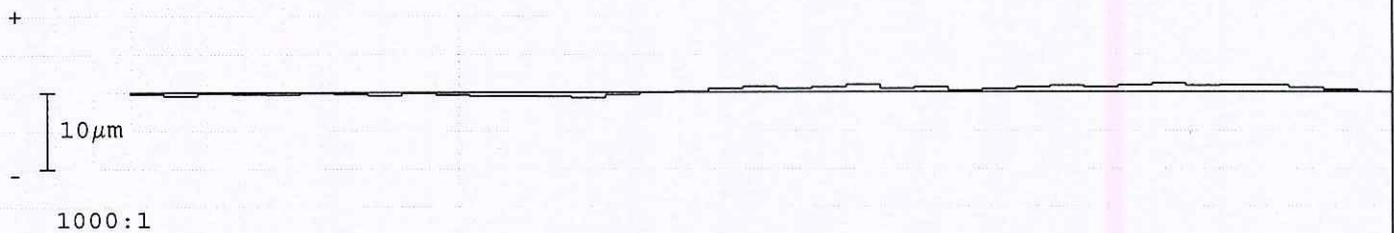


Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 12:03
Denominazione: SR4		Numero denti z 37	Angolo pressione 20°00'00"
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Angolo elica -31°00'00"
Comessa/serie nr.: 5		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formelwerkzeug	Charge:	

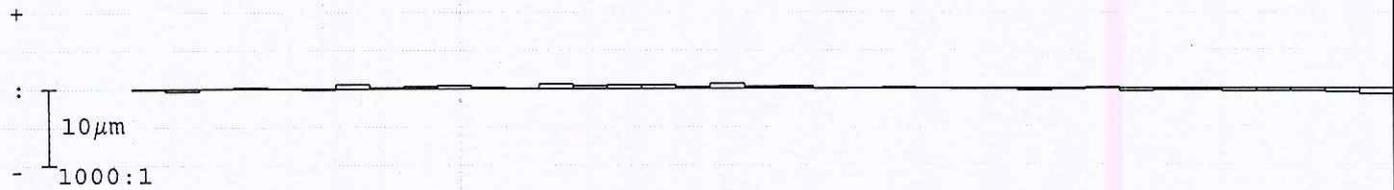
Errori singoli di divisione fp fianco sinistro



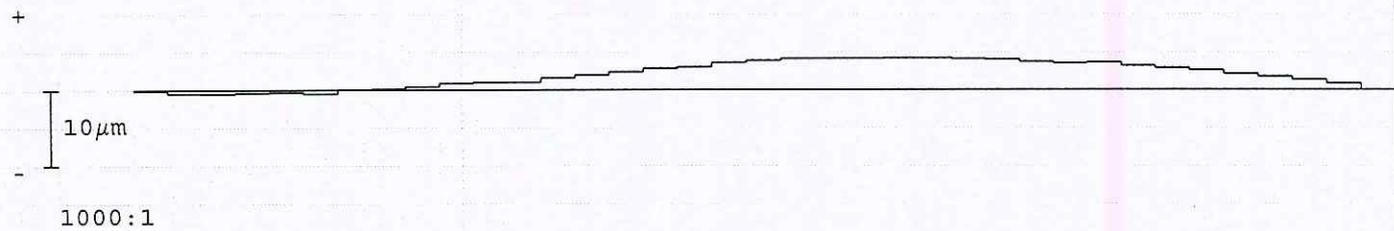
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



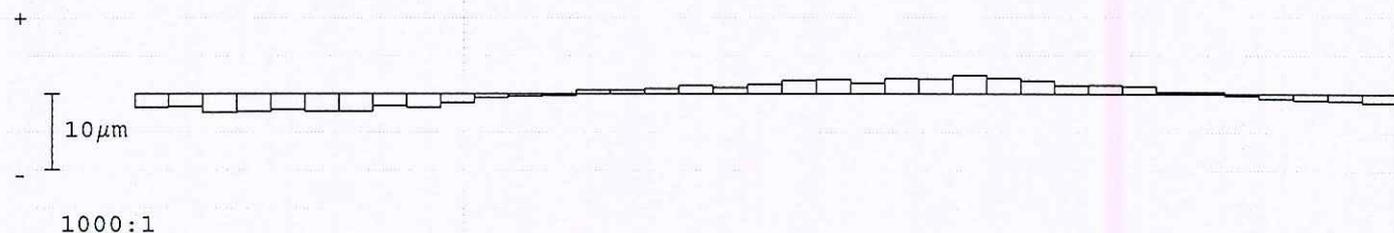
Errore somma di divisione Fp fianco destro



Corsa per misura divis.: 102.3 z=8.1mm	fianco sinistro / RILASCIO				fianco destro / TIRO			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	0.5		10.0		0.8		10.0	
Gr. salto di passo fu max	0.9		12.0		0.7		12.0	
Scarto di divisione Rp	0.9				1.4			
Err. globale di divisione Fp	1.8		36.0		4.7		36.0	
Err. cordale di divisione Fpz/8	1.4				2.6			

Centricità Fr (Ø-sfera = 3.5mm)

⊙ : 4.1µm



Err. di concentricità Fr	4.8	28.0	
Variation spessore dente Rs			

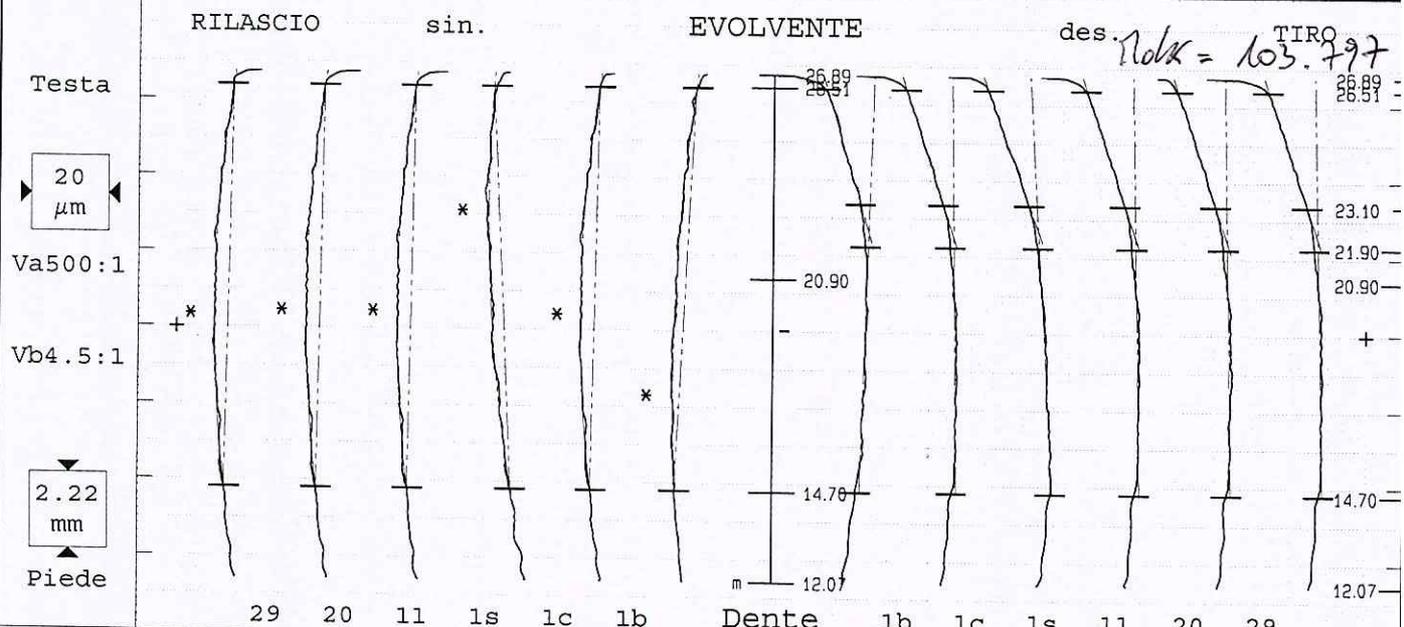
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Docum. archiviato elettronicamente. Archiviazione cartacea non necessaria

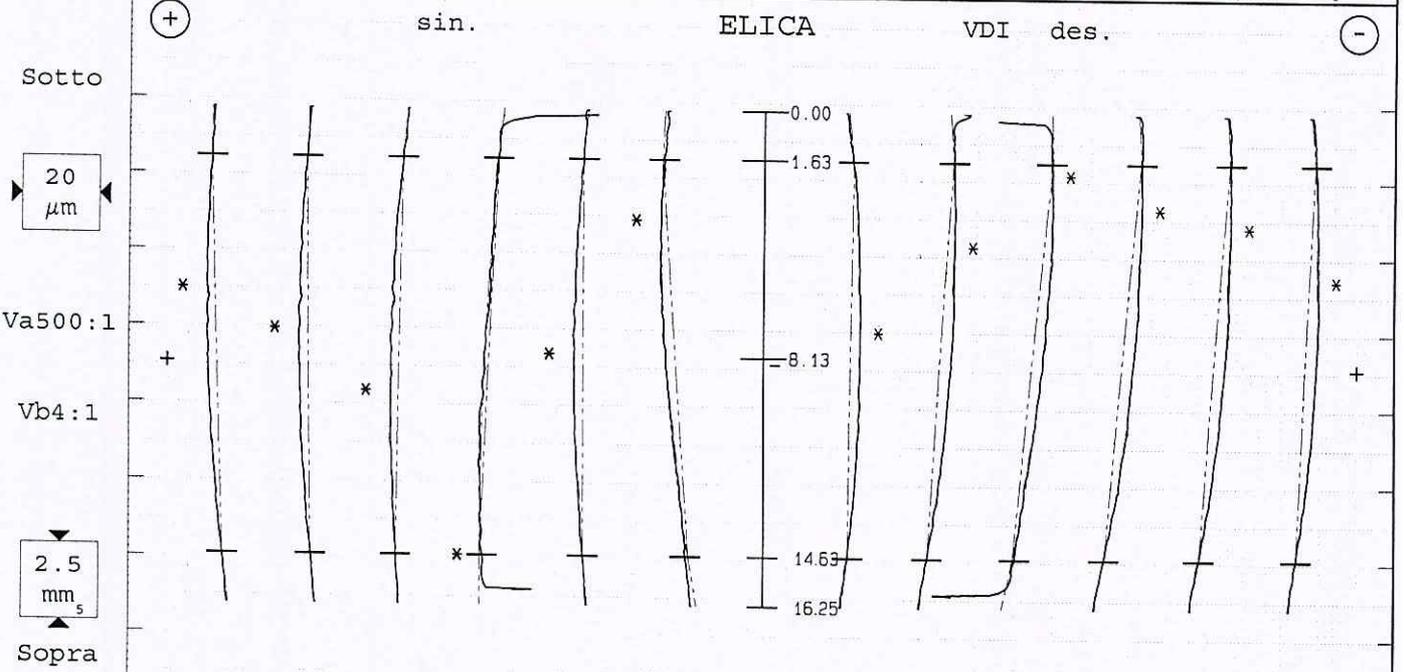
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 11:44
Denominazione: SR4		Numero denti z 37	Largh. fasc. dent. b 16.25mm
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Tratto evolv. La 11.81/7.2mm
Comessa/serie nr.: 7-3		Angolo pressione 20°00'00"	Tratto elica L&S 13mm
Masch.Nr.: M001	Spindel: Forme	Angolo elica -31°00'00"	Inizio elab. M1 14.7mm
Untersuchungszweck: Laufende Messung		Ø Base db 93.37mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -28°56'44"	Fat. scor. pr. x .226



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual	
fH _{am}	±5	-1.9	Var a 0.3								±5	Var a 1.0							-2.1	
fH _a	±8	-1.9	-2.1	-1.8	-1.8	4.9	-1.9	-5.2		±8	3.2	-1.6	-6.2	-2.1	-2.1	-2.6	-2.1			
F _a		2.6	2.8	2.5	2.5	4.6	2.4	5.4		5	1.8	1.9	1.1	2.0	2.0	1.8	1.9			
ff _a	5	1.4	1.4	1.4	1.4	1.7	1.5	1.1		5	0.9	1.3	0.7	1.5	1.6	1.3	1.4			
ca	3±2	3.7	3.7	3.7	3.7	3.2	3.7	2.5												
Ca										-16/-8	-12.4	-12.1	-11.4	-12.2	-12.4	-12.3	-12.3			
ff _{af}	3	1.2	1.1	1.1	1.3	1.1	1.2	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
P/T-Ø [mm]		94.186 [94/94.3]									108.050 [107.94/108.2]									



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual	
fH _{βm}	±4	0.9	Var β 5.7								-10±4	Var β 5.7							-8.9	
fH _β	±8	0.9	3.8	1.5	-1.9	-6.0	0.2	8.7		-10±8	-1.7	-8.2	-12.9	-11.7	-9.7	-6.0	-8.9			
F _β		2.4	3.5	2.3	2.4	4.3	1.5	6.3		5	6.9	3.7	2.9	3.1	2.0	3.8	3.2			
ff _β	5	0.7	0.7	0.8	0.8	1.3	0.5	1.4		5	0.6	0.6	1.0	0.7	0.7	0.6	0.7			
c _β	1/5	2.3	2.3	2.4	2.1	1.1	2.3	2.5		1/5	2.5	2.9	2.8	3.1	2.9	2.9	3.0			
FV		-14.7																		

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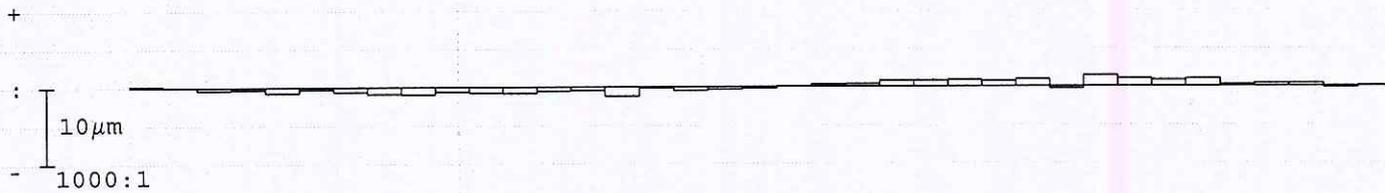


Ruota cilindrica Divisione

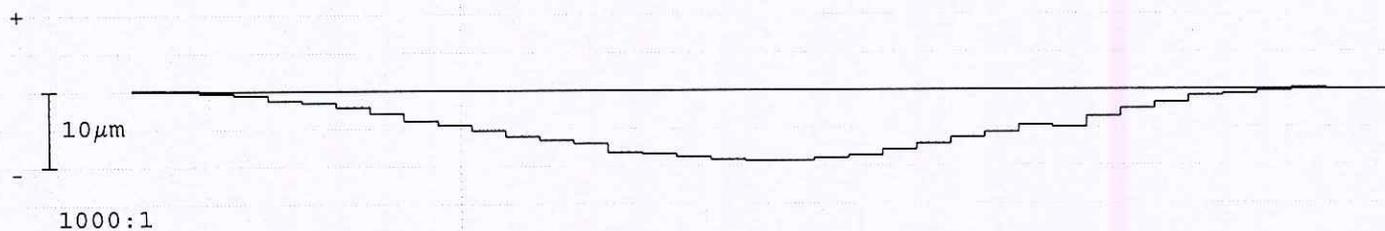


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Denominazione: SR4		Numero denti z 37	Angolo pressione 20°00'00"
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Angolo elica -31°00'00"
Comessa/serie nr.: 7		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formelwerkzeug:	Charge:	

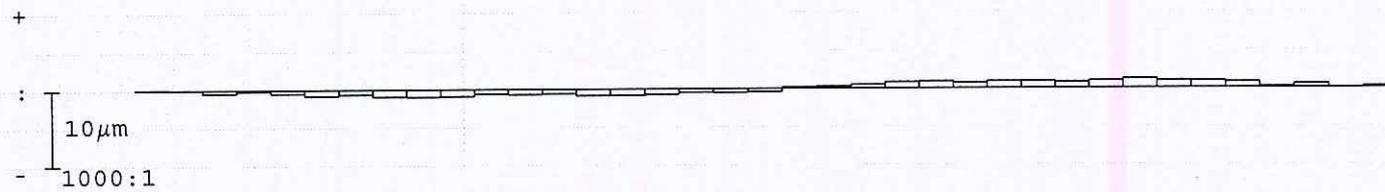
Errori singoli di divisione fp fianco sinistro



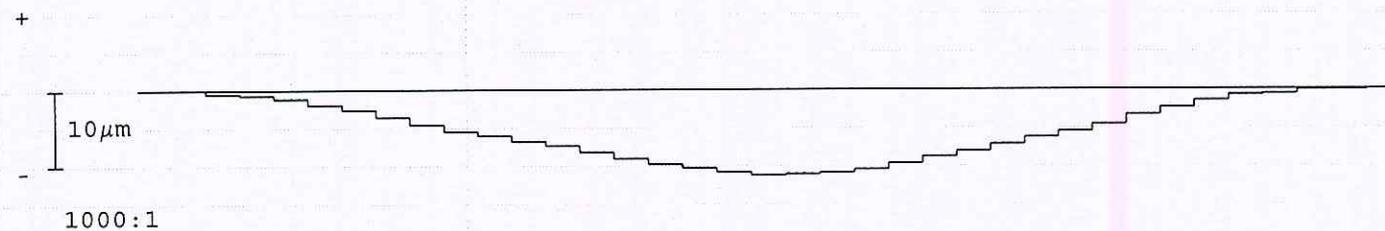
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



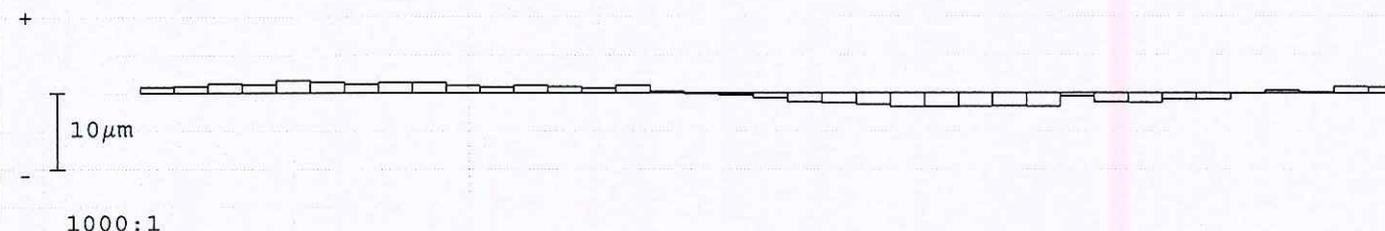
Errore somma di divisione Fp fianco destro



Corsa per misura divis.: 102.3 z=8.1mm	fianco sinistro / RILASCIO				fianco destro / TIRO			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	1.5		10.0		1.2		10.0	
Gr. salto di passo fu max	1.7		12.0		0.6		12.0	
Scarto di divisione Rp	2.7				2.2			
Err. globale di divisione Fp	9.5		36.0		11.3		36.0	
Err. cordale di divisione Fpz/8	4.4				4.8			

Centricità Fr (Ø-sfera = 3.5mm)

⊙ : 3.1µm



Err. di concentricità Fr	3.5	28.0	
Variab. spessore dente Rs			

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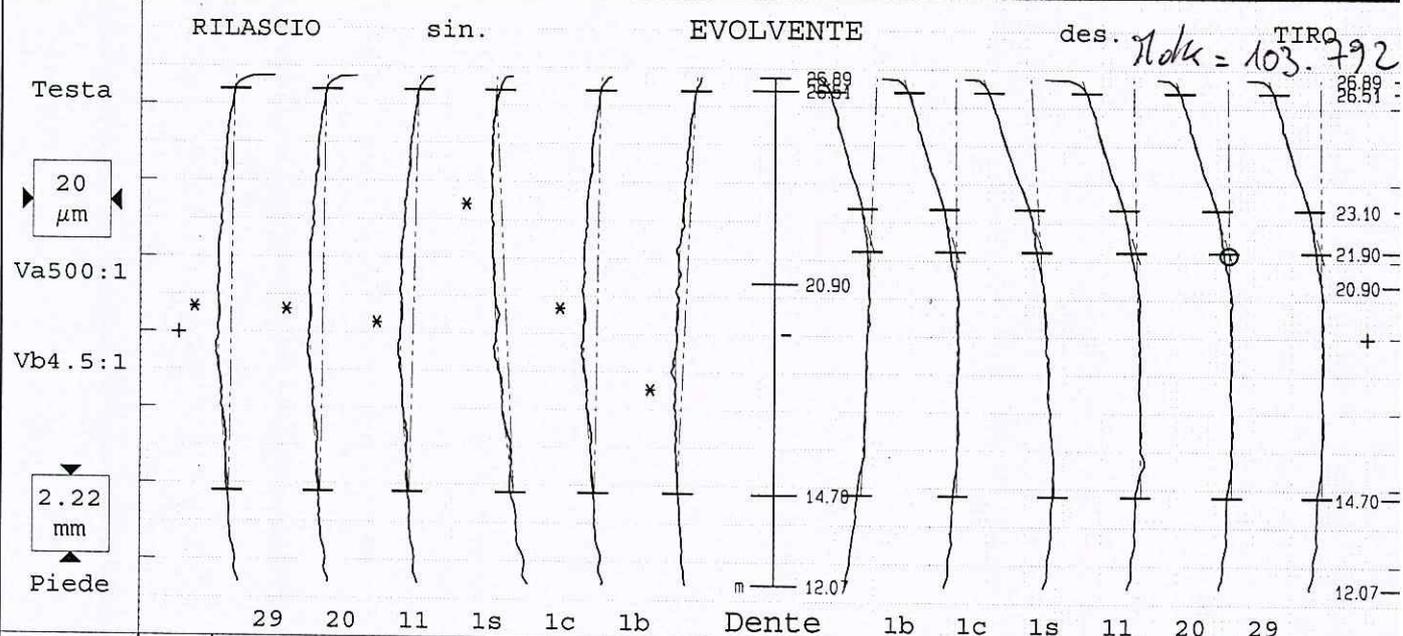
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Ruota cilindrica Evolvente/Elica

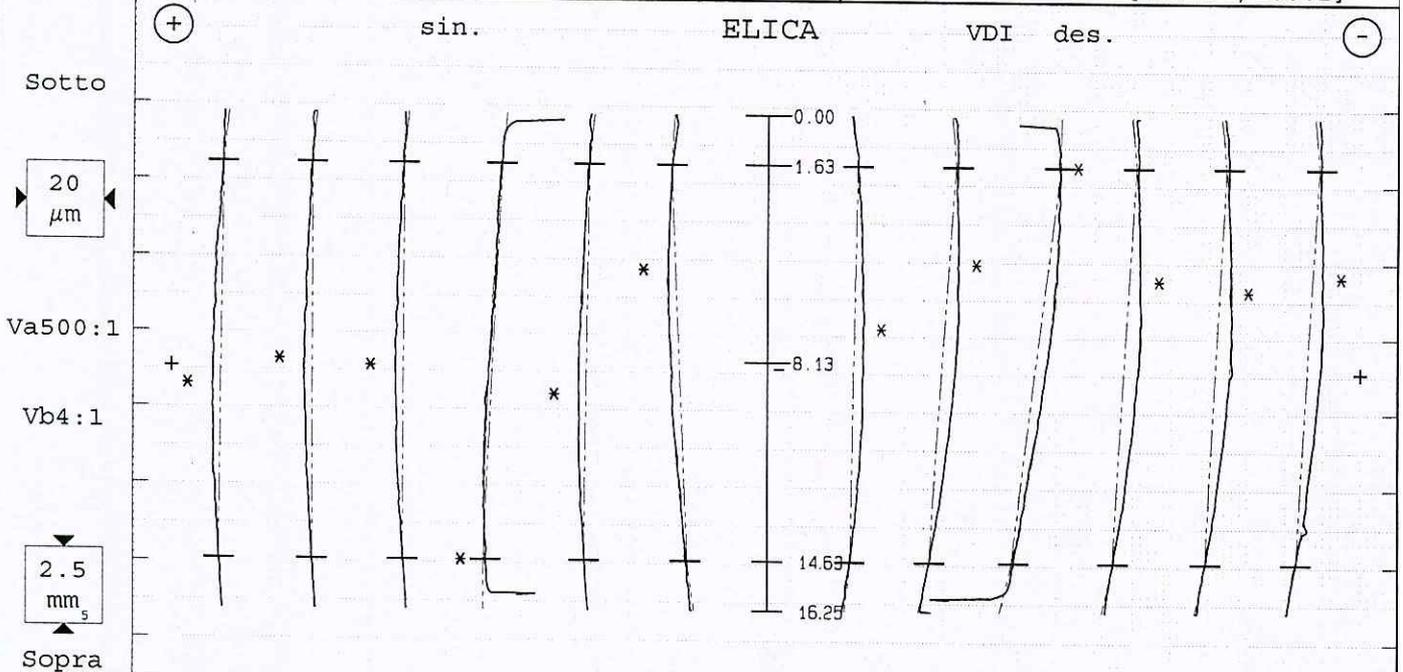


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Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 11:25
Denominazione: SR4		Numero denti z 37	Largh. fasc. dent. b 16.25mm
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Tratto evolv. La 11.81/7.2mm
Commissa/serie nr.: 10 - 4		Angolo pressione 20°00'00"	Tratto elica Ls 13mm
Masch. Nr.: M001	Spindel: Formn. elica	Ang. elica -31°00'00"	Inizio elab. M1 14.7mm
Untersuchungszweck: Laufende Messung		Ø Base db 93.37mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -28°56'44"	Fat. scor. pr. x .226



Tolerance	Medio	Val. misur [µm]						Qual	Tolerance	Val. misur [µm]						Medio	Qual	
fH _{am}	±5	-1.4	Var a 1.1							±5	Var a 1.6						-1.3	
fH _a	±8	-1.4	-1.1	-1.2	-2.2	5.0	-1.1	-4.4		±8	3.6	-0.7	-6.4	-2.3	-1.4	-0.8	-1.3	
F _a		2.4	2.2	2.3	2.8	5.2	2.1	4.4			3.2	2.4	4.7	3.7	2.6	2.2	2.7	
ff _a	5	1.6	1.5	1.6	1.6	2.1	1.5	1.8		5	1.7	2.2	1.5	2.6	2.1	1.9	2.2	
ca	3±2	3.5	3.5	3.5	3.5	2.8	3.6	2.3			1.0	1.4	0.6	1.2	1.4	1.4	1.4	
Ca										-16/-8	-12.3	-12.6	-11.5	-12.5	-12.7	-12.7	-12.6	
ff _{af}	3	1.8	1.6	1.9	1.8	1.5	2.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-Ø [mm]		94.203 [94/94.3]								108.066 [107.94/108.2]								



N:Z		sin.						⊙ Dente	VDI des.								
fH _{sm}	±4	-0.8	Var β 1.6							-10±4	Var β 1.9						-7.8
fH _β	±8	-0.8	-1.4	0.0	-0.3	-6.0	-1.6	5.3		-10±8	-2.2	-8.8	-16.0	-7.7	-6.9	-7.6	-7.8
F _β		1.5	1.8	1.2	1.2	4.1	1.8	4.0			6.2	2.8	4.9	3.3	4.1	3.3	3.4
ff _β	5	0.7	0.6	0.7	0.6	1.2	0.8	0.9		5	0.6	0.8	1.0	0.8	1.3	1.6	1.1
c _β	1/5	2.0	2.1	2.0	2.0	0.9	1.9	2.3		1/5	2.5	3.5	2.9	3.6	3.7	3.4	3.6
FV		-11.3															

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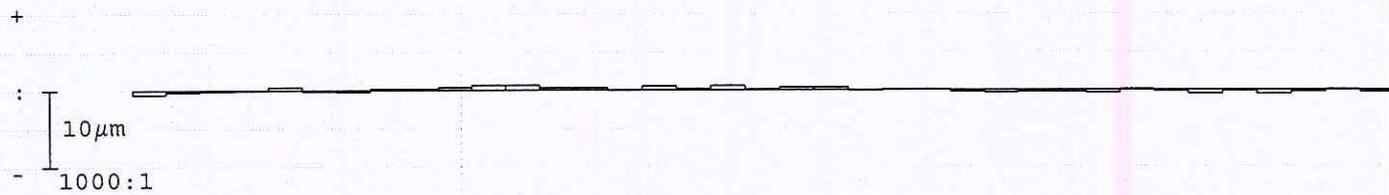


Ruota cilindrica Divisione

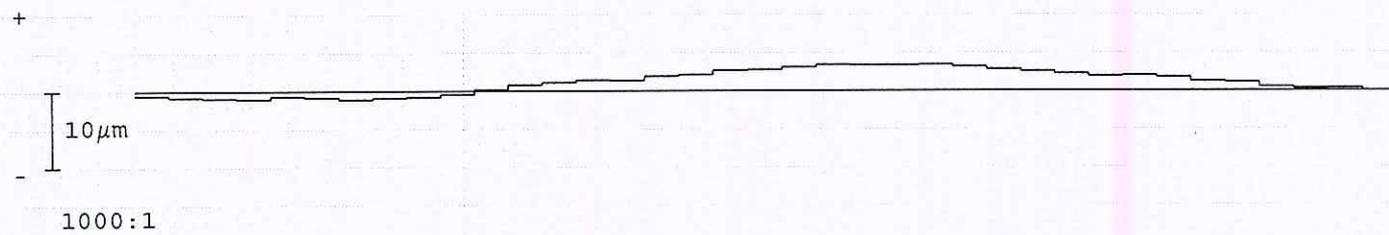


Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 11:25
Denominazione: SR4		Numero denti z 37	Angolo pressione 20°00'00"
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Angolo elica -31°00'00"
Comessa/serie nr.: 10		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formelwerkzeug	Charge:	

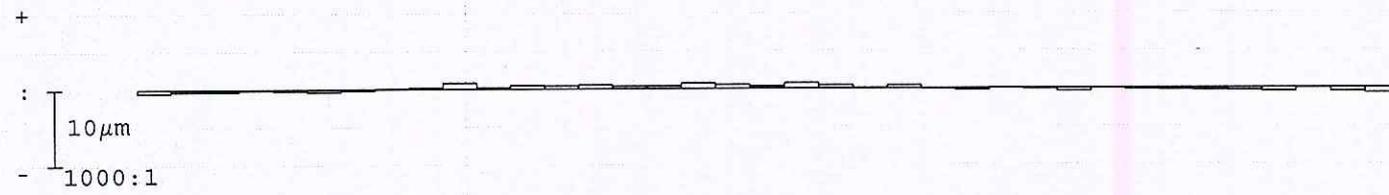
Errori singoli di divisione fp fianco sinistro



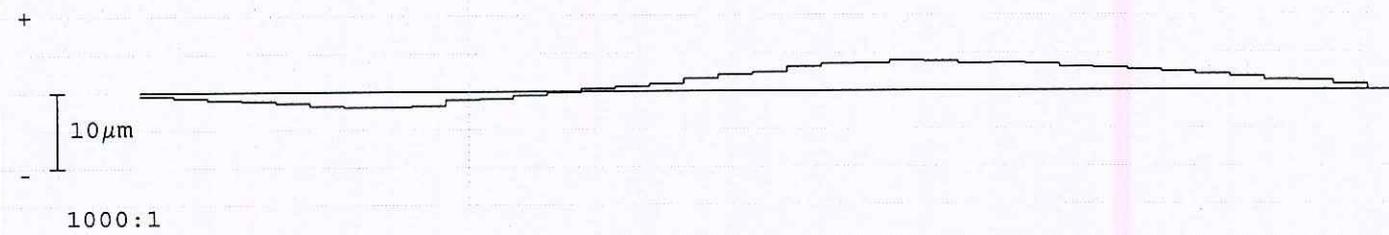
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



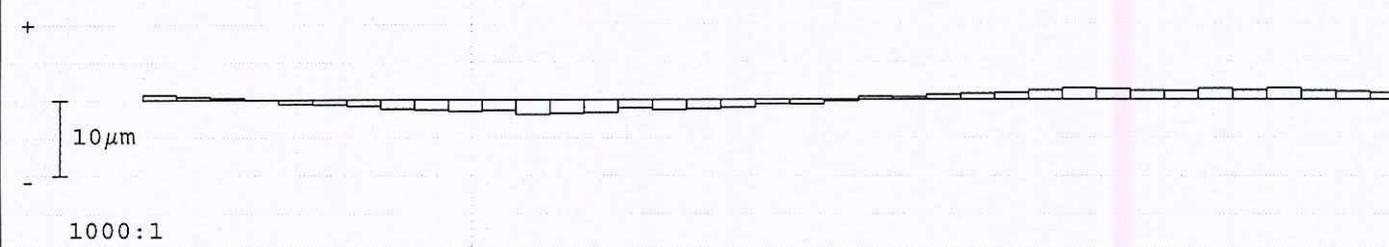
Errore somma di divisione Fp fianco destro



Corsa per misura divis.: 102.3 z=8.1mm	fianco sinistro / RILASCIO				fianco destro / TIRO			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	0.7		10.0		0.8		10.0	
Gr. salto di passo fu max	0.6		12.0		0.6		12.0	
Scarto di divisione Rp	1.3				1.5			
Err. globale di divisione Fp	4.5		36.0		6.0		36.0	
Err. cordale di divisione Fpz/B	2.2				2.6			

Centricità Fr (Ø-sfera = 3.5mm)

⊙ : 3.1µm



Err. di concentricità Fr	3.4	28.0	
Variaz. spessore dente Rs			

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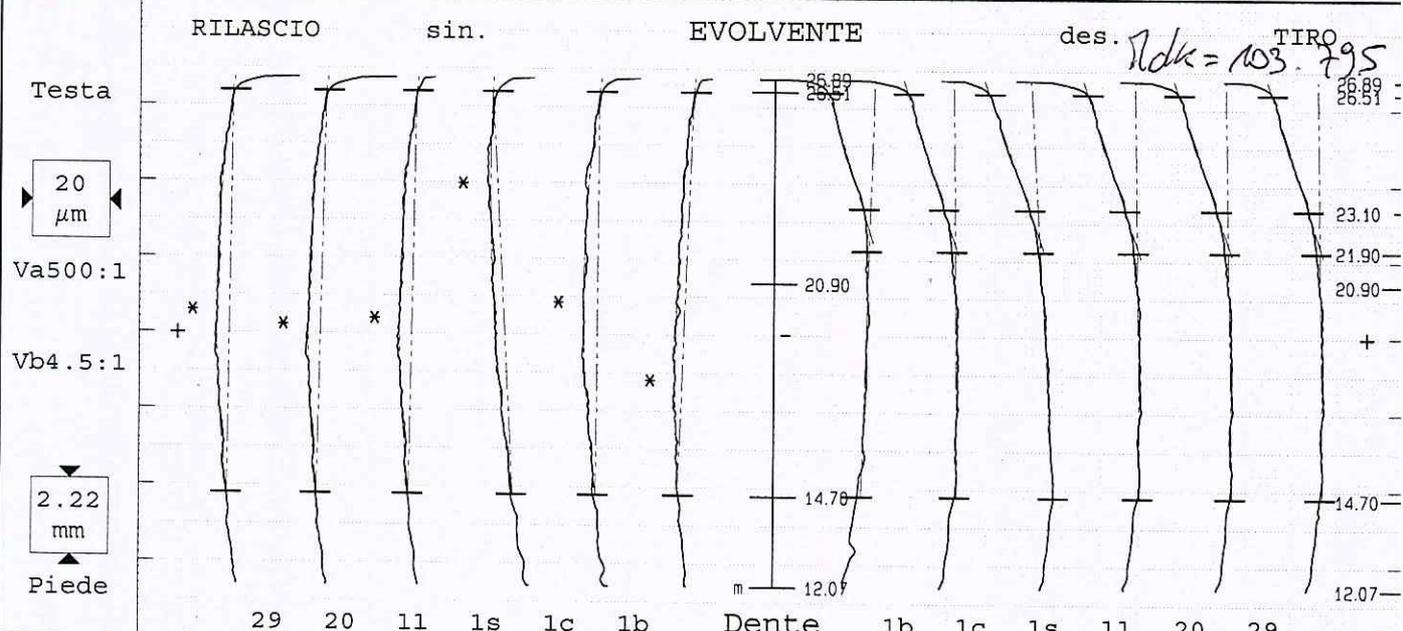
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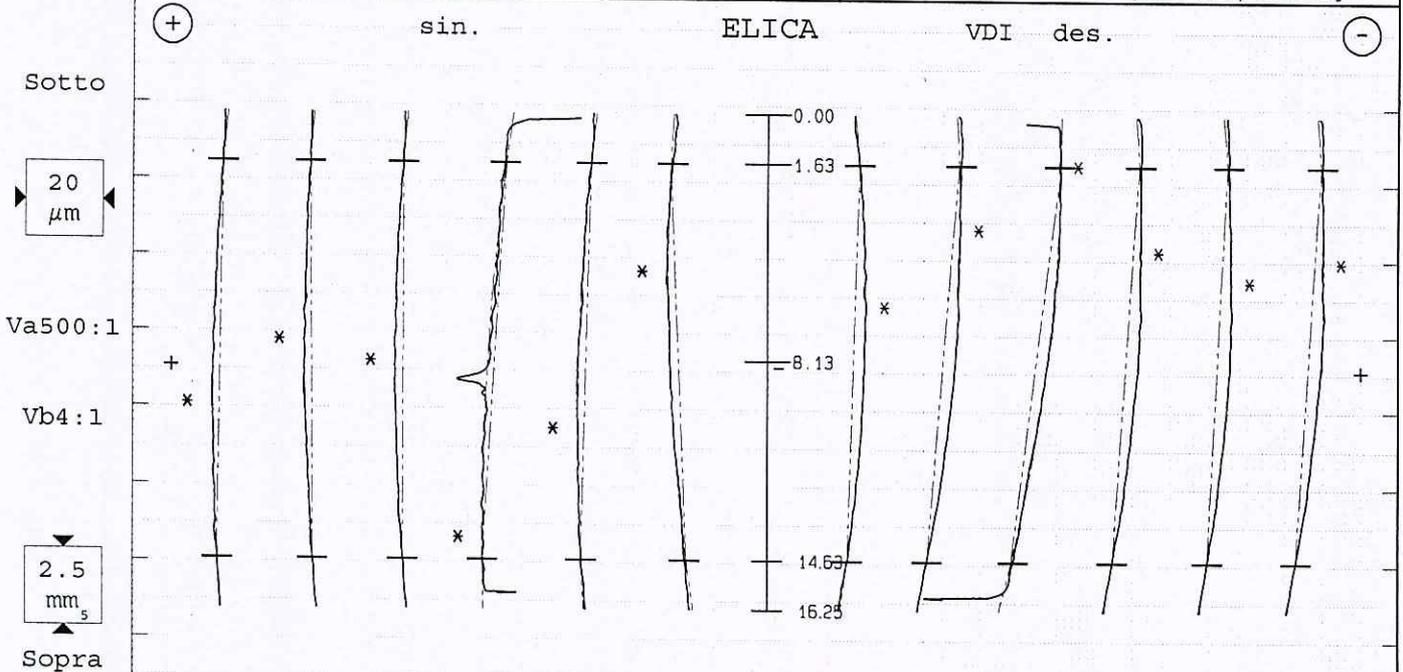
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 10:51
Denominazione: SR4		Numero denti z 37	Largh.fasc.dent. b 16.25mm
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Tratto evolv. La 11.81/7.2mm
Commessa/serie nr.: 15 -5		Angolo pressione 20°00'00"	Tratto elica Ls 13mm
Masch.Nr.: M001	Spindel: Formata	Angolo elica -31°00'00"	Inizio elab. Ml 14.7mm
Untersuchungszweck: Laufende Messung		Ø Base db 93.37mm	Palpatore ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -28°56'44"	Fat.scor.pr. x .226



Tolerance	Medio	Val.misur [µm]						Qual	Tolerance	Val.misur [µm]						Medio	Qual	
fH _{am}	±5	-1.5	Var a 1.5							±5	Var a 0.9						-1.7	
fH _a	±8	-1.5	-1.3	-2.2	-1.8	5.5	-0.7	-3.9		±8	3.1	-1.2	-6.2	-1.7	-2.1	-1.7	-1.7	
F _a		2.5	2.3	3.2	2.4	5.4	2.2	4.3			3.1	1.9	4.2	2.3	2.4	2.3	2.2	
ff _a	5	1.4	1.3	1.3	1.2	2.1	1.8	1.6		5	1.7	1.5	1.2	1.6	1.6	1.7	1.6	
ca	3±2	3.5	3.4	3.4	3.4	2.5	3.6	2.2			1.1	1.2	0.6	1.1	1.1	1.2	1.2	
Ca										-16/-8	-12.3	-12.2	-11.3	-12.5	-12.5	-12.4	-12.4	
ff _{af}	3	1.2	1.0	0.9	1.0	0.7	2.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø [mm]		94.172 [94/94.3]								108.029 [107.94/108.2]								



N:Z		sin.							des.								
fH _{sm}	±4	-1.1	Var β 4.1							-10±4	Var β 3.9						-8.5
fH _s	±8	-1.1	-2.0	0.9	-0.1	-7.7	-3.2	5.2		-10±8	-4.0	-10.4	-16.3	-8.7	-6.5	-8.3	-8.5
F _β		1.9	2.1	1.4	1.3	11.6	2.9	4.2			5.3	2.5	5.2	2.5	3.5	2.9	2.9
ff _β	5	0.7	0.7	0.8	0.5	8.9	0.9	1.0		5	0.6	0.8	1.0	0.7	0.6	0.8	0.7
c _β	1/5	1.9	1.8	1.8	2.0	1.7	1.9	2.3		1/5	2.9	3.1	3.0	3.1	3.2	3.2	3.2
FV		-12.9															-12.3

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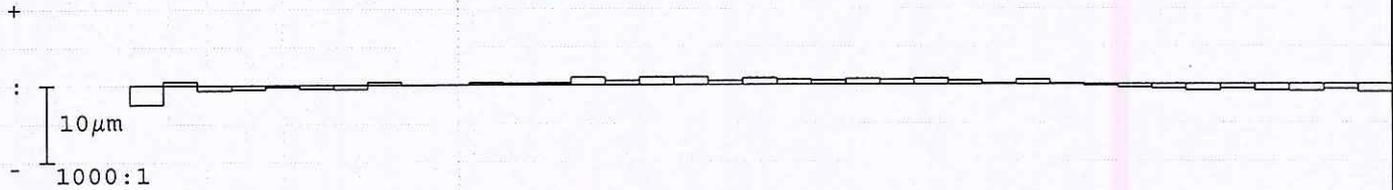


Ruota cilindrica Divisione

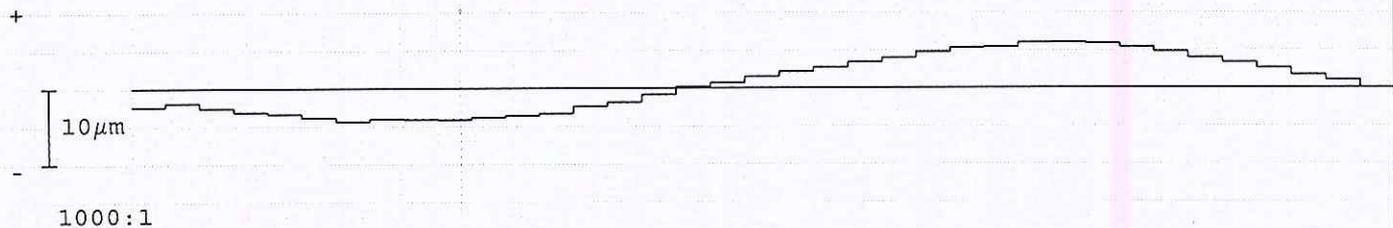


Nr. prog.: STI0416b04 0	P26 601265	Controllore: Turno A	Data: 21.04.2018 10:51
Denominazione: SR4		Numero denti z 37	Angolo pressione 20°00'00"
Numero disegno.: D51.1.1250.50-IF		Modulo m 2.35mm	Angolo elica -31°00'00"
Comessa/serie nr.: 15		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: FORMER	Arbeitszeug:	Charge:

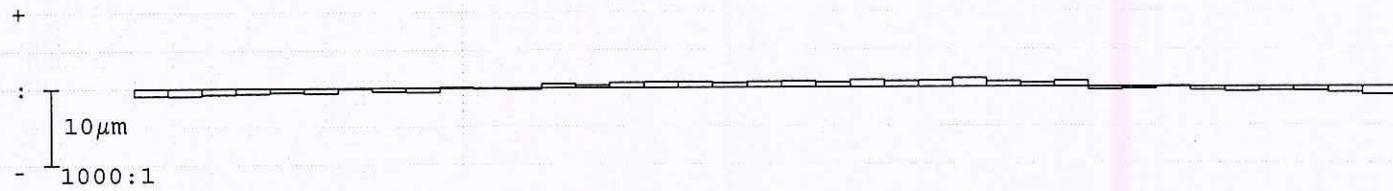
Errori singoli di divisione fp fianco sinistro



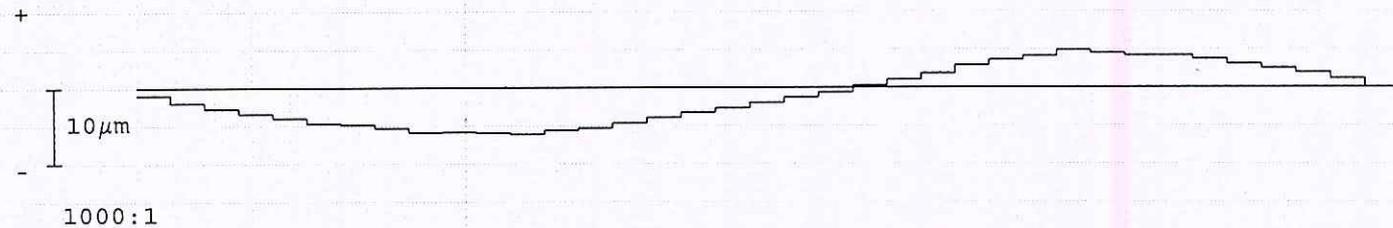
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



Errore somma di divisione Fp fianco destro

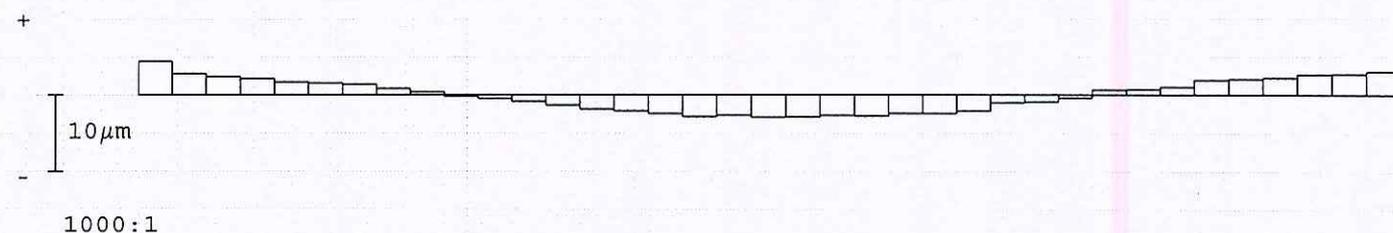


Corsa per misura divis.: 102.3 z=8.1mm

	fianco sinistro / RILASCIO				fianco destro / TIRO			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	2.4		10.0		1.1		10.0	
Gr. salto di passo fu max	2.9		12.0		1.1		12.0	
Scarto di divisione Rp	3.4				2.2			
Err. globale di divisione Fp	10.4		36.0		11.0		36.0	
Err. cordale di divisione Fpz/8	5.8				4.6			

Centricità Fr (Ø-sfera = 3.5mm)

⊙ : 5.9µm



Err. di concentricità Fr	7.4	28.0	
Variaz. spessore dente Rs			

Docum.archiviato elettronicamente. Archiviazione cartacea non necessaria



KLINGELBERG

REPORT 18/080

Date: 16/05/2018
 Author: V.BUONAROTA

Reason for analysis: PPAP
Motivo dell'indagine:

Requester: WLQ - M. Vicenti
Richiedente:

Part Name: SG4
Nome particolare:
Material: GCG_805000 Part 2
Materiale:
State of part: Finito
Stato del particolare:

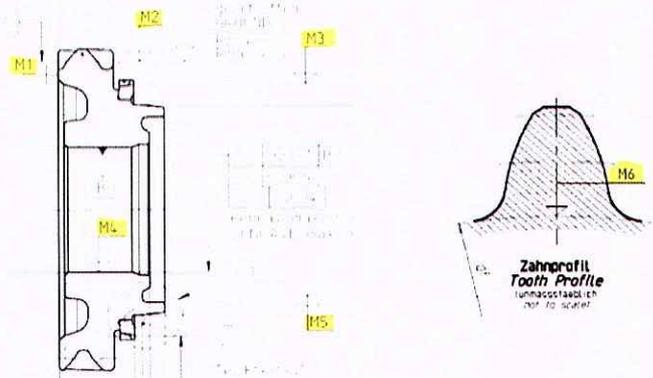
P/N: 251.1.1249.50
S/N: -
Customer: -
Cliente:

Result: OK
Risultato:

Distribution list: WLQ - M. Vicenti
Lista di distribuzione:

Notes: Gearset 32C
Note:

Drawing (disegno)



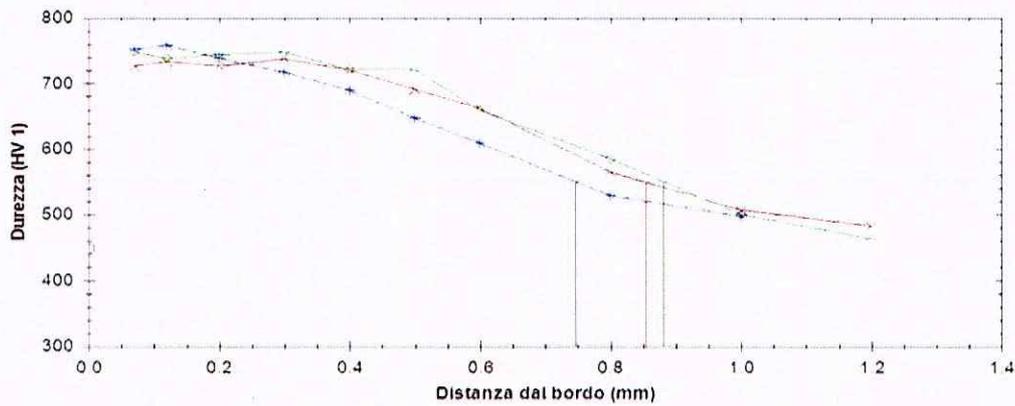
Picture 1: posizioni di misura a disegno.

Surface hardness verification (verifica durezza superficiale)

Component	Scale	Position	Measured Value	Range
Gear	HRC	M1	61.6	-
Gear	HRA	M1	81.2	80.5 + 2.5

CHD and core hardness verification (verifica CHD e durezza a cuore)

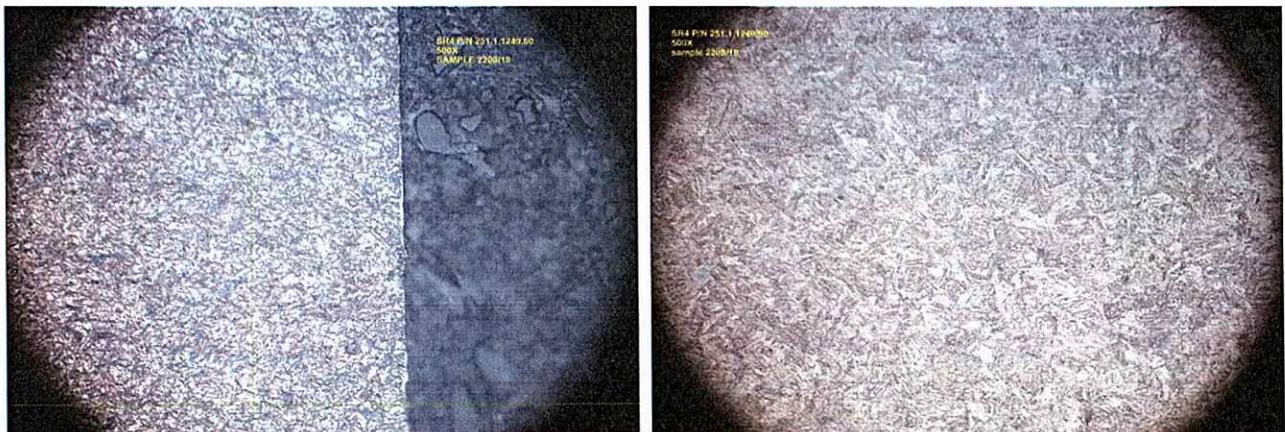
Component	Scale	Sample #	Position	Measured Value	Range
Gear	CHD 550 HV1	2208/18	M2 (tooth flank)	0,84 mm	0.5+0.4 mm
Gear	CHD 550 HV1	2208/18	M4 (Bore)	0,74 mm	min 0.3 mm
Gear	CHD 550 HV1	2208/18	M5	0,85 mm	min 0.4 mm
Gear	CHD 550 HV1	2208/18	M3	0,88 mm	min 0,5mm
Gear	Core hardness HV1	2208/18	M6 (tooth core)	449	≥ 300



Picture 2: profili di durezza.

Microstructure analysis (analisi della microstruttura)

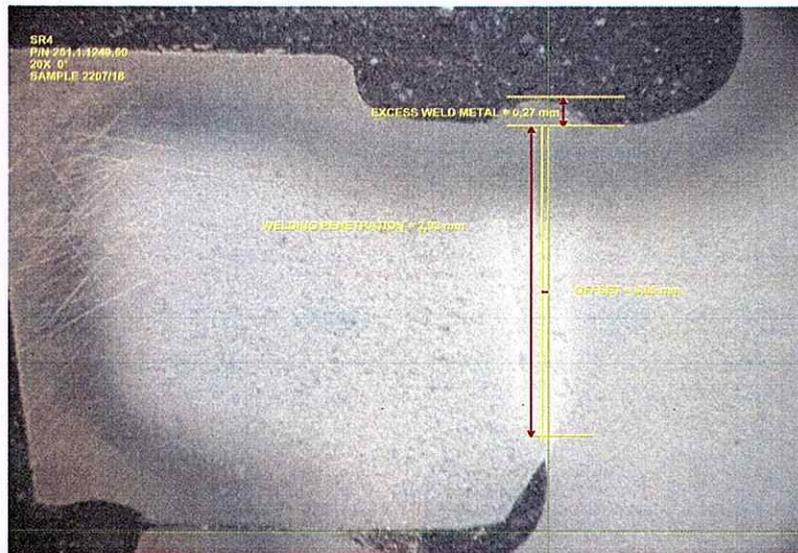
Sample #	2208/18
Shaft - Tooth flank surface structure:	Martensite e austenite residua (5-10%)
Shaft - Tooth base core structure:	Martensite, bainite



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

Analysis at Stereomicroscope (Analisi allo Stereomicroscopio)

Feature	Unit	Sample #	Measured Value	Range
Radial offset	mm	2207/18	0.05	max 0.1
Penetration	mm	2207/18	2.93	min 2.5
Excess weld metal	mm	2207/18	0.27	max 0.5



Picture 4: sezione 0° e 180°. Saldatura OK

REPORT 18/080

Date: 16/05/2018
Author: V.BUONAROTA

Analisi di similitudine Ppk

Formular Nr:
Datum:
Status: Entwurf
Formular Eigner / Fachbereich:
Prozess-/VA-verweis:

Macchina da confrontare: SLW11009
Capability da confrontare Nr.: 22/02/2017

Data: 18/05/2018
Owner: G.Sette
Abt.: WLQ1

Codice Pezzo di riferimento: 251.1.1088.50

Partnumber in esame: 251.1.1250.50

Esito Correlazione: **Il processo è paragonabile
capacità di processo confermata**

	Si	No	
Il grezzo è uguale?	X		Stesso grezzo
Stesso processo di TT?	X		Stesso processo di trattamento termico
Stesso clamping system?	X		Stesso sistema di serraggio
Gli uomini sono gli stessi?	X		Stessi uomini
Il metodo è uguale?	X		Stesso metodo applicato
MSA eseguita e ok?	X		MSA eseguita e ok
Condizioni ambientali ok?	X		Condizioni ambientali adeguate

Deviazione Std. Ammessa: ± 25 %

Componente di riferimento					Componente in esame						
DIMENSIONEN					DIMENSIONEN						
Merkmal	Einheit	Nominale		Deviazione ammessa in %	Nominale		Deviazione %	i.O./n.i.O.			
numero denti Z	---	39			37			i.O.			
diam.primitivo - Ø	mm	94.384			93.37			i.O.			
Altezza dentatura	mm	7.325			6.95			i.O.			
diam.testa - Ø (da)	mm	107.70			108.20			i.O.			

Studio delle specifiche					Studio delle specifiche						
Merkmal	Einheit	Nominale	Toleranz T ₁	P _p	P _{pk} (solo per caratteristiche unilaterali)	Nominale	Toleranz T ₂	Taregt (1,00/1,33/1,67)	i.O./n.i.O.	Min. P _p	Min. P _{pk}
Mdk - Ø	mm	102.5065	0.085	2.33		103.762	0.070	1.67	i.O	1.92	
Fr (Eccentricità)	µm	0	28	1.67		0	28	1.67	i.O	1.67	
	µm								---		
	µm								---		
	µm								---		
	µm								---		
	µm								---		
...									---		

