



3M659

Part Name: Output Shaft 1 Cust. Part No.: 251.6.1296.35
 Shown on Drawing No.: 251.6.1296.35 Org. Part No.: 251.6.1296.35
 Engineering Change Level: 3 Index "b" (C008074CP2) Dated: 26/09/2017
 Additional Engineering Changes: na Dated: na
 Safety and/or Government Regulation: Yes No Purchase Order No.: _____ Weight (kg): 1.851
 Checking Aid No.: na Checking Aid Engineering Change Level: na Dated: na

ORGANIZATION MANUFACTURING INFORMATION

CUSTOMER SUBMITTAL INFORMATION

Getrag S.p.A.
 Organization Name & Supplier / Supplier Code
Via dei Ciclamini, 4
 Street Address
Mòdugno (Ba) Puglia 70026 Italy
 City Region Postal Code Country

Bari assembly line (GPS4)
 Customer Name / Division
na
 Buyer / Buyer Code
DCT300
 Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? Yes No n/a
 Submitted by IMDS or other customer format: _____
 (IMDS=International Material Data System)
 Are polymeric parts identified with appropriate ISO marking codes? Yes No n/a

REASON FOR SUBMISSION (Check at least one)

Initial Submission Change to Optional Construction or Material
 Engineering Change(s), Supplier or Material Source Change
 Tooling: Transfer, Replacement, Refurbishment, or additional Change in Part Processing
 Correction of Discrepancy Parts Produced at Other or Additional Location
 Tooling Inactive > than 1 year Other - please specify below (e.g. additional specific customer requirement or e.g. change of EP parts)

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 na

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 163 / 8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from the declaration below.

EXPLANATION / COMMENTS: - First PPAP Submission (only differences from variant 251.6.1076.35)

- groove S and W design change (including EP part design)
- shot peening standard change
- Identification grooves in according with change C006077

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

Organization Authorized Signature: _____ Date: 23/03/2018
 Print Name: Tursi Dario Maria Phone No.: +39 0805858360 Fax No.: _____
 Title: 7DCT300 Launch Manager E-Mail: dario.tursi@magna.com

FOR CUSTOMER USE ONLY (If applicable)

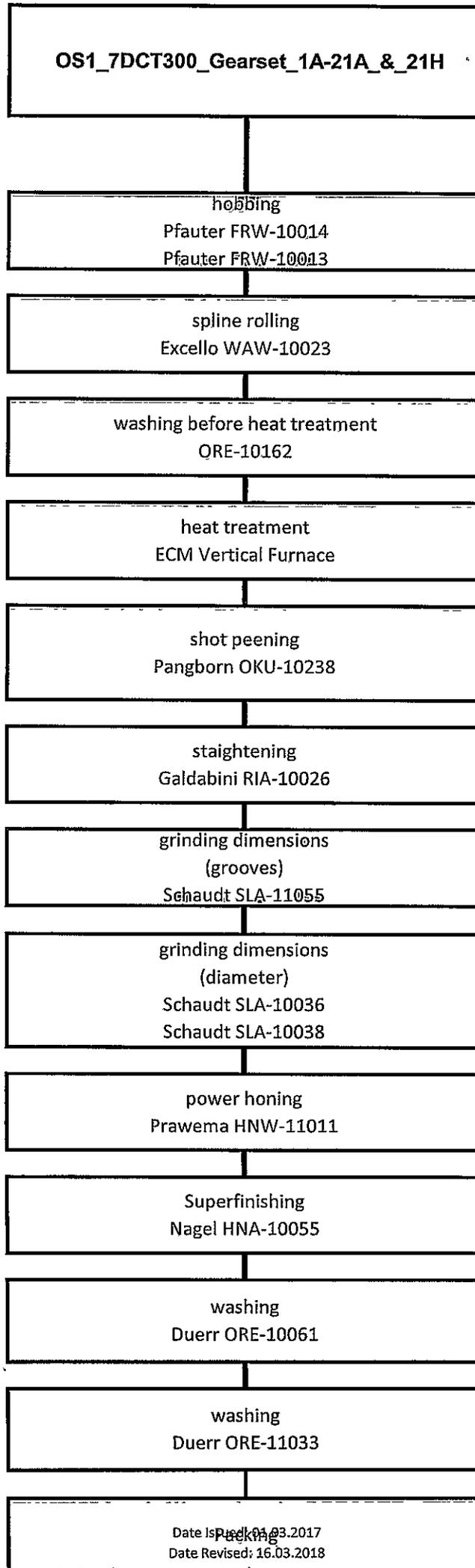
Part Warrant Disposition: Approved Rejected Other _____
 Customer Signature: _____ Date: 23/03/18
 Print Name: _____ Customer Tracking No.: _____

New P/N introduction - 1296.35

Short description: Initial PPAP (only differences from 1076)

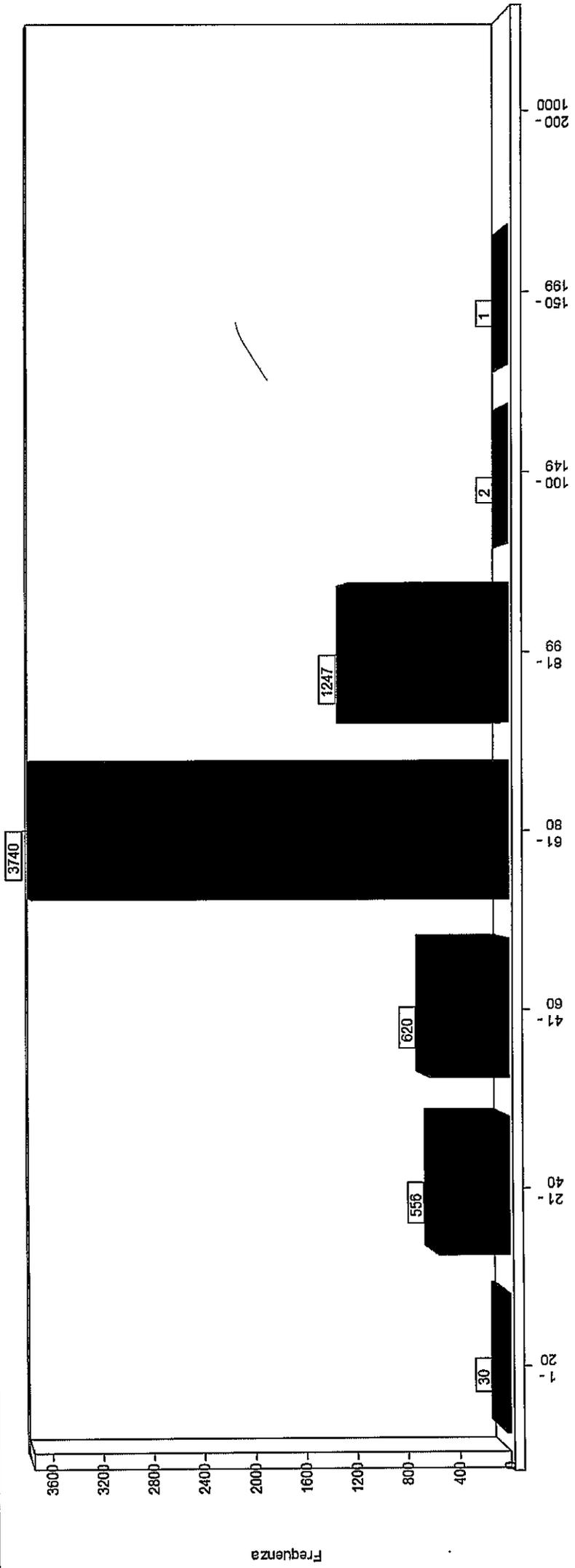
PPAP Requirements		Required	Note	PPAP Docs updated
1	Design Records	Yes	Final Drawing + G.D. + VBZ	Yes
2	Authorized Engineering change documents	Yes	see dwg	Yes
3	Customer Engineering approval	n.a.		
4	DFMEA	NO		
5	Process flow diagram(s)	Yes		Yes
6	PFMEA	Yes		Yes
7	Control plan	Yes		Yes
8	Measurement system analysis studies	Yes	Studio Tipo 1 per MdK	Yes
9	Dimensional results	Yes		Yes
10	Records of Material / Performance test results	Yes	LAB + Pallinatura + Pulizia	Yes
11	Initial process studies	Yes	Ppk for MdK and Fr	Yes
12	Qualified laboratory documentation	NO		
13	Appearance Approval Report (A.A.R.)	n.a.		
14	Sample Production Parts	Yes		Yes
15	Master sample	Yes		Yes
16	Checking aids	n.a.		
17	Customer-Specific Requirements	NO		
18	Part Submission Warrant (PSW)	Yes		Yes
Other requirements				
1	PSW Raw part	NO		
2	PSW E.P. part	Yes		Yes
3	PSW Engagement Rings	NO		

23/03/2018



DCT300 – GEARSSET: PFMEA RPN Status

■■■ GETRAG		FMEA Processo		Numero: Pagina:	1.2.1.1.1.1
Tipo/Modello/Produzione/Lotto: 7DCT300		Numero Disegno: Gearset 1A + 21A + 21H Stato modifica: _		Emesso:	31/08/2015
FMEA/Elemento: GEARSSET 7DCT300		Codice dell'operazione: Tutte Stato modifica: _		Emesso: Modificato:	13/01/2017 06/03/2018
		Responsabile: Getrag Ditta: Getrag			
		Responsabile: Pepagna, Oscuro, Nitti, Cicirelli, Tanzi T., Terlizese, Landriscina, Guerra, Sinibaldi, Caponio, Vicenti, Pigeemo, Pierro Ditta:			



Record Owner: Vicenti D.	Date Issued: 06.03.2017	GIS1 Item Number: 28.04	Page: 1 / 2
Dept.: WLP	Date Revised: 19.03.2018	GIS2 Classification: Confidential	Retention Start Date (Year): 2017

Actions ongoing – RPN > 100:

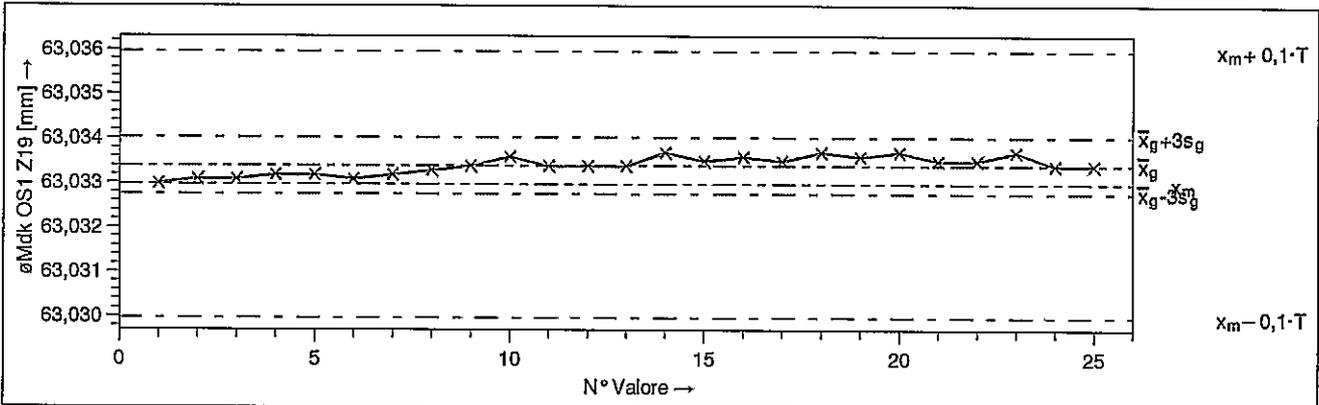
Chr. Classification	Project	Component	Operation	Chr. Description	Actual RPN			Action	Resp.	Due date	Min. RPN expected			
					S	O	D				S	O	D	
<M>	DCT300	SG1	Hard Turning	Clutch body Height	7	4	4	Final drawing tolerance review + Dogbody height review on EP (100% Check --> Sampling check)	Pierro	02-Apr-18	7	3	5	(105)
<M>	DCT300	SGRv	Hard Turning	Clutch body Height	7	4	4	New part workshop implementation on internal surface instead of toothing surface (external) Final drawing tolerance review + Dogbody height review on EP (100% Check --> Sampling check)	Papagna Pierro	02-Apr-18	7	3	5	(105)
std	DCT300	IS2	Diam. Grinding	Spine Fr	8	6	4	New operation implementation in order to ground new clamping surface for Diam. grinding operation (100% Check --> Sampling check) New machine Junker implementation for Diam. grinding operation	Cacciapaglia	20-Apr-18 31-Aug-18	8 8	3 2	5 5	(120) (80)



Capacità strumenti di misura

Pagina
1 / 1

Data/ora	16/03/2018	Nome oper.	mario.bozza	Reparto/Area/Prod.	WLQ	Posto di prova	Dentatura OS1
Calibro		Master			Caratteristica		
Desc. calibro	Calibro a forcilla	Desc. mast.	BPP	Desc. Car.	øMdk OS1 Z19		
N° calibro	MAR 402090 046	N° master	MJU 416161 004	N° Caratt.	2516129635_21H		
Ris. calibro	0,0001	Valore reale mast.	63,033	Val. Nom.	63,0330	LSS	63,0480 $\hat{=} 0,0150$
Caus. Pr.	Cg CgK	Unità di misura	mm	Unità di r	mm	LSI	63,0180 $\hat{=} -0,0150$
Nota							



i	X _i	i	X _i	i	X _i	i	X _i	i	X _i
1	63,0330	6	63,0331	11	63,0334	16	63,0336	21	63,0335
2	63,0331	7	63,0332	12	63,0334	17	63,0335	22	63,0335
3	63,0331	8	63,0333	13	63,0334	18	63,0337	23	63,0337
4	63,0332	9	63,0334	14	63,0337	19	63,0336	24	63,0334
5	63,0332	10	63,0336	15	63,0335	20	63,0337	25	63,0334

Valori a disegno		Valori Calcolati		Statistiche	
$x_m + 0,1 \cdot T$	= 63,036000	x_{maxg}	= 63,0337	$\bar{x}_g + 3s_g$	= 63,034044
x_m	= 63,033000	x_{ming}	= 63,0330	\bar{x}_g	= 63,033408
$x_m - 0,1 \cdot T$	= 63,030000	R_g	= 0,0007	$\bar{x}_g - 3s_g$	= 63,032772
$0,2 \cdot T$	= 0,006000	n_{tot}	= 25	$6s_g$	= 0,001272
T	= 0,0300			s_g	= 0,000212
Unità di misura	= mm			$ Bi $	= 0,00040800
				n_{eff}	= 25
Test per Bias				Risultati del test : significativo ($\alpha \leq 0,1\%$)	
Bias		= 1,36%			
Minimo riferimento per sistema di misura capace					
Risoluzione	%RE = 0,33%		$T_{min} (\%RE)$	= 0,00200	
$C_g = \frac{0,2 \cdot T}{4 \cdot s_g}$	= 5,09 ≤ 7,08 ≤ 9,06		$T_{min} (C_g)$	= 0,00564	
$C_{gk} = \frac{0,1 \cdot T - \bar{x}_g - x_m }{2 \cdot s_g}$	= 4,38 ≤ 6,11 ≤ 7,85		$T_{min} (C_{gk})$	= 0,00972	
Sistema di misura capace (%RE,min,C _g ,C _{gk})					
□ GETRAG MSA 2017: Capability of measuring system (Type-1 Study)					

Data _____

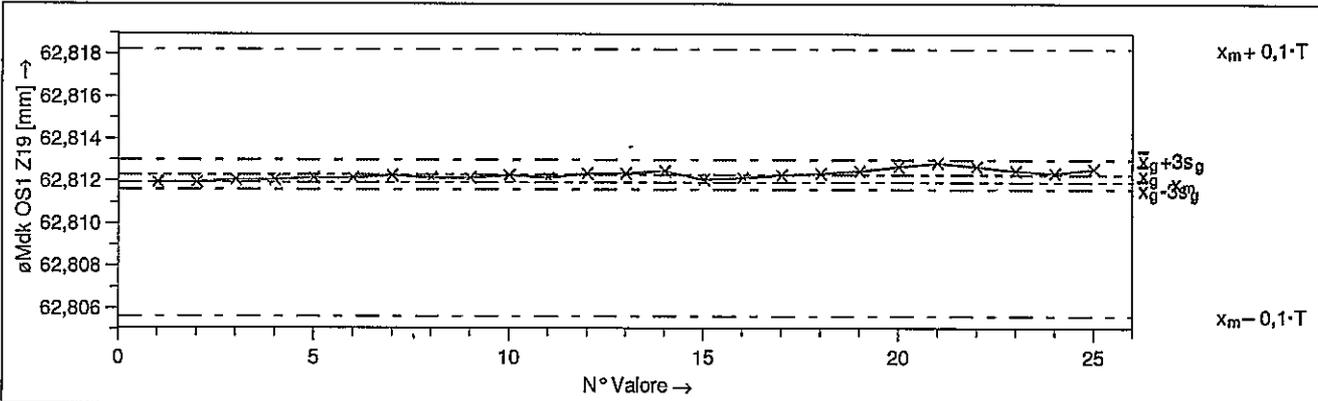
Firma _____

Dipartimento _____



Capacità strumenti di misura

Data od.	29/11/2017	Nome oper.	mario.bozza	Reparto/Area/Prod.	NN	Posto di prova	Levigatura OS1
Calibro		Master			Caratteristica		
Desc. calibro	Calibro a forcella	Desc. mast.	Serie KIT BPP		Desc. Car.	øMdk OS1 Z19	
N° calibro	MAR 402090 049	N° master	MJU 416161 004		N° Caratt.	2516129635	
Ris. calibro	0,0001	Valore reale mast.	62,812		Val. Nom.	62,8115	LSS 62,8430 $\Delta = 0,0315$
Caus. Pr.	Cg CgK	Unità di misura	mm		Unità di r	mm	LSI 62,7800 $\Delta = -0,0315$
Nota							



i	x_i	i	x_i	i	x_i	i	x_i	i	x_i
1	62,8120	6	62,8122	11	62,8122	16	62,8122	21	62,8129
2	62,8120	7	62,8123	12	62,8124	17	62,8123	22	62,8127
3	62,8121	8	62,8122	13	62,8124	18	62,8124	23	62,8125
4	62,8121	9	62,8122	14	62,8125	19	62,8125	24	62,8124
5	62,8122	10	62,8123	15	62,8121	20	62,8127	25	62,8126

Valori a disegno		Valori Calcolati		Statistiche	
x_m	= 62,812000			\bar{x}_g	= 62,812336
LSI	= 62,7800	$x_{min g}$	= 62,8120	s_g	= 0,000229
LSS	= 62,8430	$x_{max g}$	= 62,8129	$ B = \bar{x}_g - x_m $	= 0,00033600
T	= 0,0630	R_g	= 0,0009		
		n_{tot}	= 25		

Minimo riferimento per sistema di misura capace

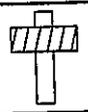
$C_g = \frac{0,2 \cdot T}{4 \cdot s_g}$	= 13,76		$T_{min}(C_g)$	= 0,00609
$C_{gk} = \frac{0,1 \cdot T - \bar{x}_g - x_m }{2 \cdot s_g}$	= 13,03		$T_{min}(C_{gk})$	= 0,00945
%RE	= 0,16%		$T_{min}(\%RE)$	= 0,00200

Sistema di misura capace (%RE, C_g , C_{gk})

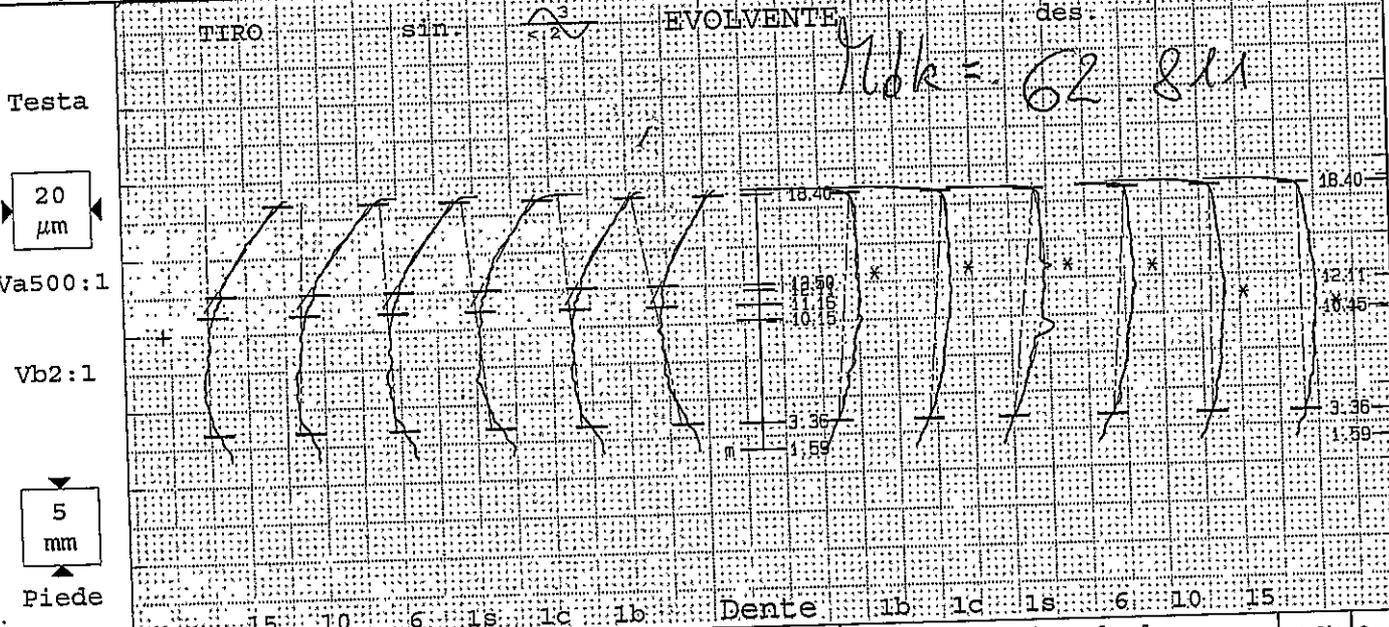


GETRAG 2014 MSA: Verfahren 1

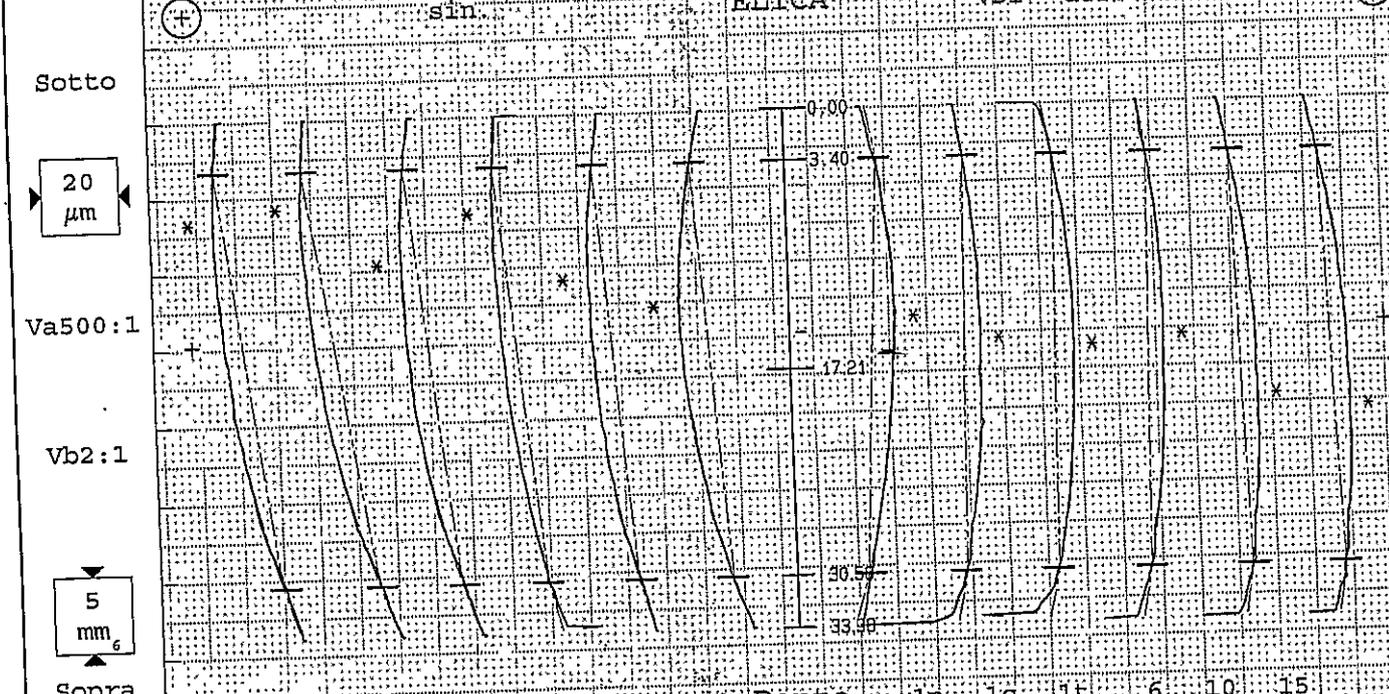
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:01
Denominazione: Output Shaft 1		Numero denti z 19	Largh.fasc.dent. b 33.98mm
Numero disegno.: D51.6.1296.35-IF		Modulo m 2.65mm	Tratto evolv. La 7.8/15.04mm
Comessa/serie nr.: 1		Angolo pressione 20°00'00"	Tratto elica LS 27.18mm
Masch.Nr.: M001	Spindel: Forme	Angolo elica -24°00'00"	Inizio elab. M1 3.36mm
Untersuchungszweck: Laufende Messung		Ø Base db 51.2009mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -22°28'14"	Fat.scor.pr. x .43



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual
		Var a 6.4									Var a 5.4								
fHcm ±6	1.2									±6	4.3	4.6	6.6	4.2	0.6	-0.8	2.2		
fHa ±12	1.2	-0.3	-2.0	2.7	6.2	4.4	11.4		±12	6.0	5.9	10.2	5.9	3.7	4.6	5.0			
Fa	4.0	3.4	3.5	4.3	6.0	4.8	7.1		4	2.3	2.2	5.0	1.4	1.8	1.6	1.8			
ffa 4	3.7	3.5	4.0	3.6	4.6	3.7	3.1		1/5	3.8	3.6	5.1	3.4	3.2	3.7	3.5			
ca																			
Ca -21/-13	-18.2	-18.1	-18.0	-18.8	-18.2	-17.8	-19.2		3	0.0	0.0	0.9	0.0	0.0	0.2	0.0			
ffaf 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0			63.766							[63.7/63.9]		
P/T-Ø [mm]	47.102	[46.9/47.3]																	



N:Z	15	10	6	1t	1c	1p	Ø Dente	1p	1c	1t	6	10	15			
fHsm 20±6	16.9															
fHs 20±13	16.9	18.7	21.9	15.5	14.5	11.4	10.4		±13	-6.5	-2.5	-1.7	-2.2	3.9	5.4	1.2
FB	5.7	4.1	4.6	6.0	4.9	8.2	9.6		4	6.8	4.2	4.0	3.3	4.5	5.3	4.3
ffb 4	1.2	1.2	1.2	1.1	0.6	1.1	0.9		4	1.0	1.4	0.6	0.9	1.1	0.8	1.1
									2/6	5.7	4.5	5.0	4.1	4.2	4.4	4.3



Ruota cilindrica Divisione



Nr. prog.: STI0416a04 0	P26 601265	Controllere: turno c	Data: 03.01.2018 18:01
Denominazione: Output Shaft 1		Numero denti z 19	Angolo pressione 20°00'00"
Numero disegno: D51.6.1296.35-IF		Modulo m 2.65mm	Angolo elicita -24°00'00"
Comessa/serie nr.: 1		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formest	Charge:	



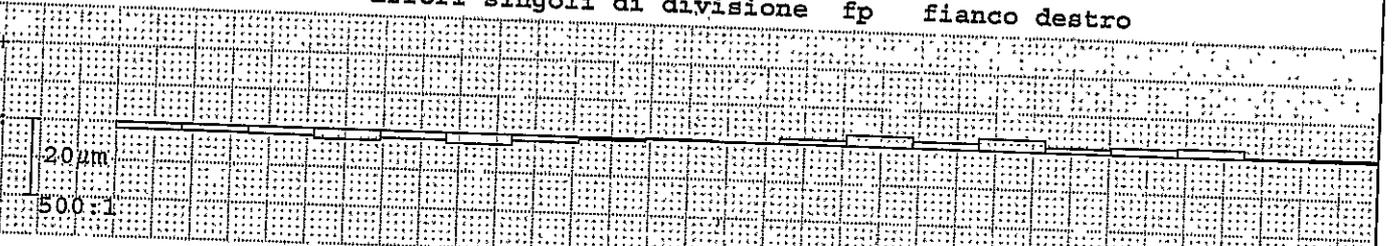
Errori singoli di divisione fp fianco sinistro



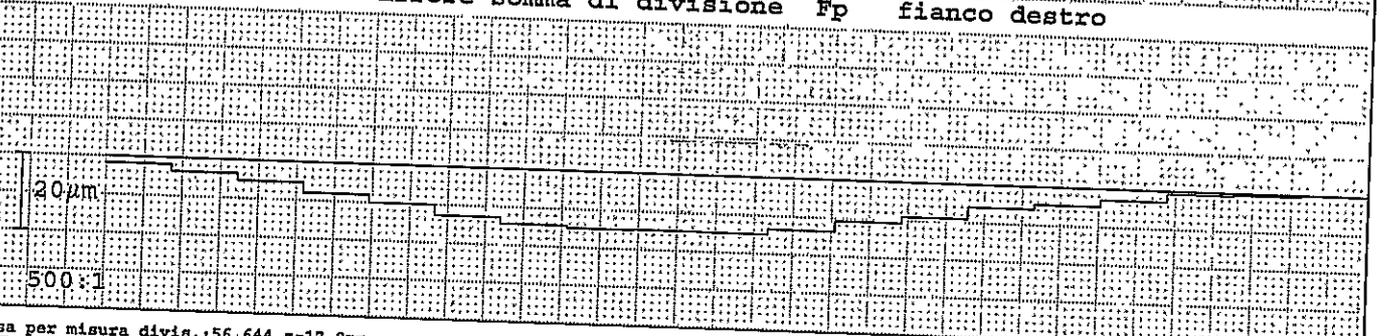
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



Errore somma di divisione Fp fianco destro

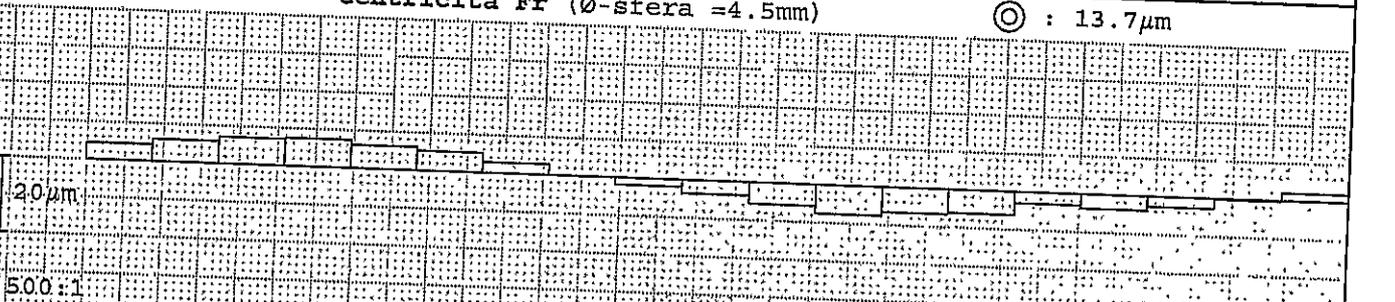


Corsa per misura divis.: 56.644 z=17.2mm

	fianco sinistro / TIRO				fianco destro			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	3.4		14.0		3.1		14.0	
Gr. salto di passo fu max	2.4		18.0		2.2		18.0	
Scarto di divisione Rp	6.7				5.9			
Err. globale di divisione Fp	15.8		50.0		15.0		50.0	
Err. cordale di divisione Fpz/8	6.4				4.8			

Centricità Fr (Ø-sfera =4.5mm)

⊙ : 13.7µm



Err. di concentricità Fr	14.9	40.0
Variaz. spessore dente Rs		

Documento elettronico

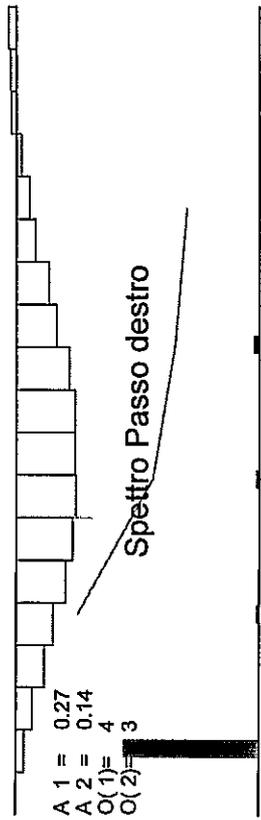
Copyright (c) Klingelberg GmbH



Numero di disegno: D51.6.1296.35-IFDenominazione: Output Shaft
 Serie nr: 1 Scopo: Laufende Messung / 18:06
 Macchina: M001 Mandrino: Formnest 1 z= 19

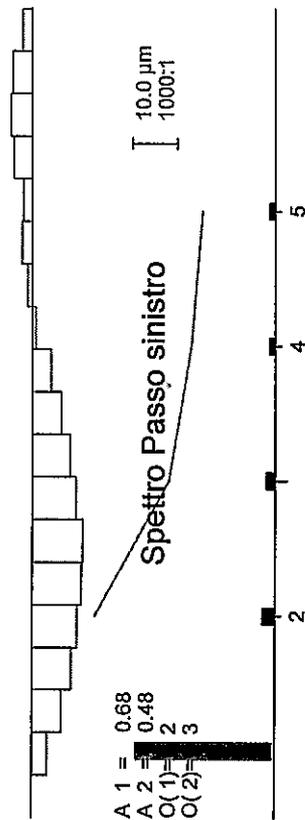


Ondulazione Passo destro



Ondulazione Passo sinistro

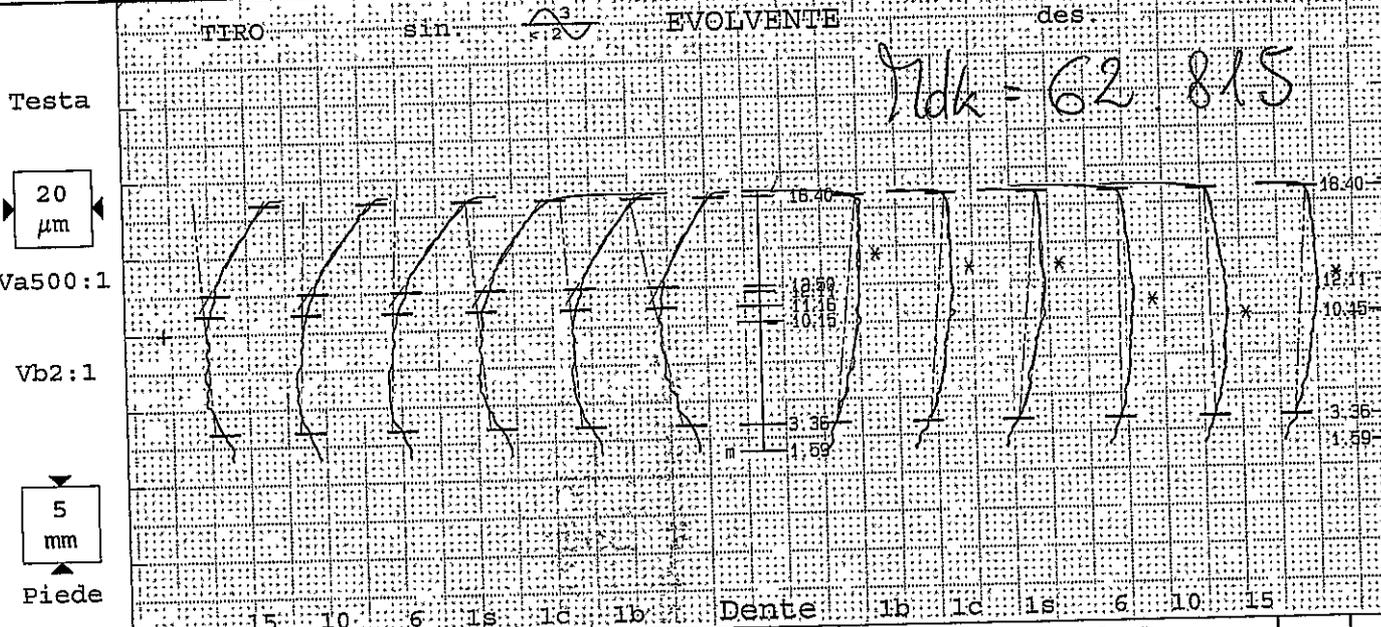
2.50 μm



Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:07
Denominazione: Output Shaft 1	Numero denti z 19	Largh.fasc.dent. b 33.98mm	
Numero disegno.: D51.6.1296.35-IF	Modulo m 2.65mm	Tratto evolv. La 7.8/15.04mm	
Commessa/serie nr.: 2	Angolo pressione 20°00'00"	Tratto elica Ls 27.18mm	
Masch.Nr.: M001	Spindel: Forme elicoidale	Inizio elab. Ml 3.36mm	
Untersuchungszweck: Laufende Messung	Ø Base db 51.2009mm	Palpatore Ø (#2) 1mm	
Werkzeug:	Charge:	Ang. Base -22°28'14"	Fat.scor.pr. x .43



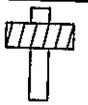
Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual
		Var a 6.6									Var a 6.6								
fH _{om} ±6	1.1	6.6							±6	6.1	4.9	5.5	0.4	-1.7	3.9	1.9			
fH _a ±12	1.1	4.3	-2.1	-2.2	5.3	4.4	12.5	±12	7.7	6.8	6.9	4.0	5.5	5.8	5.5				
F _a	3.9	4.7	3.2	3.3	5.7	4.5	7.8	4	3.0	2.3	2.0	1.9	1.5	1.6	1.8				
ff _a 4	3.7	3.9	3.7	3.9	4.5	3.4	3.8	1/5	3.2	3.5	3.9	3.3	4.1	4.1	3.8				
ca																			
Ca -21/-13	-17.9	-17.6	-17.0	-18.0	-19.8	-18.8	-19.8	3	0.4	0.0	0.0	0.0	0.0	0.6	0.1				
ff _{af} 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		63.765							[63.7/63.9]			
P/T-Ø [mm]	47.101	[46.9/47.3]																	



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual
		Var B 10.0									Var B 9.6								
fH _{Bm} 20±6	17.1	10.0							±6	FV 1.7	4.1	6.2	-1.7	1.3					
fH _B 20±13	17.1	12.1	20.8	22.1	19.5	13.5	11.4	±13	-4.6	-3.4	-3.3	4.1	6.2	-1.7	1.3				
F _B	5.9	7.5	4.0	4.7	2.6	7.4	9.7	4	5.3	4.0	4.9	4.6	6.1	5.0	4.9				
ff _B 4	1.2	1.1	1.1	1.2	0.7	1.2	0.9	2/5	1.9	1.2	1.1	0.8	0.7	2.2	1.2				



Ruota cilindrica Divisione



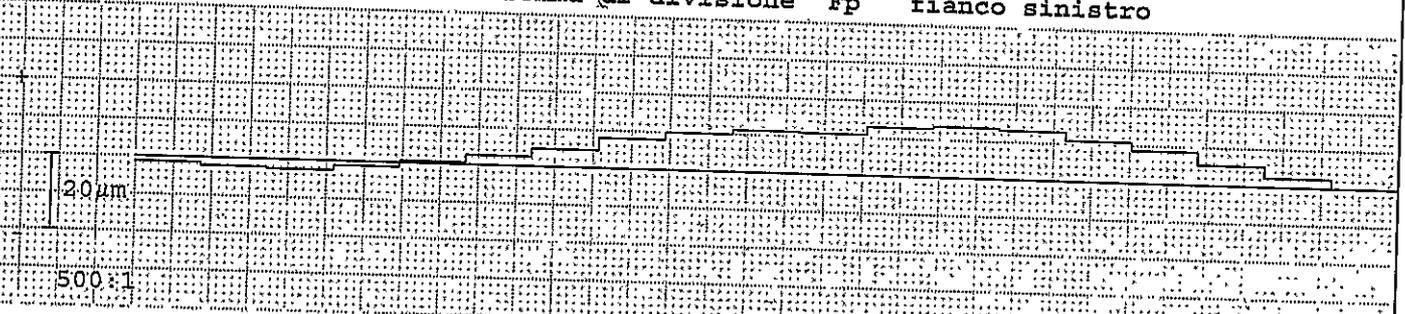
Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:07
Denominazione: Output Shaft 1	Numero denti z: 19	Angolo pressione: 20°00'00"	
Numero disegno: D51.6.1296.35-IF	Modulo m: 2.65mm	Angolo elic: -24°00'00"	
Comessa/serie nr.: 2	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001	Spindel: Formelwerkzeug:	Charge:	



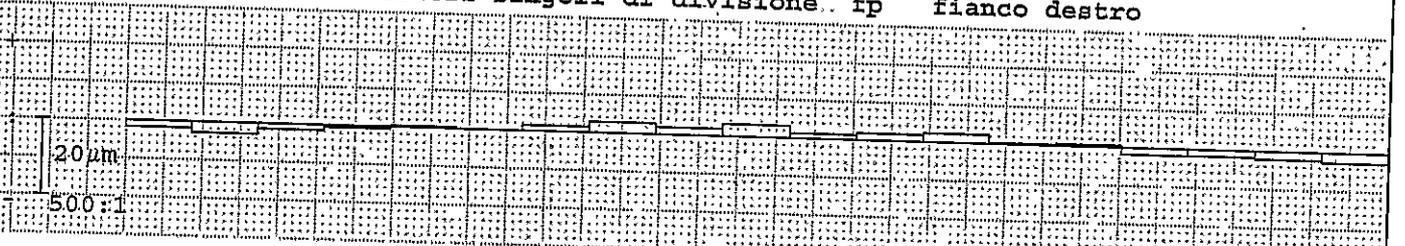
Errori singoli di divisione fp fianco sinistro



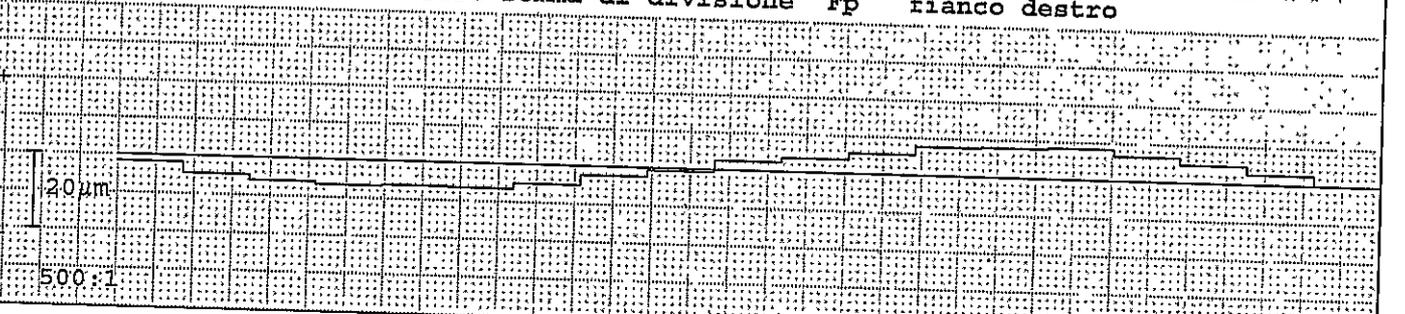
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



Errore somma di divisione Fp fianco destro

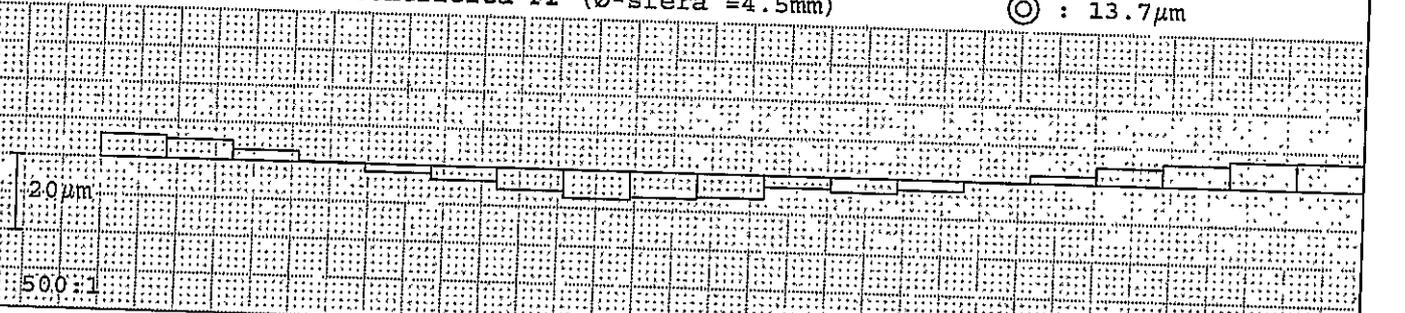


Correa per misura divis.: 56.644 z=17,2mm

		fianco sinistro / TIRO				fianco destro			
		Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	3.3		14.0		3.1		14.0	
Gr. salto di passo	fu max	2.4		18.0		2.3		18.0	
Scarto di divisione	Rp	6.6				6.0			
Err. globale di divisione	Fp	16.0		50.0		15.1		50.0	
Err. cordale di divisione	Fpz/8	6.2				4.9			

Centricità Fr (Ø-sfera =4.5mm)

⊙ : 13.7µm



Err. di concentricità	Fr	14.7	40.0
Variaz. spessore dente	Rs		

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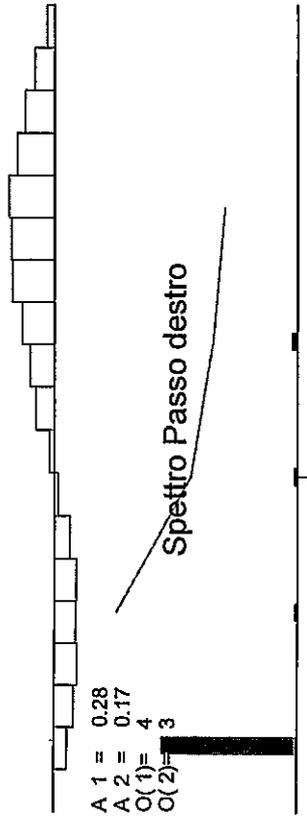
Docum archiviato elettronicamente



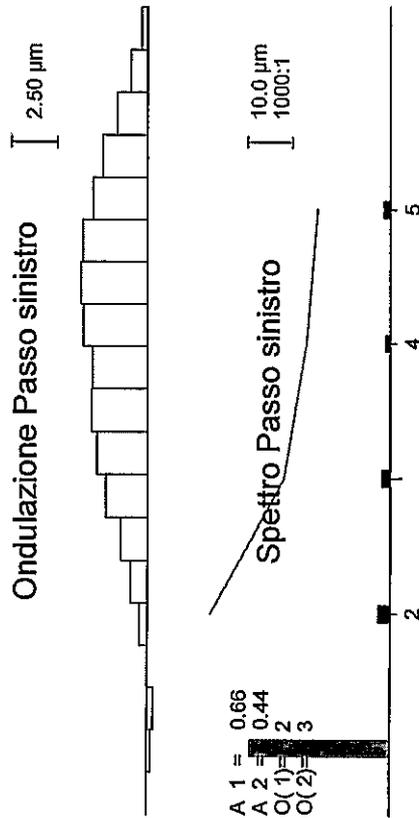
KLINGELBERG

Numero di disegno: D51.6.1296.35-IFDenominazione: Output Shaft
Serie nr: 2 Scopo: Laufende Messteil / 18:11
Macchina: M001 Mandrino: Formnest 1 z= 19

Ondulazione Passo destro

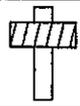


Ondulazione Passo sinistro

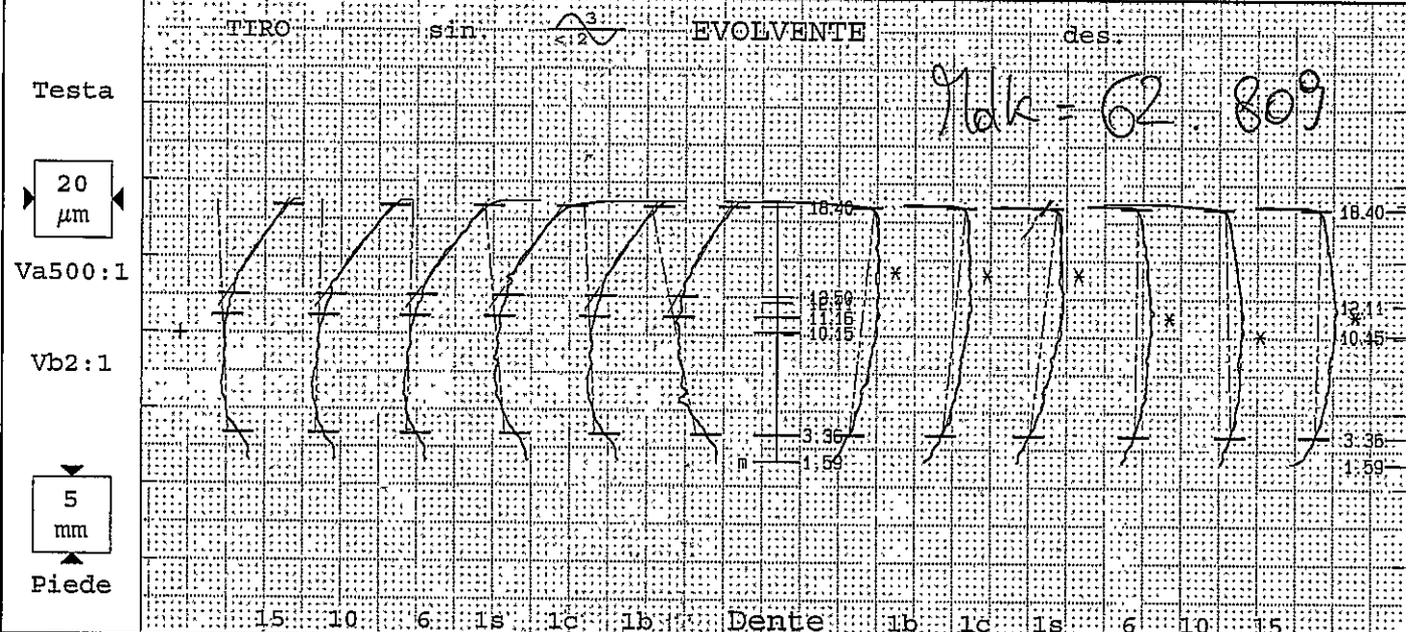


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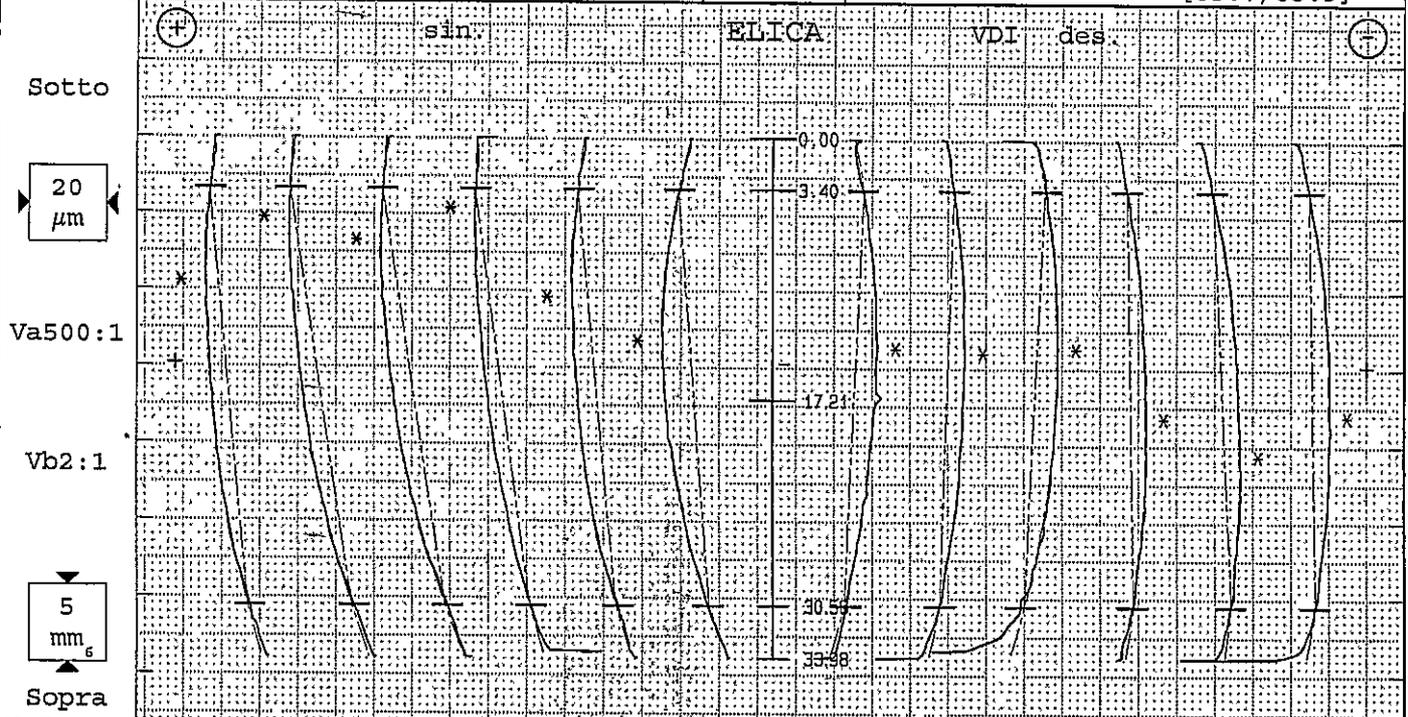
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 17:50
Denominazione: Output Shaft 1		Numero denti z 19	Largh. fasc. dent. b 33.98mm
Numero disegno.: D51.6.1296.35-IF		Modulo m 2.65mm	Tratto evolv. La 7.8/15.04mm
Comessa/serie nr.: 3		Angolo pressione 20°00'00"	Tratto elica L _S 27.18mm
Maach.Nr.: M001	Spindel: Formant.1	Angolo elica -24°00'00"	Inizio elab. M1 3.36mm
Untersuchungszweck: Laufende Messung		Ø Base db 51.2009mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -22°28'14"	Fat. scor. pr. x .43



Tolerance	Medio	Val. misur [μm]							Qual	Tolerance	Val. misur [μm]							Medio	Qual		
fHm	±6	0.6	Var a 4.4							5.4	±6	Var a 7.4							1.6		
fHa	±12	0.6	2.8	-1.6	-1.5	5.3	2.8	11.7	5.4	±12	6.4	5.9	7.1	0.6	-1.5	1.2	1.6				
Fa		3.9	4.5	3.3	3.2	5.5	4.5	7.9	5.4		7.5	7.3	8.3	4.3	5.6	4.9	5.5				
ffa	4	3.7	3.9	3.6	3.5	4.1	3.9	5.2	5.4	4	2.7	1.9	3.2	1.5	2.4	1.8	1.9				
ca									5.4	1/5	3.7	3.6	4.2	3.6	3.5	4.4	3.8				
Ca	-21/-13	-18.3	-17.7	-18.5	-18.8	-20.2	-18.3	-20.4													
ffaf	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
P/T-ø [mm]		47.094	[46.9/47.3]									63.747	[63.7/63.9]								



N:Z		15	10	6	1t	1c	1p	Ø Dente	1p	1c	1t	6	10	15				
fHSm	20±6	16.5	FV 7. Var β 8.2							±6	FV -0. Var β 10.7							1.3
fHs	20±13	16.5	12.5	20.4	20.6	17.9	12.4	10.0	±13	-6.6	-4.8	-6.9	2.0	5.9	2.0	1.3		
Fβ		5.7	7.2	3.8	4.3	3.1	7.6	10.6		7.3	5.1	8.1	3.4	6.0	3.9	4.6		
ffβ	4	1.1	1.1	1.2	1.1	0.5	1.0	0.8	4	1.9	0.7	2.1	0.9	0.7	0.7	0.8		

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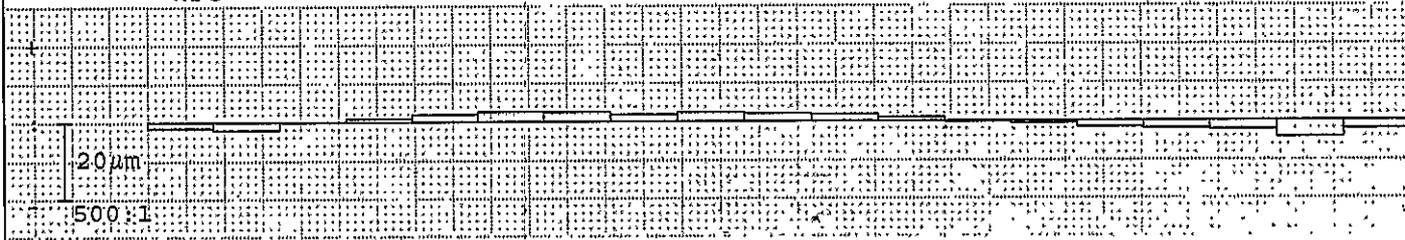
Ruota cilindrica Divisione



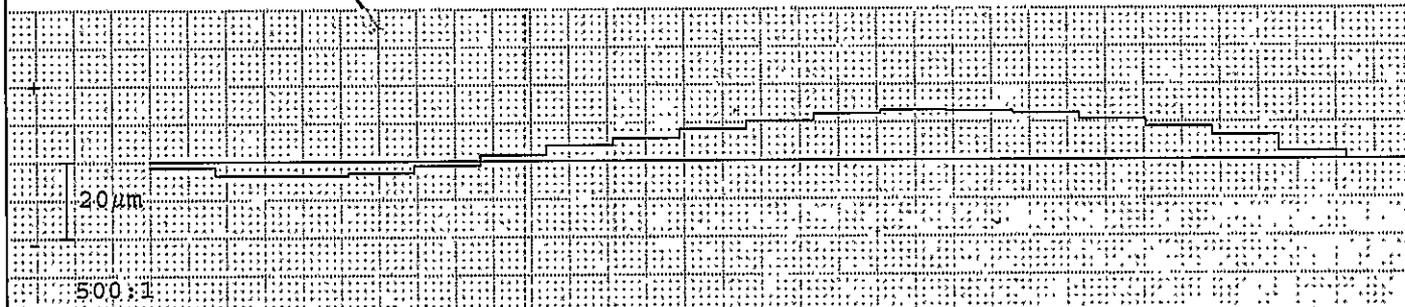
Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 17:50
Denominazione: Output Shaft 1	Numero' denti z: 19	Angolo pressione: 20°00'00"	
Numero disegno.: D51.6.1296.35-IF	Modulo m: 2.65mm	Angolo elicita: -24°00'00"	
Comessa/serie nr.: 3	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001	Spindel: FORMER	Charge:	



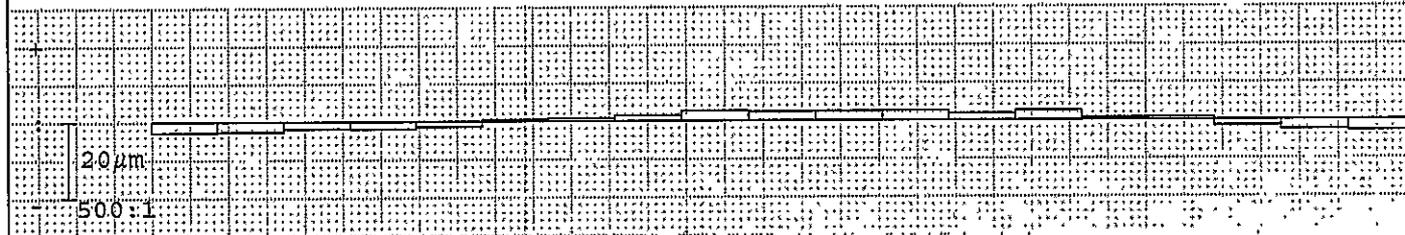
Errori singoli di divisione fp fianco sinistro



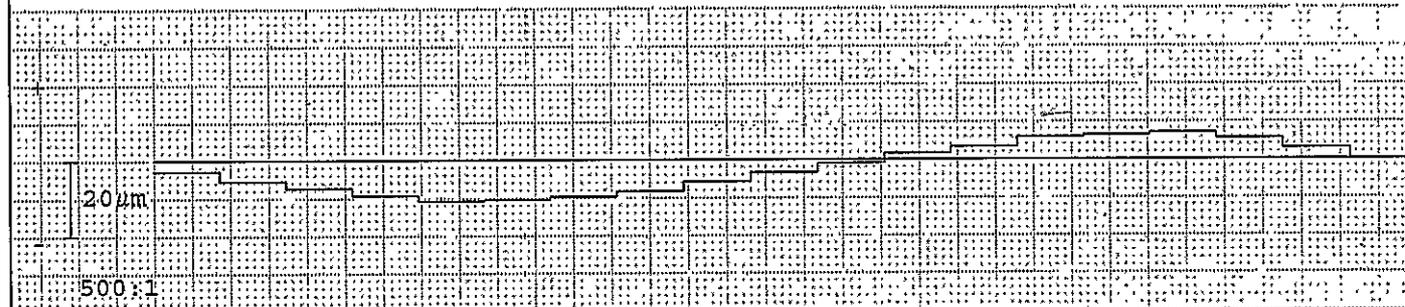
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



Errore somma di divisione Fp fianco destro

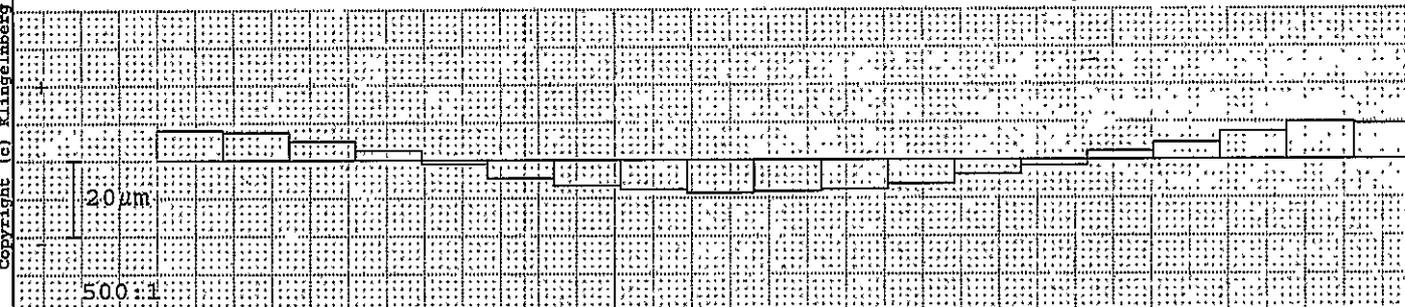


Corsa per misura divis.: 56.644 z=17.2mm

	fianco sinistro / TIRO				fianco destro			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	4.2		14.0		2.9		14.0	
Gr. salto di passo fu max	2.1		18.0		2.2		18.0	
Scarto di divisione Rp	6.9				5.5			
Err. globale di divisione Fp	16.8		50.0		17.8		50.0	
Err. cordale di divisione Fpz/θ	6.5				5.7			

Centricità Fr (Ø-sfera =4.5mm)

⊙ : 18.4 μm

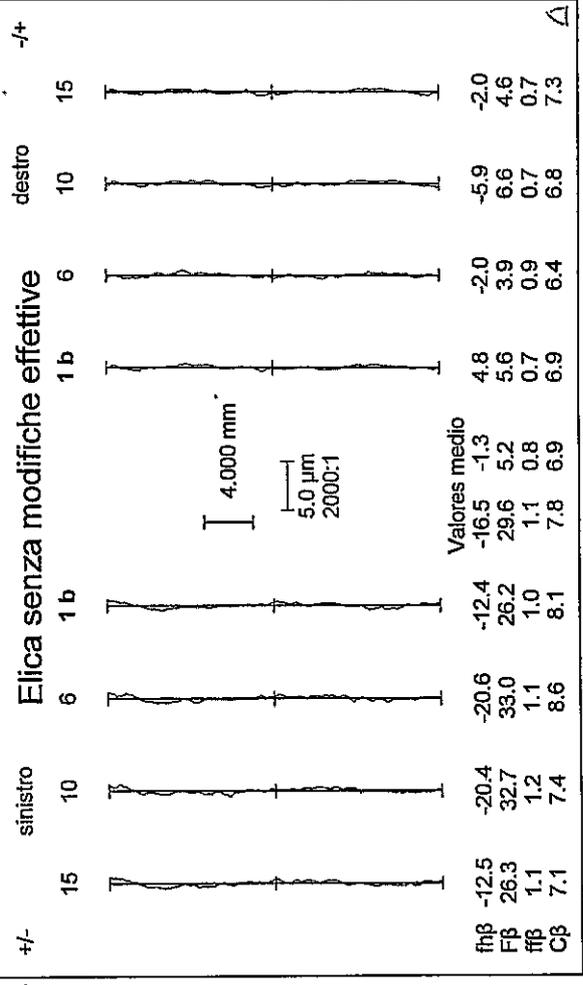
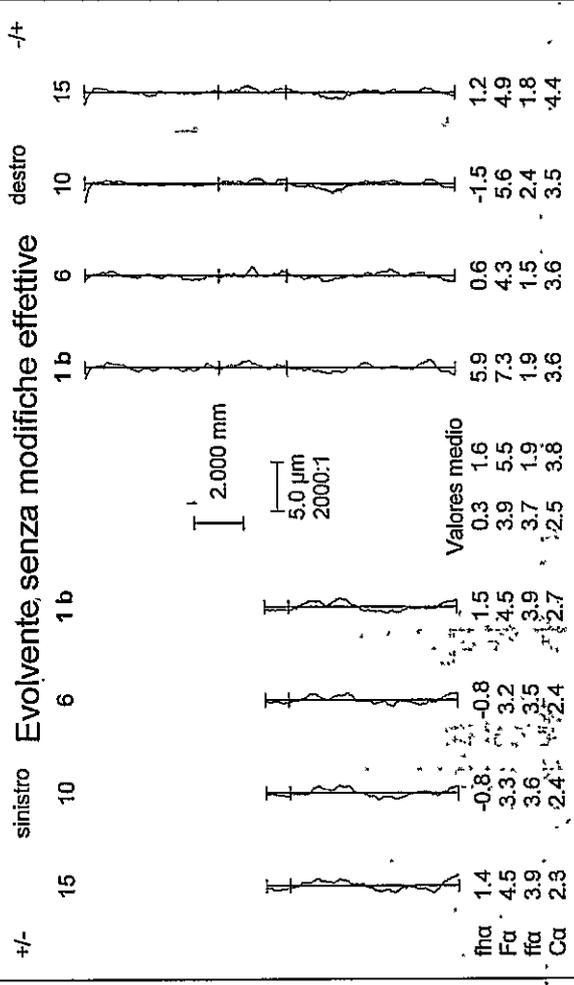


Err. di concentricità Fr	18.5	40.0	
Variaz. spessore dente Rs			

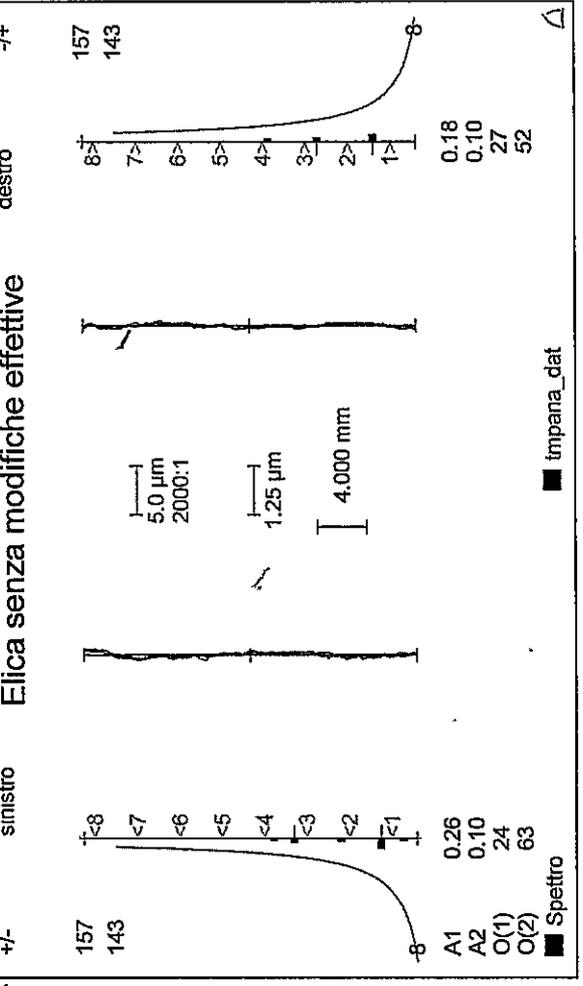
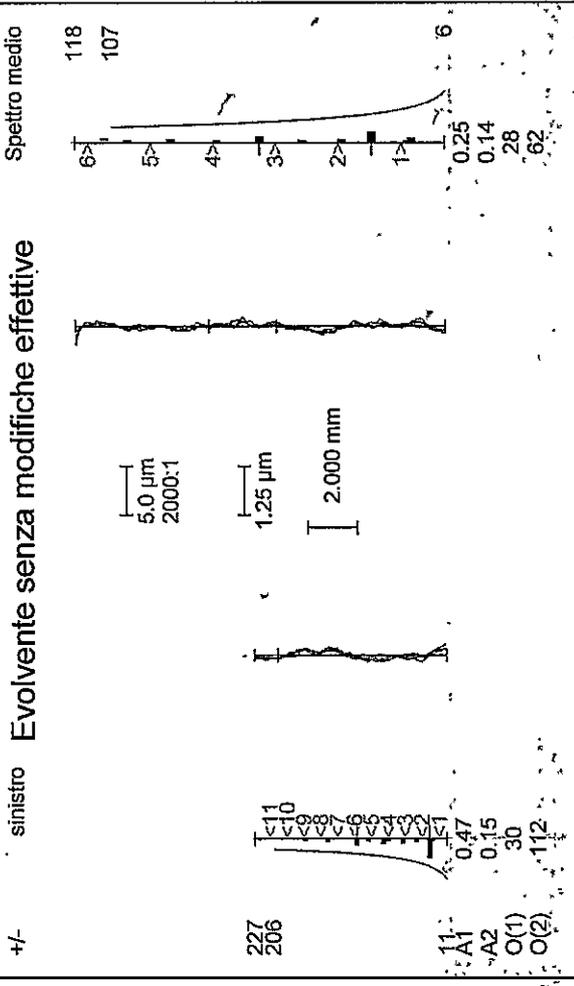
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Numero di disegno: D51.6.1296.35-IF **Denominazione:** Output Shaft 03.01.18
Serie nr: 3 **Scopo:** Laufende Messung 50 / 17:55
Macchina: M001 **Mandrino:** Formnest 1 **Z=** 19




Numero di disegno: D51.6.1296.35-IF **Denominazione:** Output Shaft 03.01.18
Serie nr: 3 **Scopo:** Laufende Messung 50 / 17:55
Macchina: M001 **Mandrino:** Formnest 1 **Z=** 19



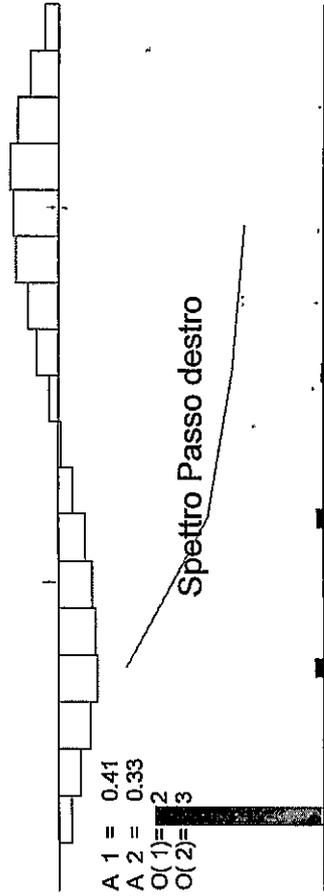
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■ Spettro

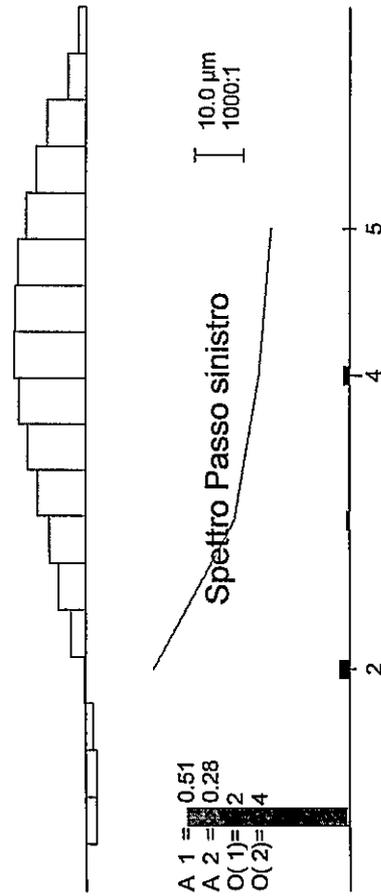


Numero di disegno: D51.6.1296.35-IF Denominazione: Output Shaft 03.01.18
Serie nr. 3 Scopo: Laufende Messung 50 / 17:55
Macchina: M001 Mandrino: Formnest 1 z= 19

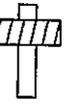
Ondulazione Passo destro



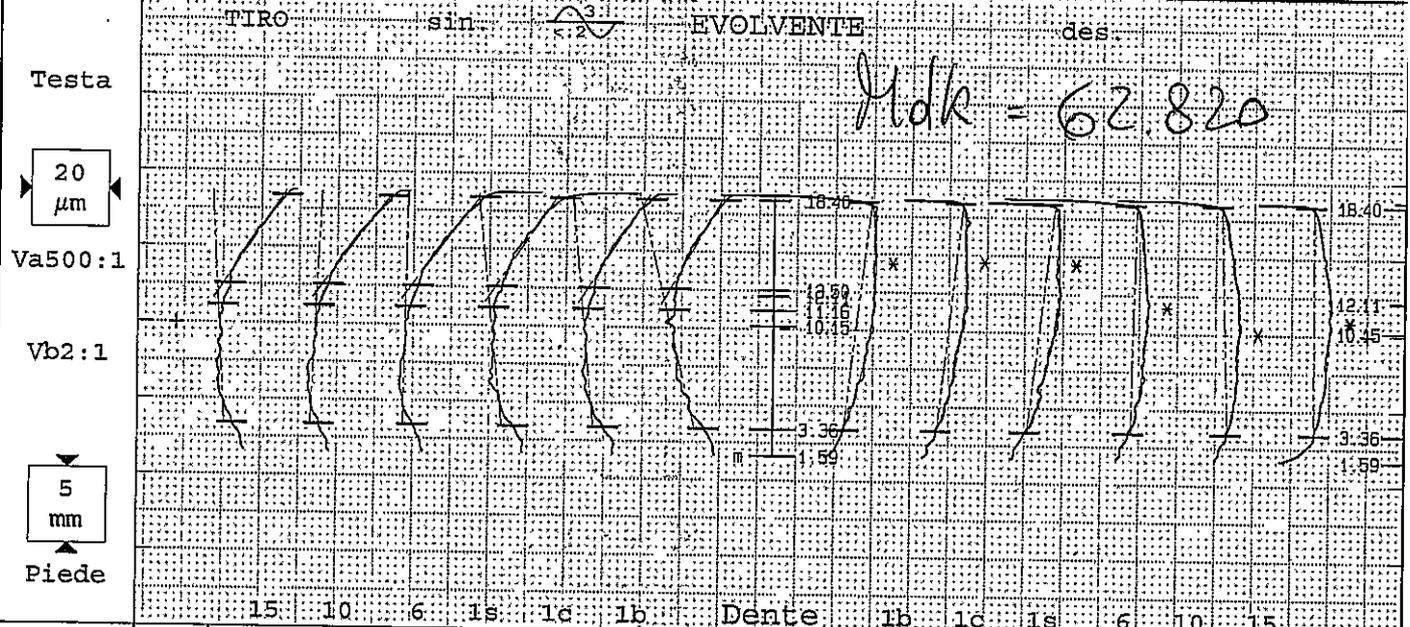
Ondulazione Passo sinistro



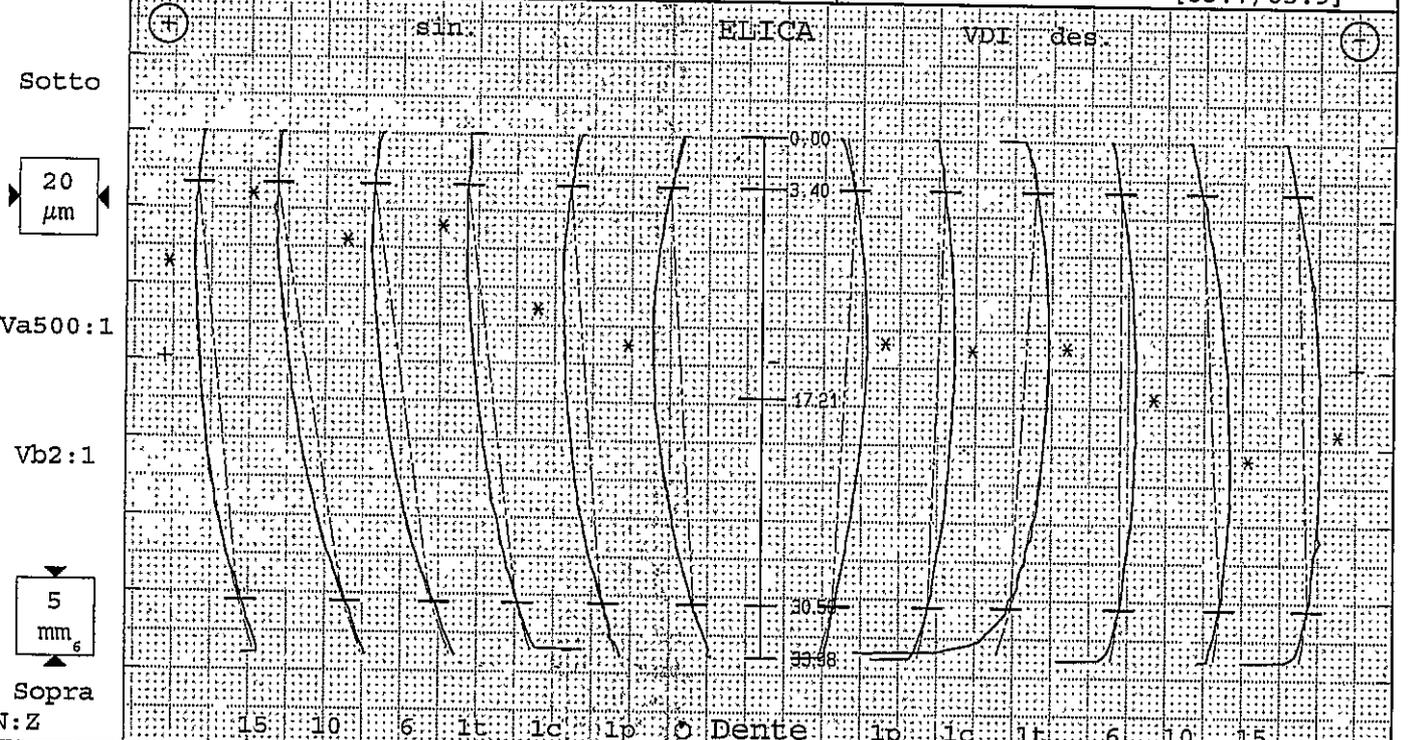
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:13
Denominazione: Output Shaft 1		Numero denti z 19	Largh.fasc.dent. b 33.98mm
Numero disegno.: D51.6.1296.35-IF		Modulo m 2.65mm	Tratto evolv. La 7.8/15.04mm
Commissa/serie nr.: 4		Angolo pressione 20°00'00"	Tratto elica LS 27.18mm
Masch.Nr.: M001	Spindel: Form	Angolo elica -24°00'00"	Inizio elab. M1 3.36mm
Untersuchungszweck: Laufende Messung		Ø Base db 51.2009mm	Palpatore Ø (#2) 1mm
Werkzeug:	Charge:	Ang. Base -22°28'14"	Fat.scor.pr. x .43



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual	
fHm ±6	1.3	Var a 8.2								±6	Var a 8.5							1.5		
fHa ±12	1.3	3.3	-2.7	-1.0	6.3	5.5	14.3		±12	7.2	6.7	7.2	1.4	-1.8	-0.2	1.5				
Fa	4.0	4.0	3.2	3.5	6.3	5.3	9.9			8.4	8.4	8.6	4.5	5.5	4.8	5.8				
ffa	4	3.7	3.2	3.8	3.7	5.1	4.0	3.9		4	3.5	2.0	3.1	2.7	1.9	1.5	2.0			
ca										1/5	3.9	3.5	3.9	3.4	3.7	4.2	3.7			
Ca -21/-13	-18.7	-18.5	-18.1	-18.9	-20.3	-19.1	-21.1													
ffaF	3	0.0	0.0	0.0	0.0	0.0	0.0			3	0.0	0.0	0.0	0.0	0.0	0.2	0.1			
P/T-Ø [mm]	47.097	[46.9/47.3]									63.748	[63.7/63.9]								



N:Z	fHm	fHs	Fa	ffa	ca	Ca	ffaF	P/T-Ø	FV	Var	β	Qual	FV	Var	β	Qual
20±6	16.5	16.5	6.1	1.3				47.097	8.0	8.0	11.8	1.3	-0.0	-0.0	11.3	1.3
20±13	16.5	13.9	7.2	1.3				46.9/47.3	-7.0	-5.0	11.3	1.3	-7.7	0.0	11.3	1.3
	6.1	7.2	4.4	3.8					6.4	5.1	11.3	1.3	9.0	2.5	11.3	1.3
	1.3	1.3	1.5	1.2					0.8	0.6	1.0	1.0	0.8	0.9	1.0	1.0

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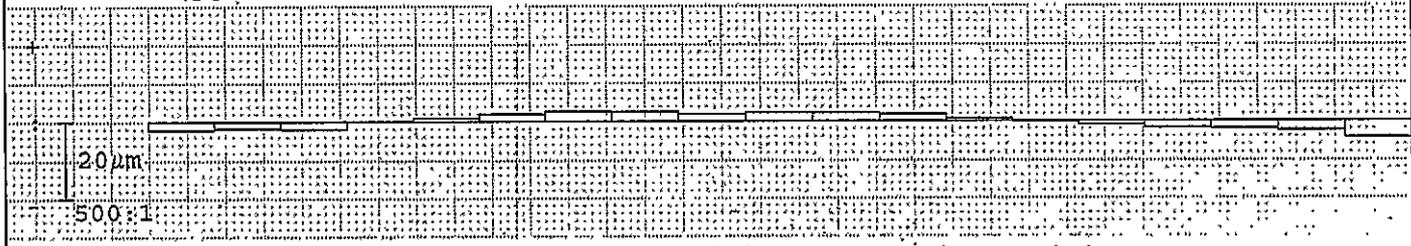
Ruota cilindrica Divisione



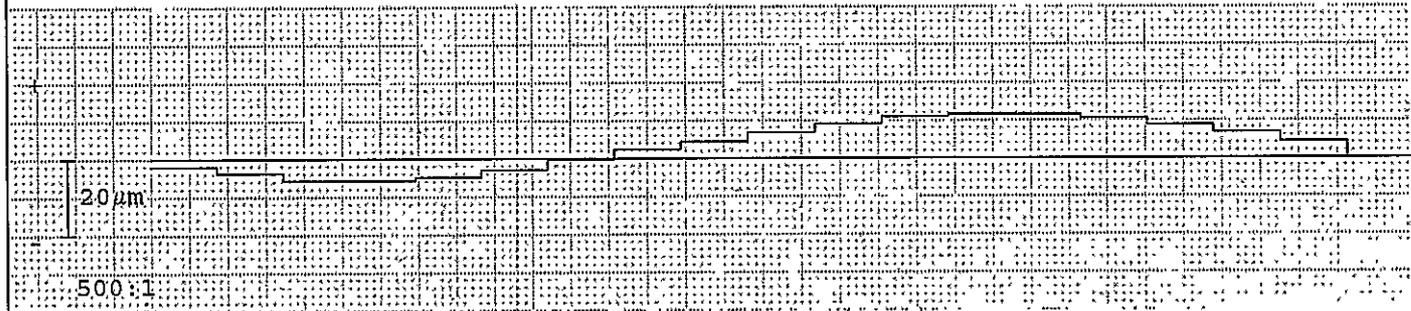
Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:13
Denominazione: Output Shaft 1		Numero denti z 19	Angolo pressione 20°00'00"
Numero disegno.: D51.6.1296.35-IF		Modulo m 2.65mm	Angolo elica -24°00'00"
Comessa/serie nr.: 4		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formel	Charge:	



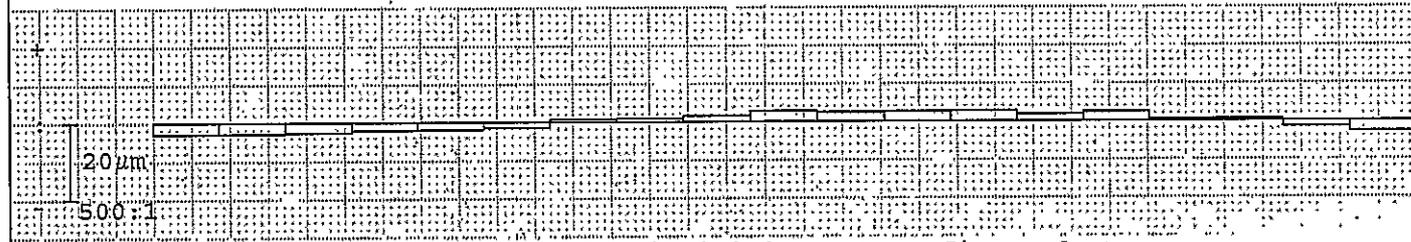
Errori singoli di divisione fp fianco sinistro



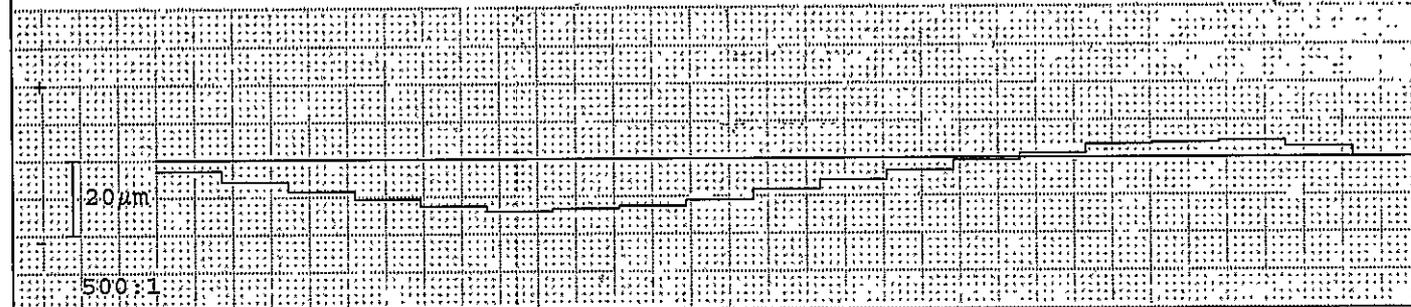
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro

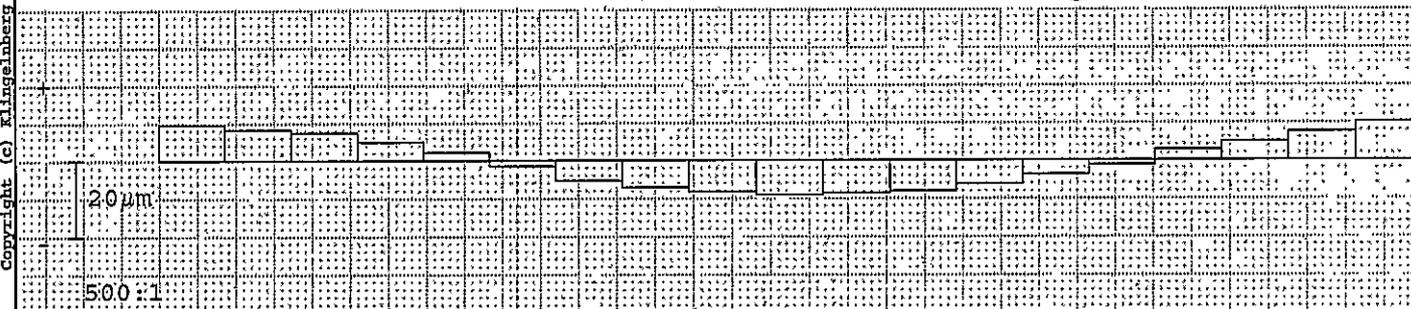


Errore somma di divisione Fp fianco destro

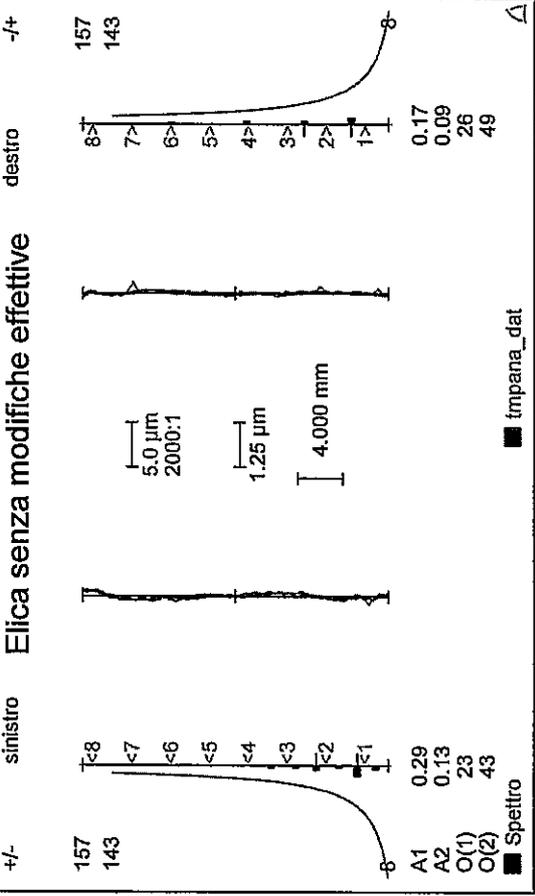
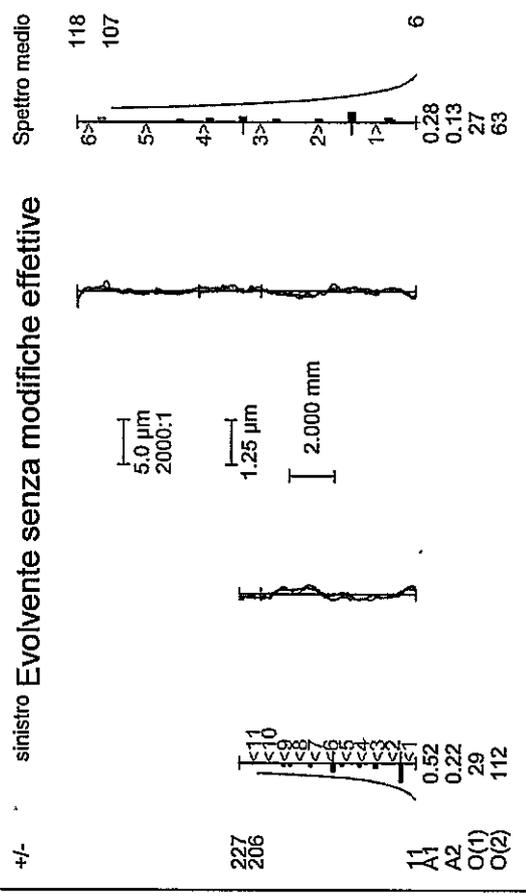
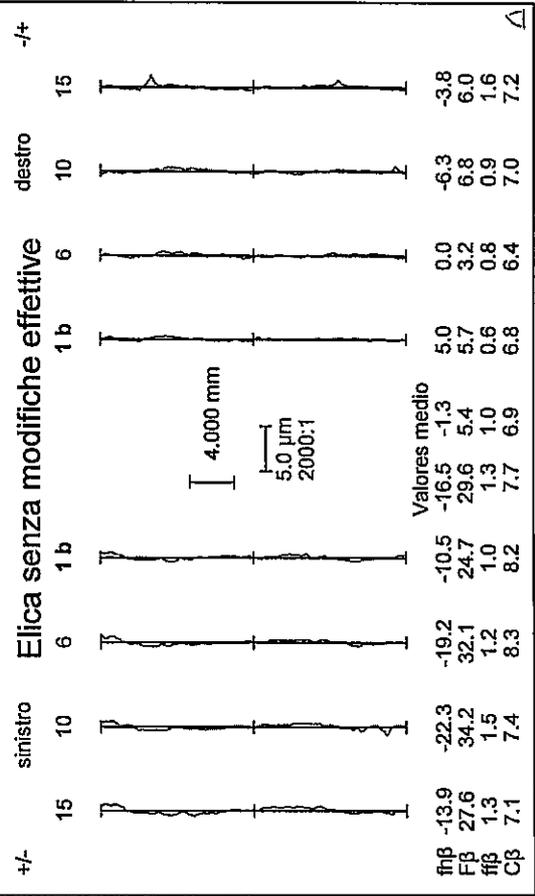
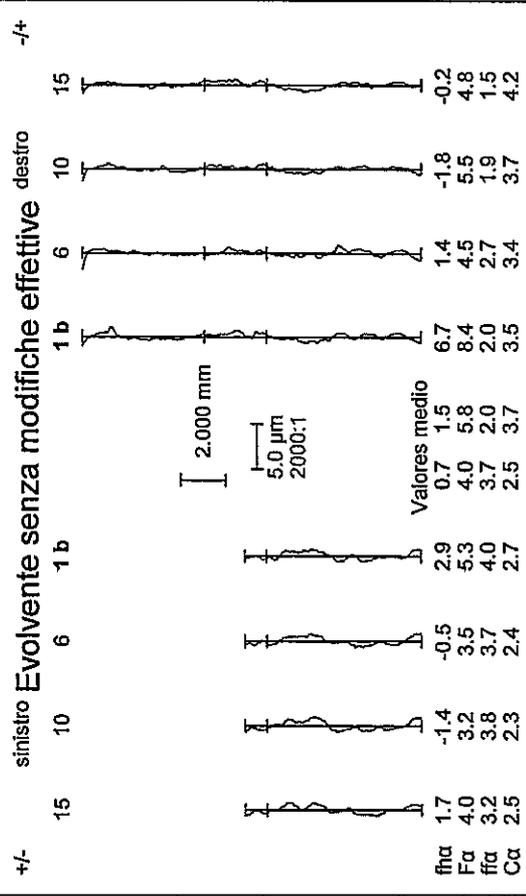


Corsa per misura divis. 156.644 z=17.2mm	fianco sinistro / TIRO				fianco destro			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	4.3		14.0		3.0		14.0	
Gr. salto di passo fu max	2.2		18.0		2.1		18.0	
Scarto di divisione Rp	7.0				5.8			
Err. globale di divisione Fp	17.3		50.0		18.4		50.0	
Err. cordale di divisione Fpz/8	6.8				5.9			

Centricità Fr (Ø-sfera =4.5mm) \odot : 19µm



Err. di concentricità Fr	19.2	40.0	
Variaz. spessore dente Rs			

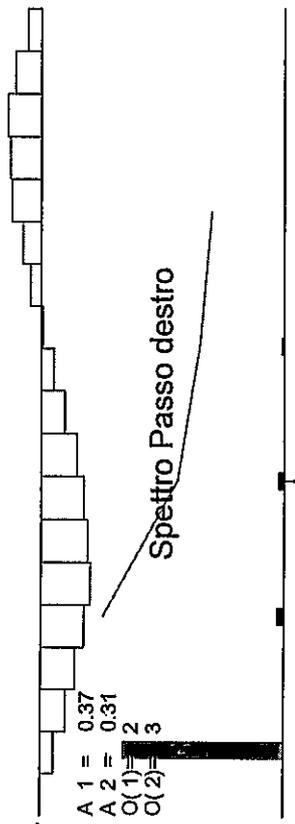




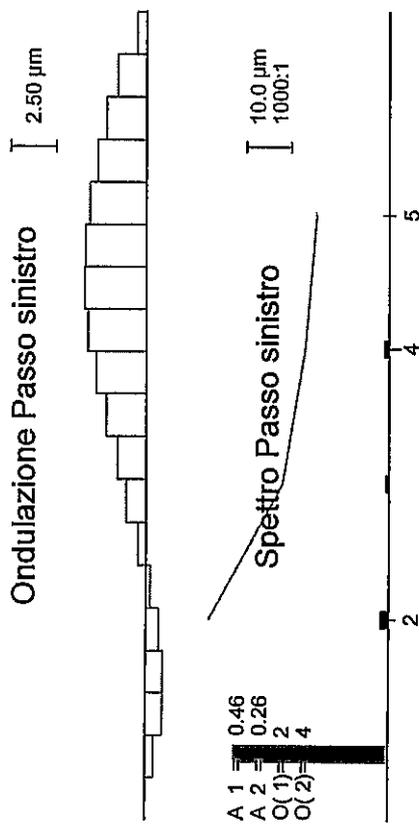
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Numero di disegno: D51.6.1296.35-1|Denominazione: Output Shaft 301.18
Serie nr: 4
Macchina: M001
Scopo: Laufende Messung / 18:18
Mandrino: Formnest 1 z= 19

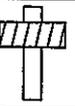
Ondulazione Passo destro



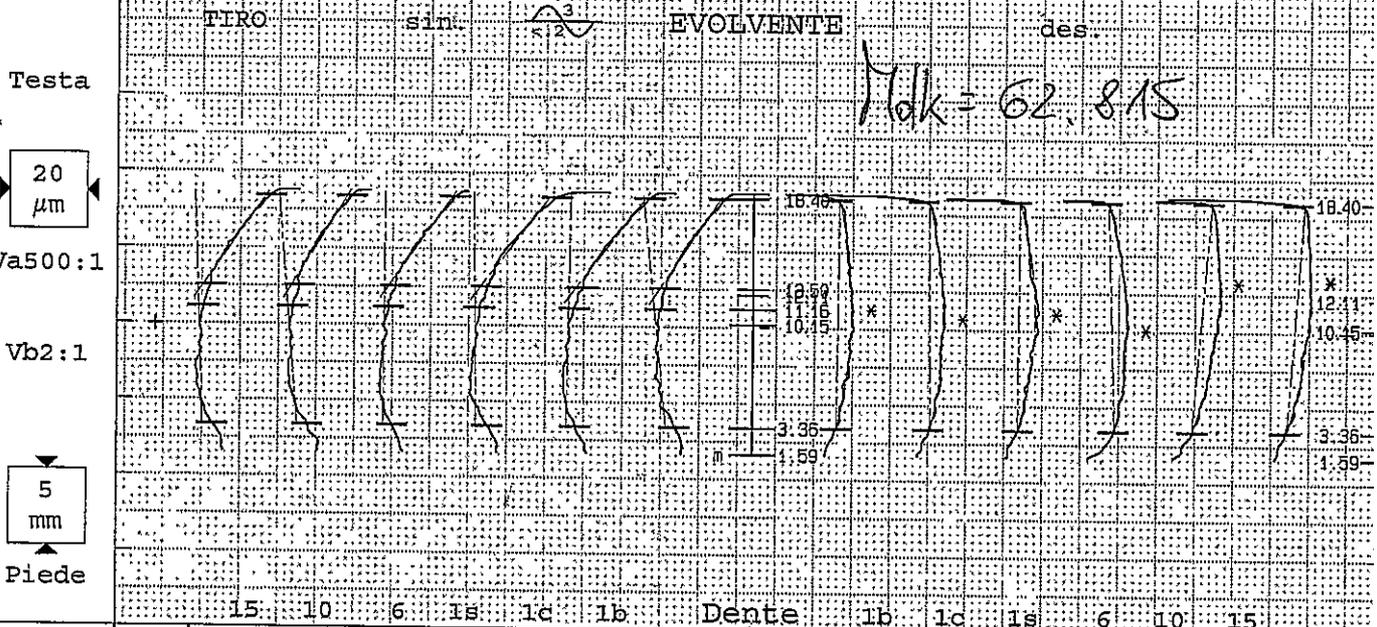
Ondulazione Passo sinistro



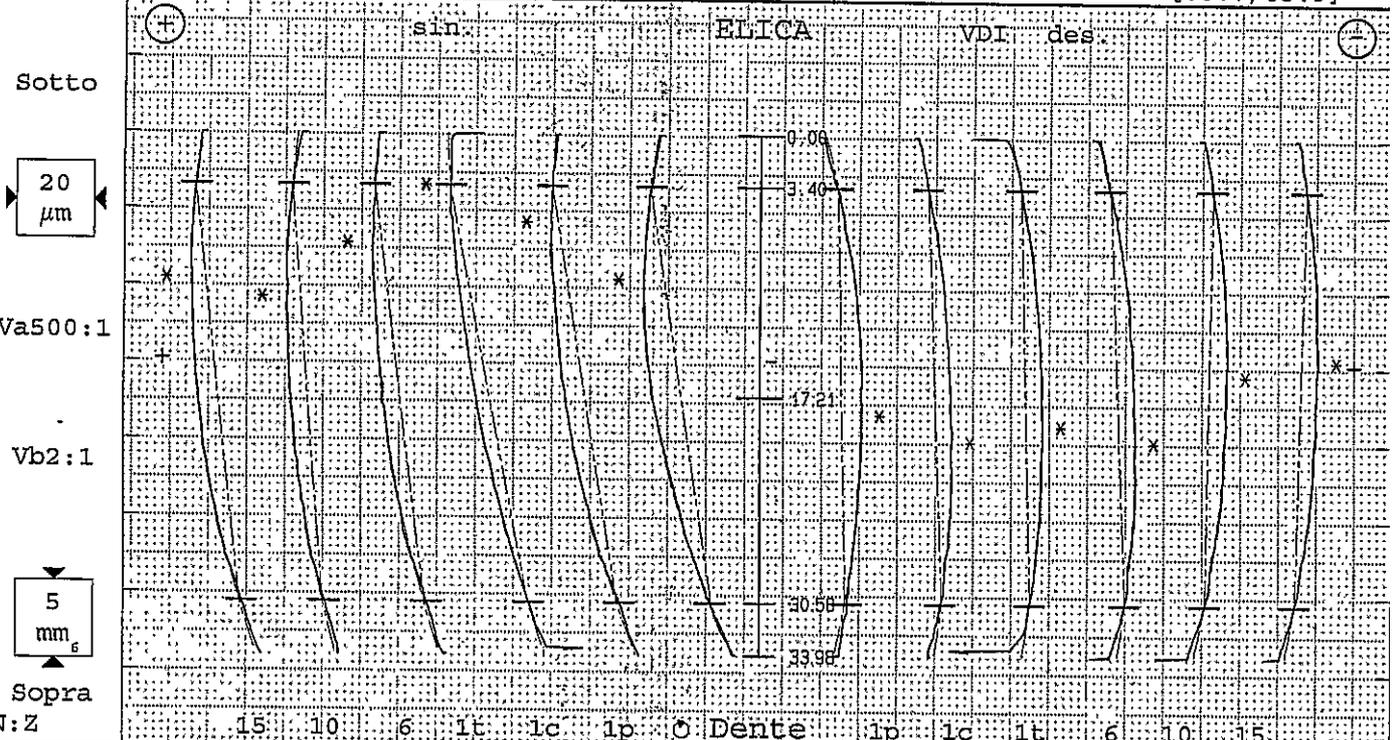
Ruota cilindrica Evolvente/Elica



Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:11
Denominazione: Output Shaft 1	Numero'denti'z: 19	Largh.fasc.dent. b: 33.98mm	
Numero disegno.: D51.6.1296.35 ^L (L)F-4-0-0	Modulo m: 2.65mm	Tratto evolv. La: 7.8/15.04mm	
Comessa/serie nr.: 5	Angolo pressione: 20°00'00"	Tratto elica Ls: 27.18mm	
Masch.Nr.: M001	Spindel: Form. ang. elica: -24°00'00"	Inizio elab. M1: 3.36mm	
Untersuchungszweck: Laufende Messung	Ø Base db: 51.2009mm	Palpatore Ø (#2): 1mm	
Werkzeug: Charge:	Ang. Base: -22°28'14"	Fat. scor. pr. x: .43	



Tolerance	Medio	Val. misur [µm]							Qual	Tolerance	Val. misur [µm]							Medio	Qual
fHm	±6	Var a 5.7								±6	Var a 6.8							1.9	
fHa	±12	1.4	2.1	4.8	-0.4	0.7	-0.9	6.1		±12	0.7	-0.5	0.4	-1.7	5.1	4.5	1.9		
Fa		4.0	4.4	5.1	3.3	4.5	3.2	5.0			3.7	4.8	5.3	5.0	6.6	5.9	5.6		
ffa	4	3.7	3.9	4.0	3.3	4.4	3.5	3.6		4	1.6	2.1	2.2	1.2	1.6	2.4	1.8		
ca										1/5	3.6	3.6	4.3	3.9	4.1	3.5	3.8		
Ca	-24/-13	-18.4	-18.6	-18.0	-17.7	-19.8	-19.4	-20.2											
ffaf	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.2	0.0	0.0		
P/T-Ø [mm]		47.098 [46.9/47.3]									63.753 [63.7/63.9]								



N:Z	fHSm	fHS	FS	ffS	FV 5. Var β 11.0							Qual	FV 0. Var β 8.6							Medio	Qual
20±6	15.7										±6								0.8		
20±13	15.7	14.5	10.3	16.5	25.9	21.3	20.1				±13	2.5	4.6	3.2	4.9	-2.5	-3.7	0.8			
	6.0	6.3	8.7	4.5	5.6	4.4	5.8					4.7	5.0	3.9	5.4	4.0	4.4	4.7			
4	1.2	1.1	1.1	1.3	0.9	1.2	0.9			4	0.9	0.8	0.6	0.9	0.8	0.7	0.8	0.8			

Docum.archiviato elettronicamente.Archiviazione cartacea non necessaria

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Ruota cilindrica Divisione

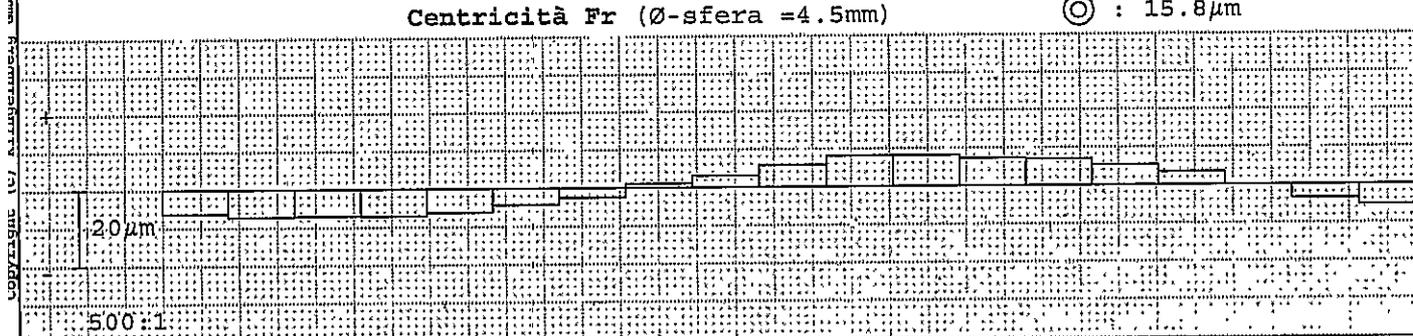


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Nr. prog.: STI0416a04 0	P26 601265	Controllore: turno c	Data: 03.01.2018 18:18
Denominazione: Output Shaft 1		Numero denti z 19	Angolo pressione 20°00'00"
Numero disegno.: D51.6.1296.35-IF		Modulo m 2.65mm	Angolo elica -24°00'00"
Commessa/serie nr.: 5		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	spindel: Formel	Charge:	



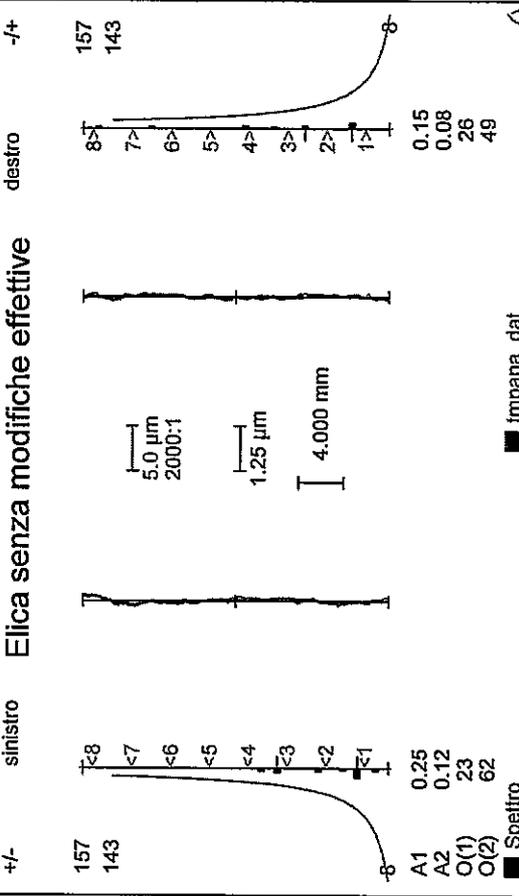
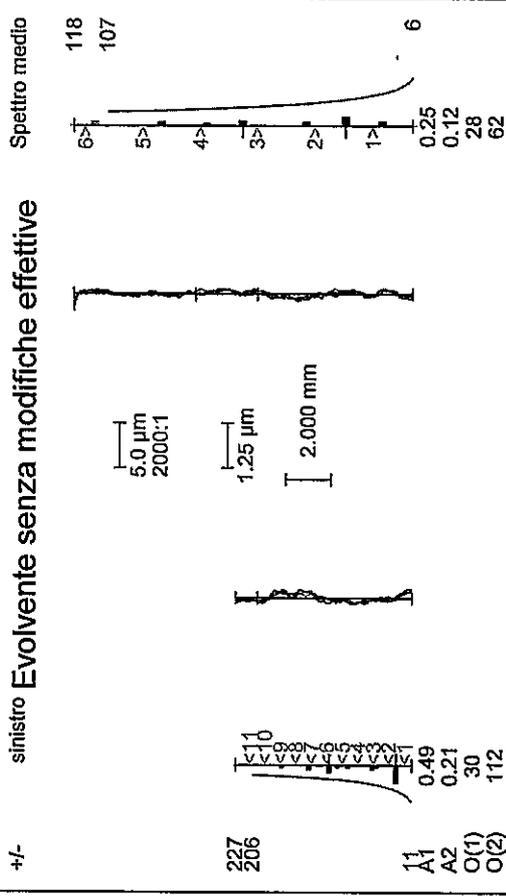
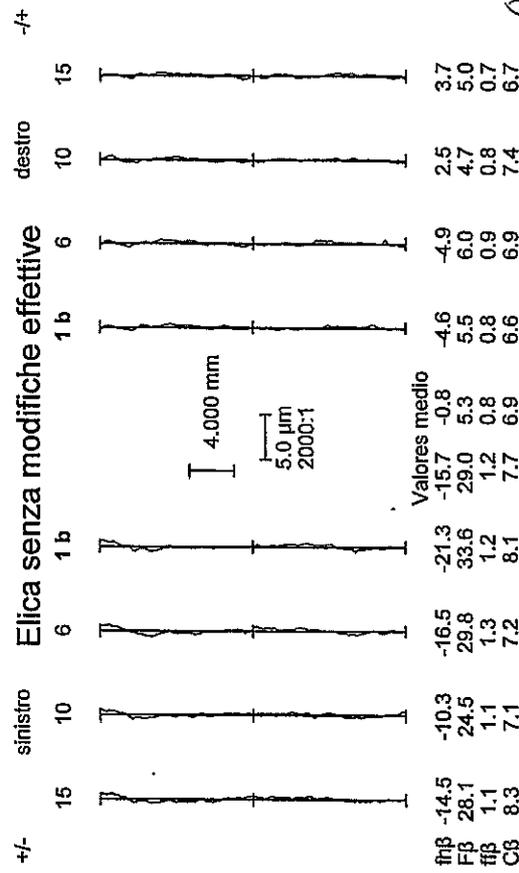
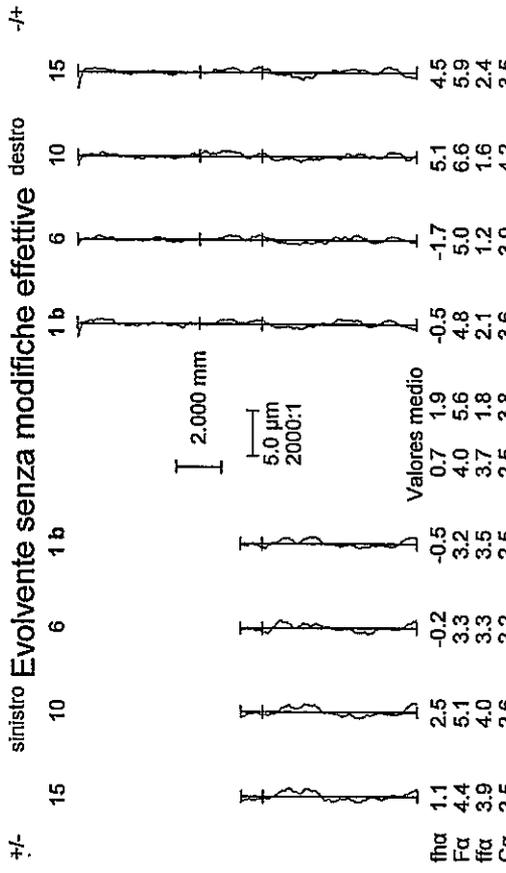
Corsa per misura divis.: 56.644 z=17.2mm	fianco sinistro / TIRO				fianco destro			
	Val. misur	Qual.	Val. amm	Qual.	Val. misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione fp max	3.5		14.0		2.6		14.0	
Gr. salto di passo fu max	1.7		18.0		2.1		18.0	
Scarto di divisione Rp	5.6				4.9			
Err. globale di divisione Fp	13.9		50.0		15.6		50.0	
Err. cordale di divisione Fpz/8	5.6				4.6			



Err. di concentricità Fr	15.3	40.0
Variaz. spessore dente Rs		



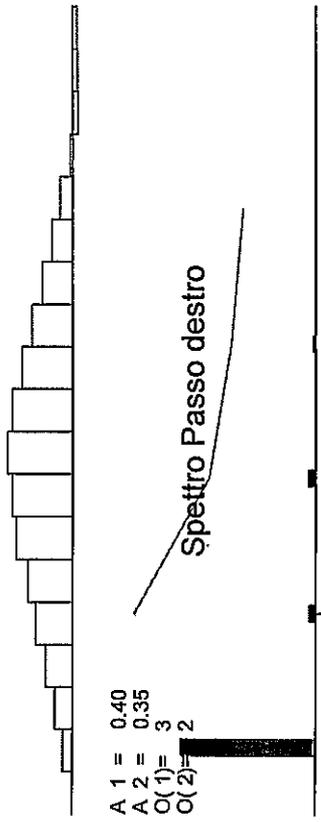
KLINGENBERG



Numero di disegno: D51.6.1296.35-IFDenominazione: Output Shaft
 Serie nr: 5 Scopo: Laufende Messung / 18:23
 Macchina: M001 Mandrino: Formnest 1 z= 19

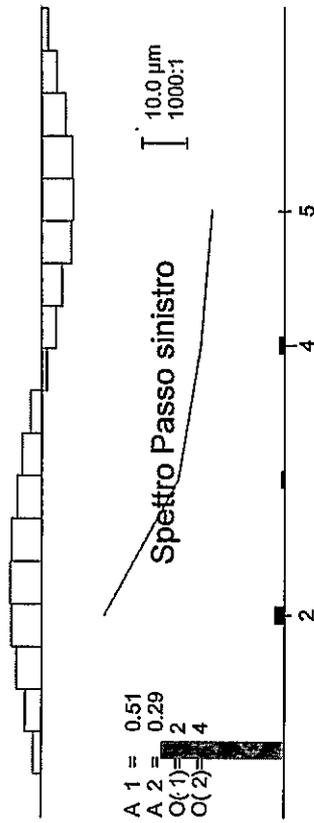


Ondulazione Passo destro



Ondulazione Passo sinistro

2.50 μm



$\phi 41.1 \text{max.}$
 $(\phi 40^{-0.013})$
 $\phi 39.5 \text{F} \phi 0.1$

$\phi 39.7 \text{min.}$
 $\text{RO.} 8^{-0.2}$

$\text{RO.} 5^{-0.25}$
 $\phi 41.4 \text{F} \phi 0.1$

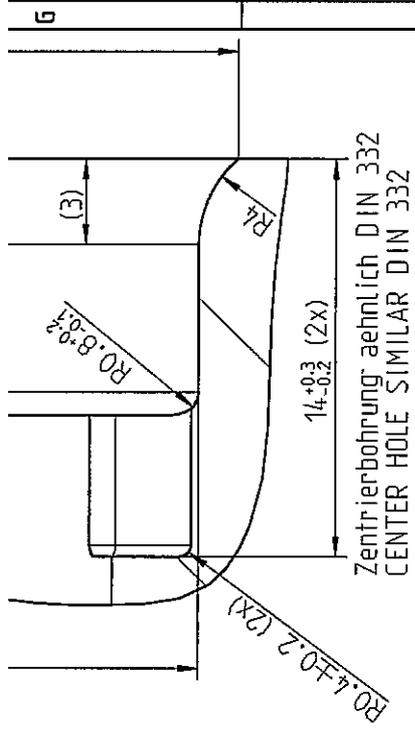
OVAL
 in diesem Bereich nicht geschliffen,
 verfahrensbedingter Materialaufwurf
 zulässig.
 IN THIS AREA NOT GROUND,
 PROCESS-RELATED MATERIAL
 PROTRUSION PERMITTED.

Einstich geschliffen
 CUT IN GROUND



Kugelstrahlen nach G_804010-M>
 SHOT PEENING ACCORDING TO G_804010

In diesem Bereich kugelgestrahlt nach dem Schleuderradverfahren alternativ auf Druckluftanlage
 Ziel der Optimierung: Verfestigung von Zahnfuss und rechter Planflaeche incl. Radius 1,5mm (Seite des kurzen Wellenende)
 IN THIS AREA SHOT PEENED ACCORDING TO CENTRIFUGAL WHEEL PROCESS ALTERNATIV USING COMPRESSED AIR UNIT
 TARGET OF OPTIMIZATION: STRAIN HARDENING OF TOOTH ROOT AND AXIAL SURFACE INCL. RADIUS 1,5mm (SIDE OF SHORT SHAFT END)



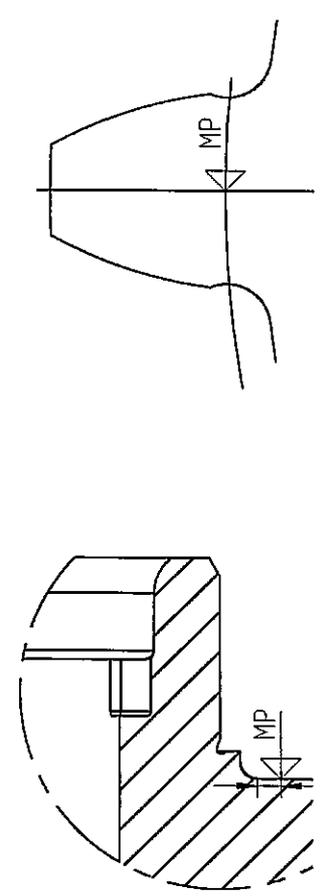
Prozessfolge:
 Verzahnung fraesen - haerten - verfestigungsstrahlen - Verzahnungs-Hartbearbeitung
 keine Spuren der Hartbearbeitung in der Zahnfussausrundung bzw.
 im Zahnfuss zulassungig !
 PROCESS SEQUENCE:
 HOBGING OF TEETH - HARDENING - SHOT-PEENING - TEETH HARD MACHINING
 NO MARKS OF HARD MACHINING IN THE ROOT FILLET RESPECTIVELY
 ROOT PERMISSIBLE !

Fourier-Analyse.
 USING FOURIER-ANALYSIS.

Druckeigenspannung im Zahnfuss / RESIDUAL COMPRESSIVE STRESS FOR TOOTH ROOT
 Eigenspannungsklasse 2b; Messpunkt B
 RESIDUAL STRESS CLASS 2b; MEASUREMENT POINT B

Druckeigenspannungen fuer Radius und Planflaeche / RESIDUAL COMPRESSIVE STRESS FOR RADIUS AND AXIAL SURFACE
 min. 750MPa in 20-60µm Tiefe / MIN.750MPa IN 20-60µm DEPTH
 Messpunkt MP / MEASUREMENT POINT MP:
 2±0.5mm radialer Abstand von tangentialem Uebergangspunkt des Radius in axiale Planflaeche.
 2±0.5mm RADIAL DISTANCE FROM TANGENT TRANSITION OF RADIUS TO AXIAL SURFACE.
 Zu verwendete Blende / APERTURE TO BE APPLIED: Ø1mm
 unmassstaeblich / NOT TO SCALE

sammen mit Rz, Rmax
 ert werden
 TO BE DOCUMENTED
 z, Rmax AND Rpk



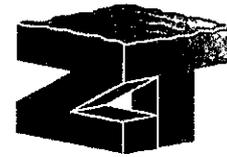
**U N I K A S S E L
V E R S I T Ä T**



Institute of Materials Engineering
Metallic Materials
Prof. Dr.-Ing. Berthold Scholtes
Prof. Dr.-Ing. Thomas Niendorf



Deutsche
Akkreditierungsstelle
D-PL-19045-03-00



ZERTECH
Zentrum für
Randschichtanalytik
und -Technik

ZerTech – division of Institute of Materials Engineering, D-34125 Kassel

MAGNA POWERTRAIN
VIA DEI CICLAMINI, 4
IT-70026 MODUGNO
Italy

delivery address: Sophie-Henschel-Haus
Mönchebergstraße 3
D-34125 Kassel

phone: 0049-561/804-3657

telefax: 0049-561/804-3662

Order-No. 4500505072

our reference
MPT-I007_rep

person in charge
Dipl.-Ing. Django Baunack

phone: 0049561/804-
3657

date:
20 February 2018

Test Report

Object of examination:

One specimen of each part number has been examined. Residual stress measurements have been performed in accordance with the test standard of G_804010. Position A has a measuring area of approximately 0.5 mm to 1.5 mm above the root form diameter d_{Ff} in a zone of ± 3 mm from the centre of the tooth width (means in active profile of the tooth flank). Position B has a measuring area of approximately 0.5 mm to 1.5 mm below the root form diameter d_{Ff} and in a zone of ± 3 mm from the gear centre means in tooth root area of the gear). The tilt of Ψ -angle occurs in the height of the tooth. The residual stress state is carried out in the distances to the surface shown in table 1.

No.	Part Name	Part/Drawing No.	gear teeth	Measuring Pos.			Depth Profile in μm
				A	B	MP	
1	Output schaft 1	2516129635	I		X	X	5 μm , 20 μm , 40 μm , 60 μm , 80 μm .
2	RG	2511130050	I		X	X	5 μm , 20 μm , 40 μm , 60 μm , 80 μm .

Table I: Part list of samples

The residual stress measurements were carried out on a stationary X-ray diffractometer (Manufacturer: Siemens; Type F2). The following list contains the most important measuring parameters.

Measurement details:

Diffractometer: F2
Radiation: Cr $\kappa\alpha$
Crystal lattice: {211}
Crystal orientation (ψ -angle): $0^\circ; \pm 18^\circ; \pm 27^\circ; \pm 33^\circ; \pm 39^\circ; \pm 45^\circ$
Diffraction angle range (2Θ): $148^\circ - 164^\circ$
Step-feeding: 0.1°
Primary aperture: $\varnothing 1.0$ mm for measuring point A and F
 0.5×4.0 mm² for measuring point B
Detector aperture: symmetrizing slit

Evaluation parameter:

Determination of peak position: gravitational line method
Calculation of residual stresses: $\sin^2\Psi$ -method
Diffraction angle of stress free crystal lattice: $\Theta_0 = 78.035^\circ$
X-ray elastic constant: $\frac{1}{2}S_2 = 6.09 \cdot 10^{-6}$ mm²/N

Results:

The residual stress values in the tables are rounded by 5 MPa. Standard deviation assigned to the residual stress values is a measure of the reliability of the measurement procedure. The integral width of the interference lines indicates hardening or softening effects, respectively.

Distance from the surface in mm	Residual stresses σ^{ES} in MPa	Integral width IW in degree
0,005	-740 ± 35	6,24
0,020	-1110 ± 55	6,04
0,039	-1230 ± 60	6,06
0,060	-1295 ± 60	6,00
0,080	-1175 ± 55	6,20

Table 1: Residual stresses and integral width; Pos. 1, Position B

Distance from the surface in mm	Residual stresses σ^{ES} in MPa	Integral width IW in degree
0,005	-980 ± 50	6,21
0,020	-1135 ± 60	5,82
0,040	-1015 ± 50	5,86
0,060	-890 ± 40	5,95
0,080	-560 ± 25	6,12

Table 1_2: Residual stresses and integral width; Pos. 1, Position MP

Distance from the surface in mm	Residual stresses σ^{ES} in MPa	Integral width IW in degree
0,005	-705 ± 40	5,85
0,019	-930 ± 50	5,81
0,039	-1060 ± 50	5,73
0,060	-1115 ± 55	6,04
0,080	-895 ± 40	6,19

Table 2_1: Residual stresses and integral width; Pos. 2, Position B

Distance from the surface in mm	Residual stresses σ^{ES} in MPa	Integral width IW in degree
0,005	-870 ± 40	5,86
0,020	-995 ± 45	5,82
0,040	-1070 ± 50	5,96
0,060	-895 ± 45	5,98
0,080	-555 ± 30	6,17

Table 2_2: Residual stresses and integral width; Pos. 2, Position MP

As agreed with the customer the residual values are marked with (*), if the shear stress indicator is higher than 80 MPa.

Yours sincerely

Django Baunack

Django Baunack

Person in charge

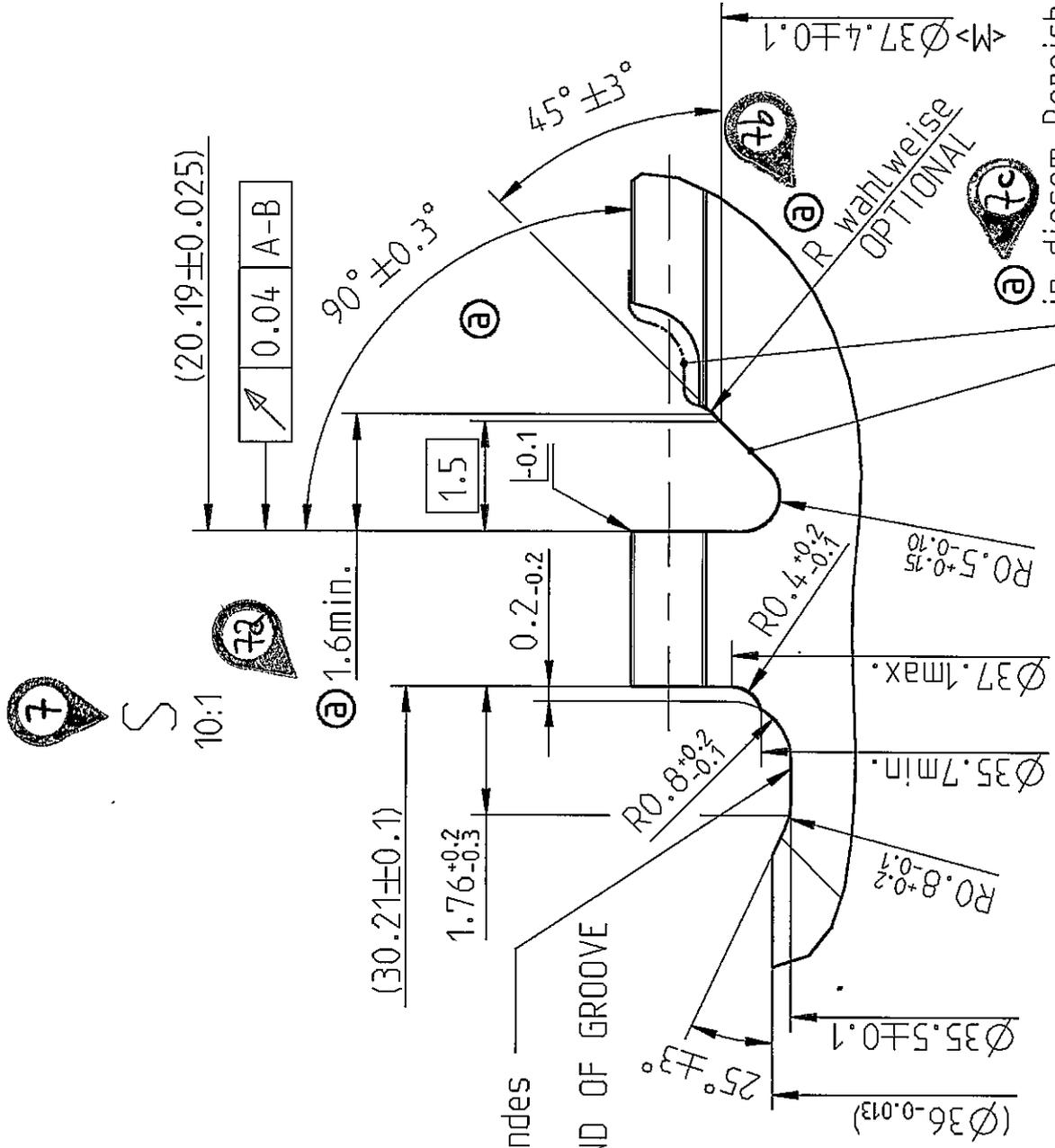


**Zentrum für
Randschichtanalytik
und -Technik**

Annotations:

ZerTech is accredited to *DIN EN ISO/IEC 17025* referring to procedures of residual stress analysis by X-ray diffraction (XRD) as well as the Hole Drilling Method (HDM). The X-ray diffraction method is described in *DIN EN 15305 Non-destructive testing - Test Method for Residual Stress Analysis by X-ray Diffraction*. The proceedings of the Hole Drilling Method are ruled in *ASTM-Designation E837-13a Standard Test Method for Determining Residual Stress by the Hole-drilling Strain Gage Method*.

The experimental data are only valid for the investigated specimen. The work pieces and specimen of disposition will be stored for persistence of 6 month. After that time they will supply to material recycling, if there is no explicit desire by client. A send back is possible. Therefore the client has to take over the postage costs. This procedure is necessary because of our limited stock keeping capacity.

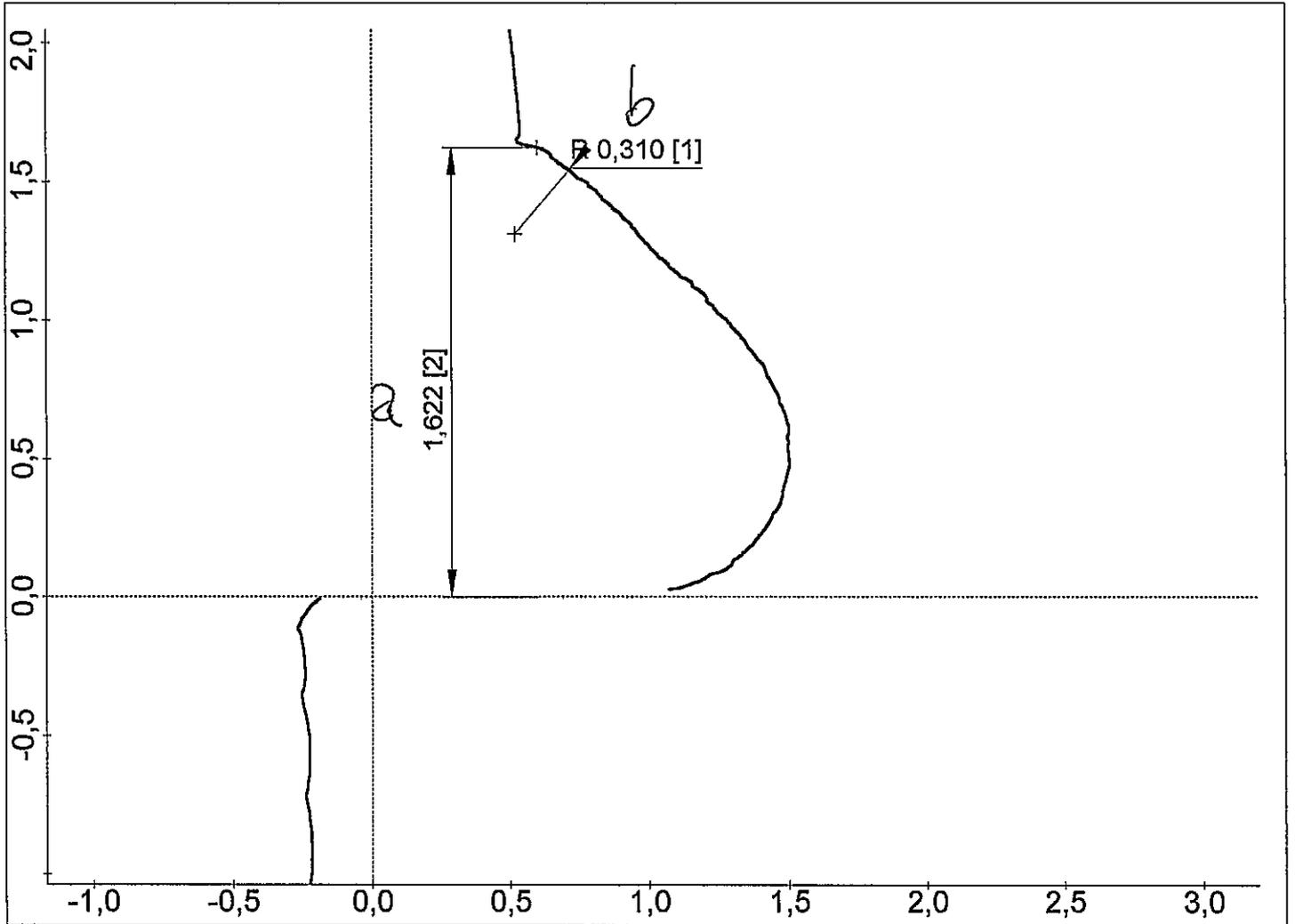


Anschleifen des Nutgrundes
nicht zulässig
MACHINING INTO GROOVE
IS NOT ALLOWED

in diesem Bereich nicht geschliffen,
verfahrensbedingter Materialaufwurf
zulässig.
IN THIS AREA NOT GROUND,
PROCESS-RELATED MATERIAL
PROTRUSION PERMITTED.

Einstich geschliffen
CUT IN GROUND

U
10:1



PERTHOMETER CONCEPT

Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

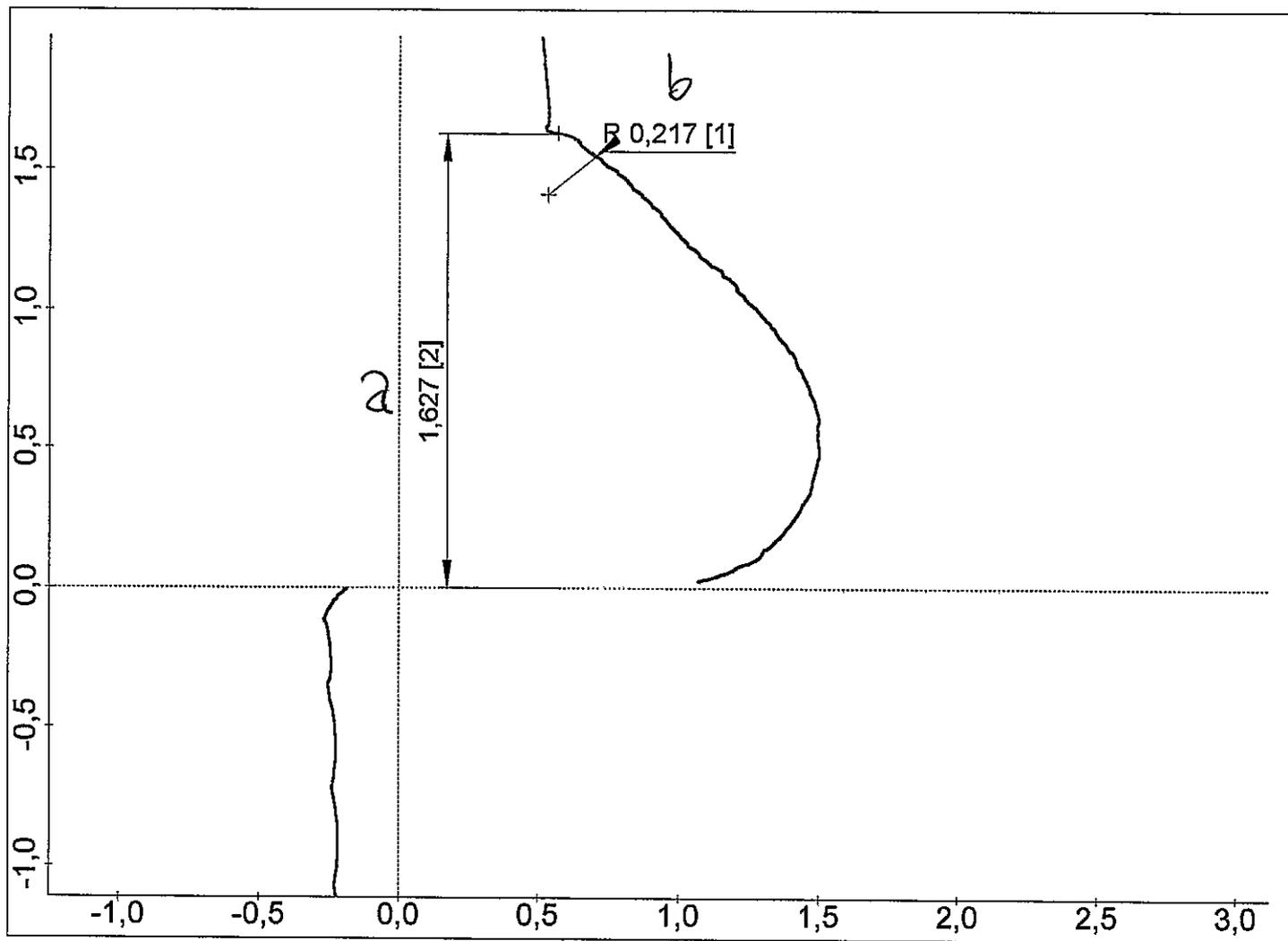
N°BADGE ODP RICEVENTE



Via dei Ciclamini 4, Modugno (BA)

Oggetto: QS 1
Numero: 1096 PZ N.2
Operatore: TURNO C
Data, ora: 11.12.2017, 12:14
Nota: PART. S
Tastatore: PCV 350 / 33 mm

Macchina: MOA 416120 002



PERTHOMETER CONCEPT

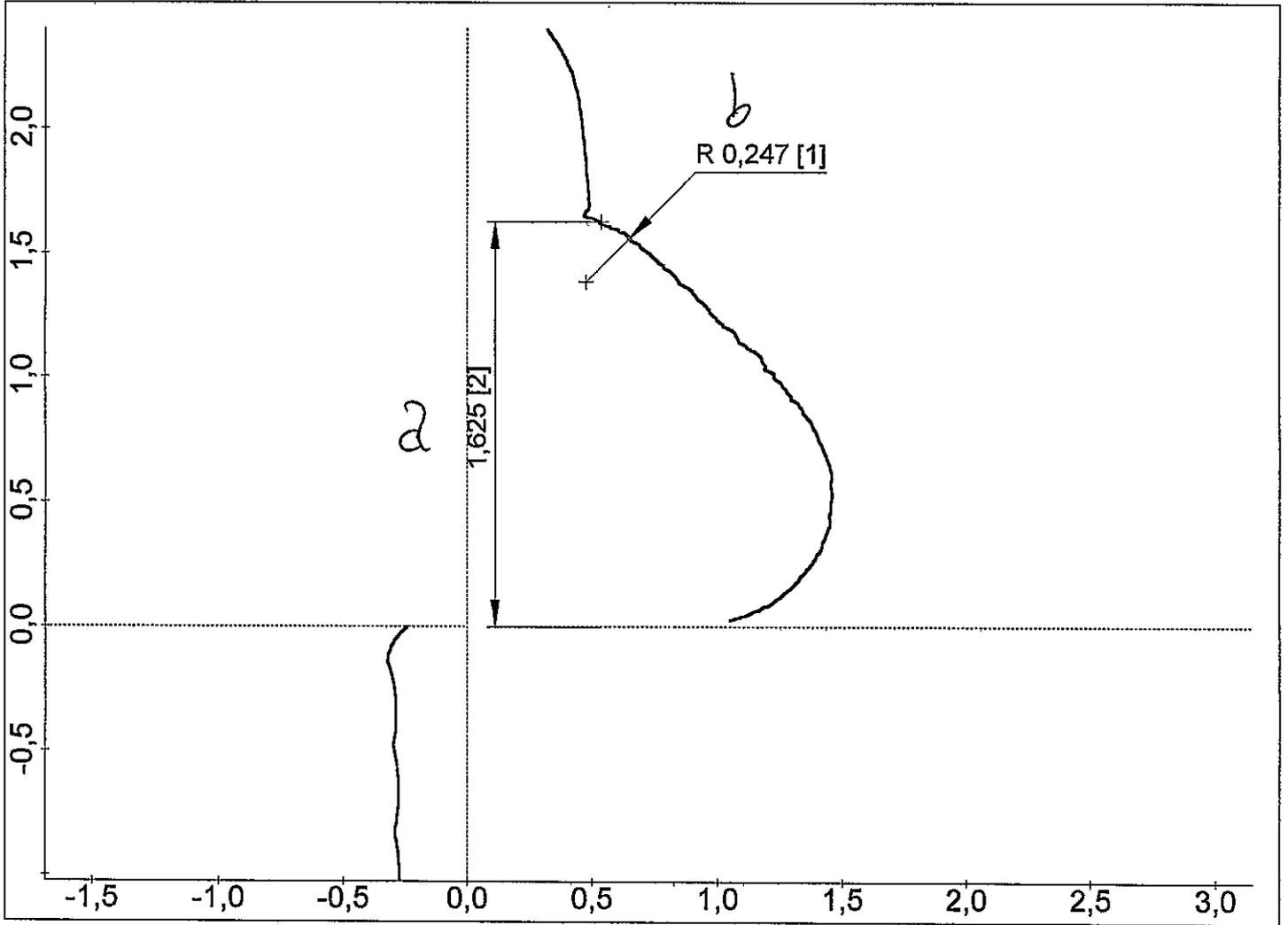
Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

N°BADGE ODP RICEVENTE



PERTHOMETER CONCEPT

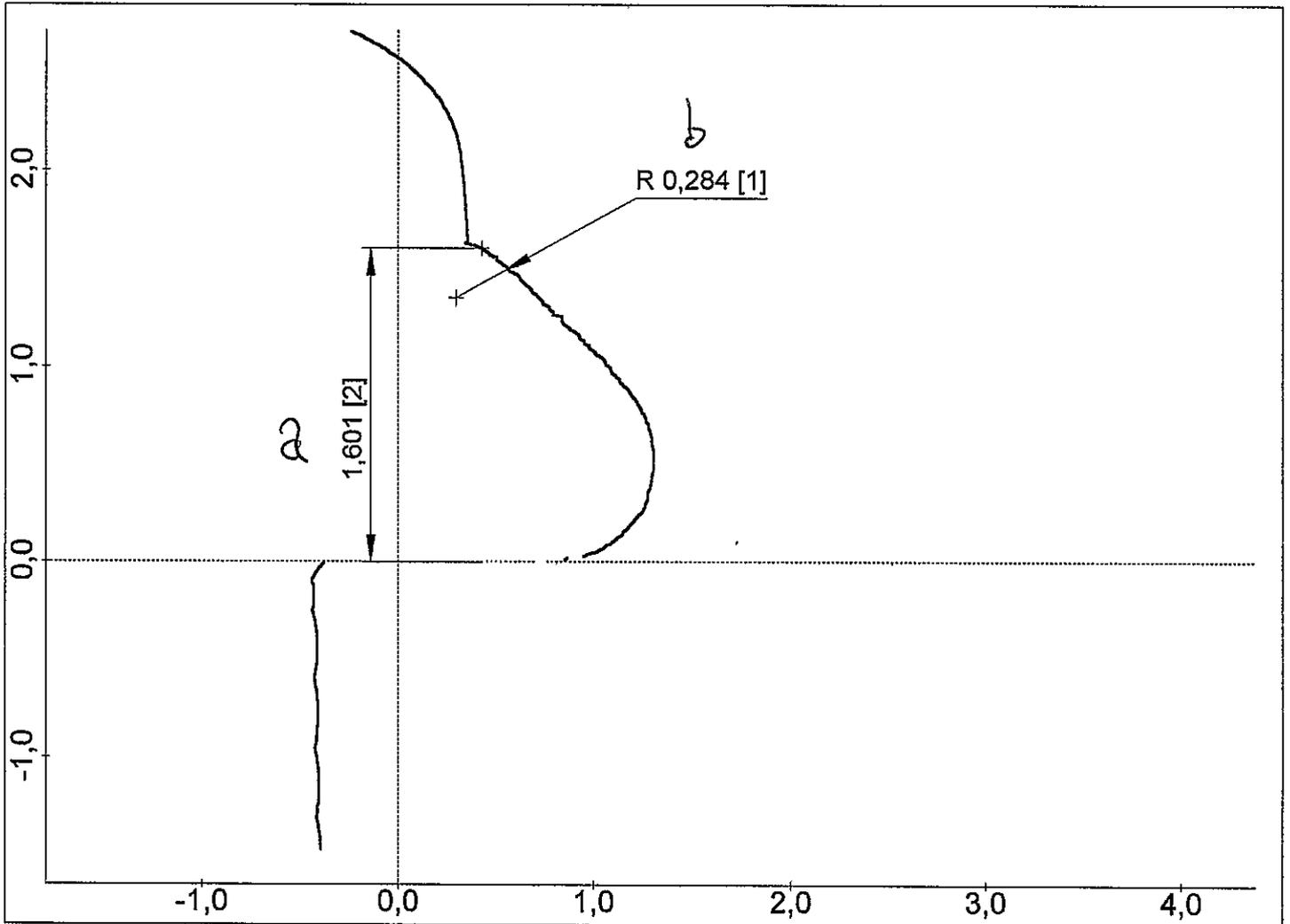
Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

N°BADGE ODP RICEVENTE



PERTHOMETER CONCEPT

Area Riservata alla Produzione

Valutazione Profilo

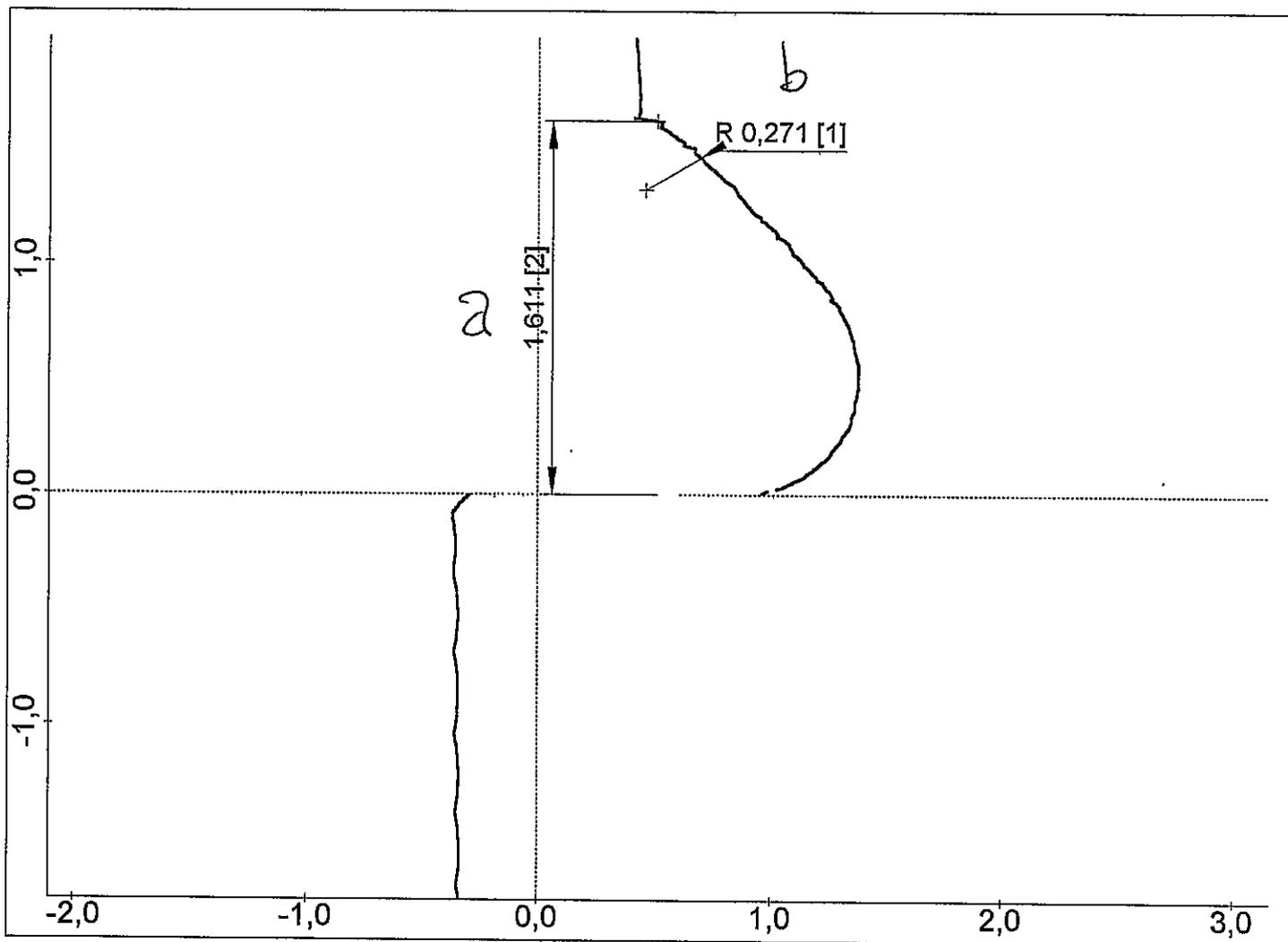
OK

NOK

N°BADGE ODP RICEVENTE

Oggetto: QS 1
Numero: 1696 PZ N.5
Operatore: TURNO C
Data, ora: 11.12.2017, 12:09
Nota: PART. S
Tastatore: PCV 350 / 33 mm

Macchina: MOA 416120 002



PERTHOMETER CONCEPT

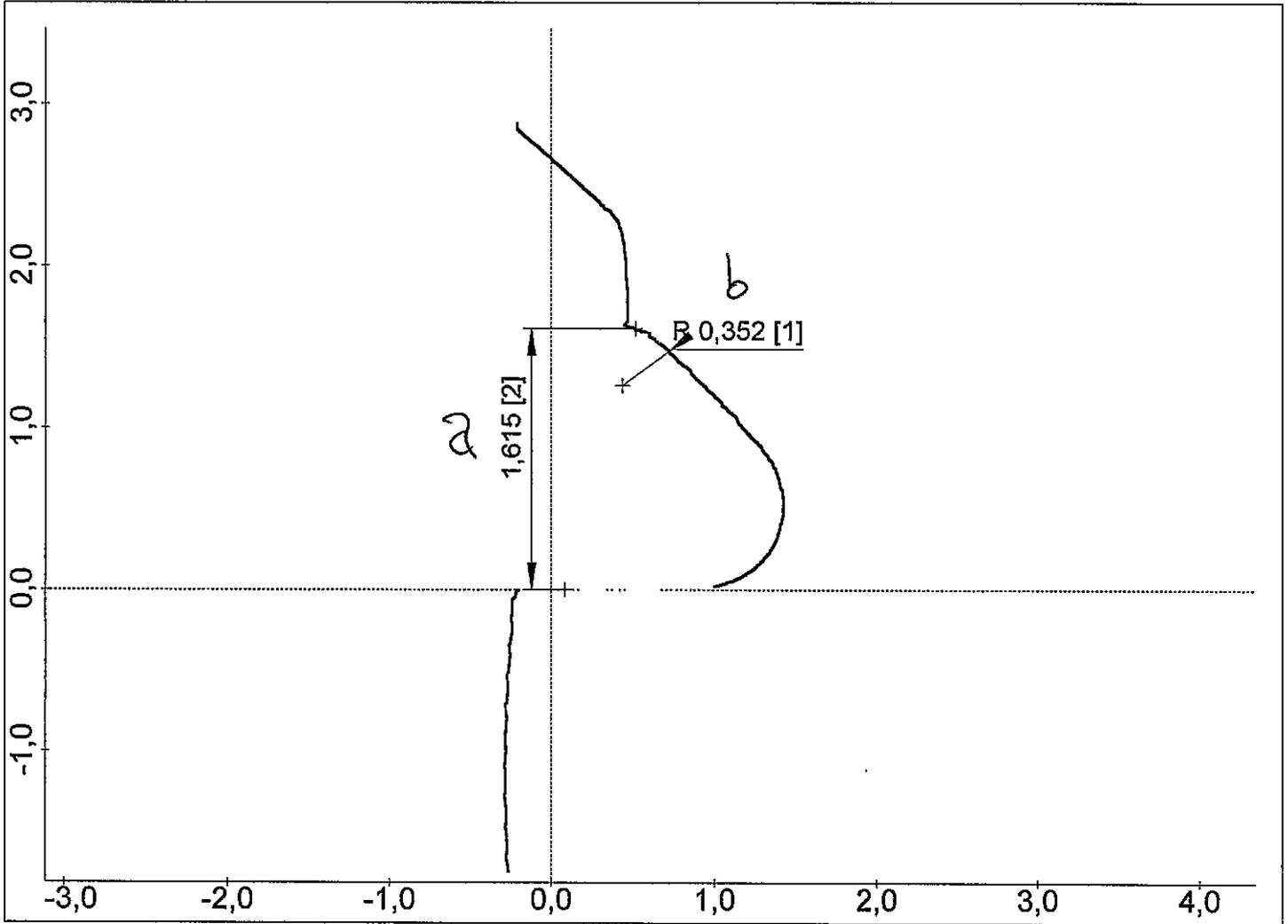
Area Riservata alla Produzione	
Valutazione Profilo	
OK	<input type="checkbox"/>
NOK	<input type="checkbox"/>
N°BADGE ODP RICEVENTE	
<input type="text"/>	



Via dei Ciclamini 4, Modugno (BA)

Oggetto: QS 1
Numero: 1996 PZ N.1
Operatore: TURNO C
Data, ora: 11.12.2017, 11:44
Nota: PART. W
Tastatore: PCV 350 / 33 mm

Macchina: MOA 416120 002



PERTHOMETER CONCEPT

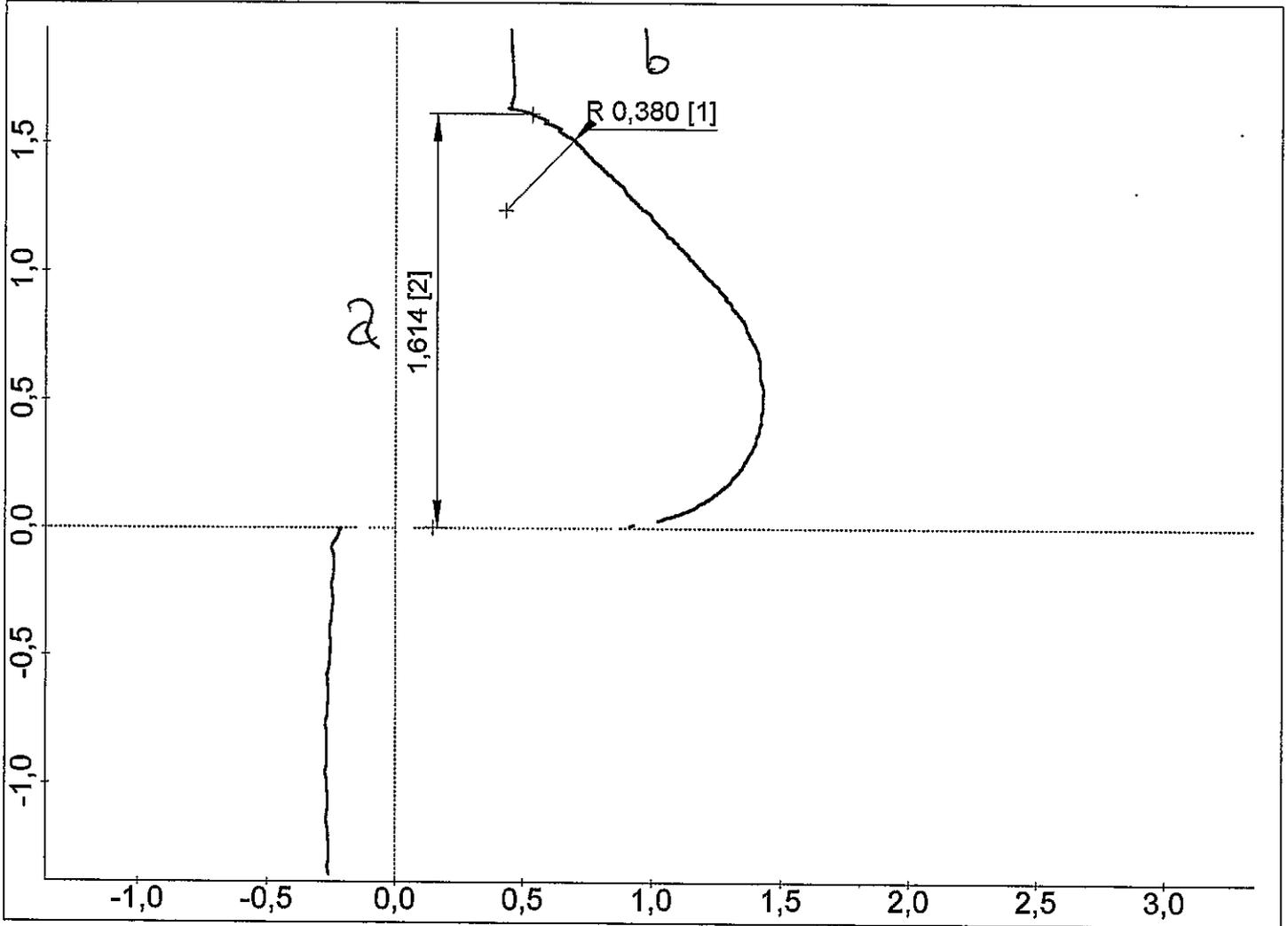
Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

N°BADGE ODP RICEVENTE



PERTHOMETER CONCEPT

Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

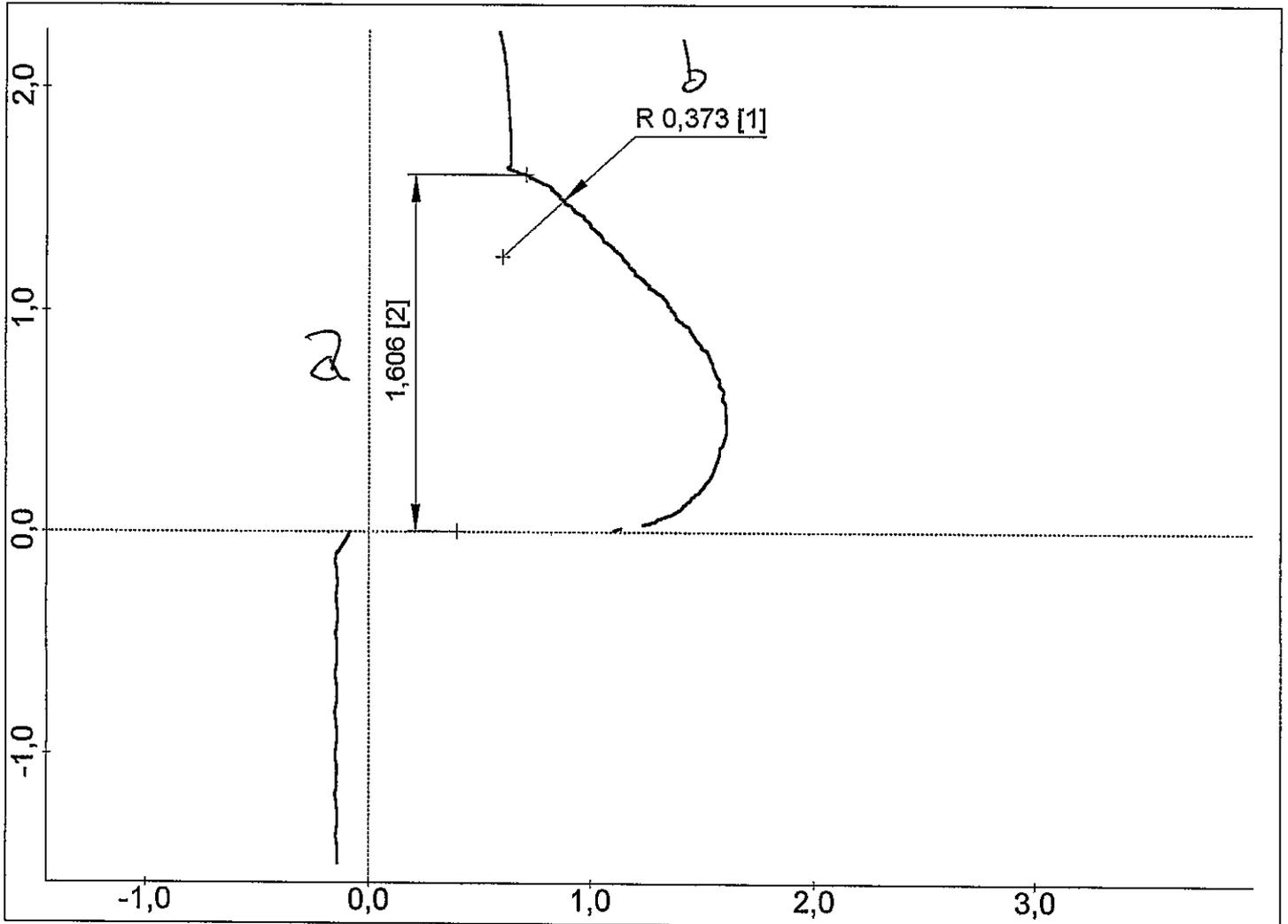
N°BADGE ODP RICEVENTE



Via dei Ciclamini 4, Modugno (BA)

Oggetto: OS 1
Numero: 1096 PZ N.3
Operatore: TURNO C
Data, ora: 11.12.2017, 11:55
Nota: PART. W
Tastatore: PCV 350 / 33 mm

Macchina: MOA 416120 002



PERTHOMETER CONCEPT

Area Riservata alla Produzione

Valutazione Profilo

OK

NOK

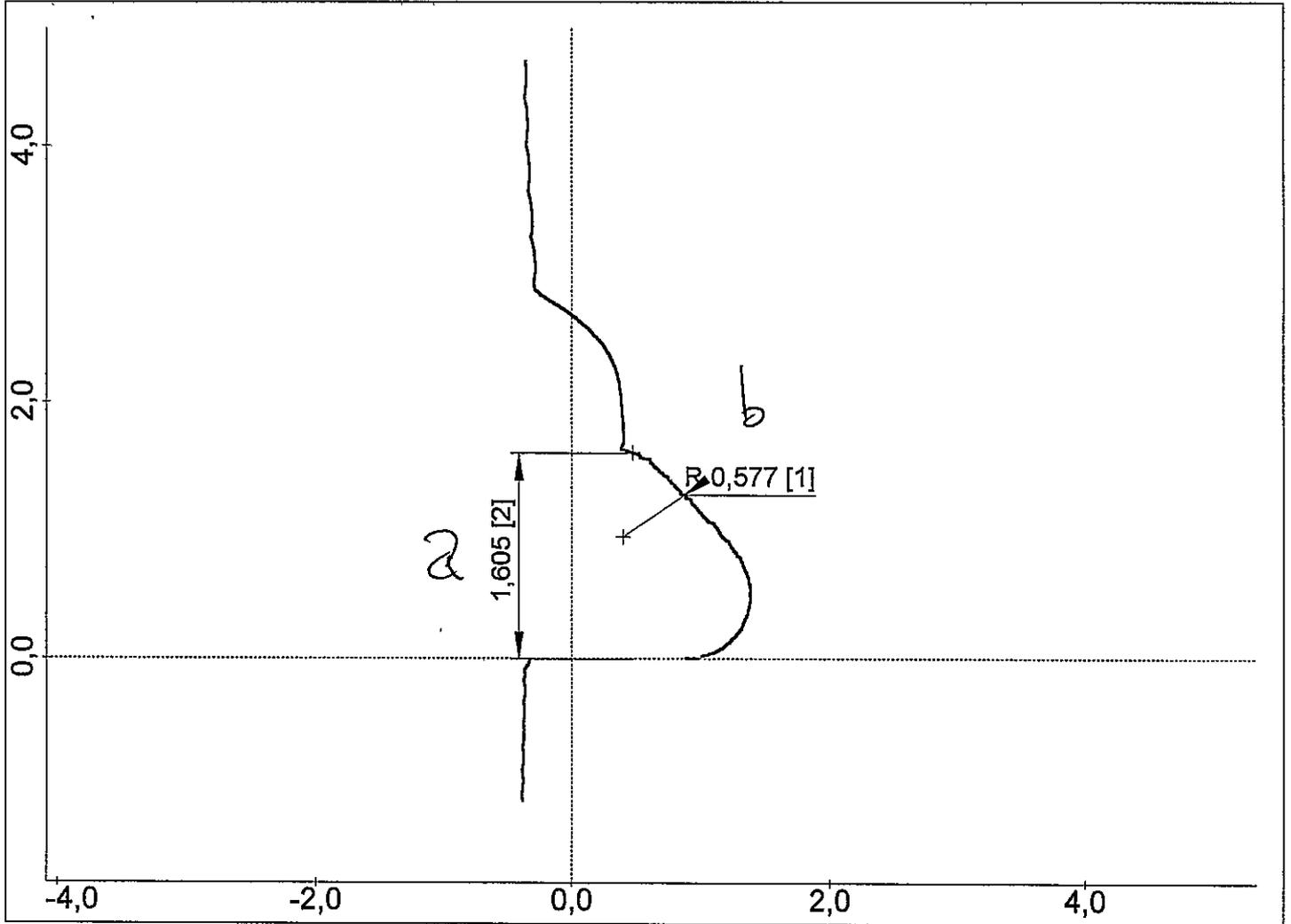
N°BADGE ODP RICEVENTE



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Oggetto: QS 1
Numero: 1096 PZ N.4
Operatore: TURNO C
Data, ora: 11.12.2017, 11:57
Nota: PART. W
Tastatore: PCV 350 / 33 mm

Macchina: MOA 416120 002



PERTHOMETER CONCEPT

Area Riservata alla Produzione

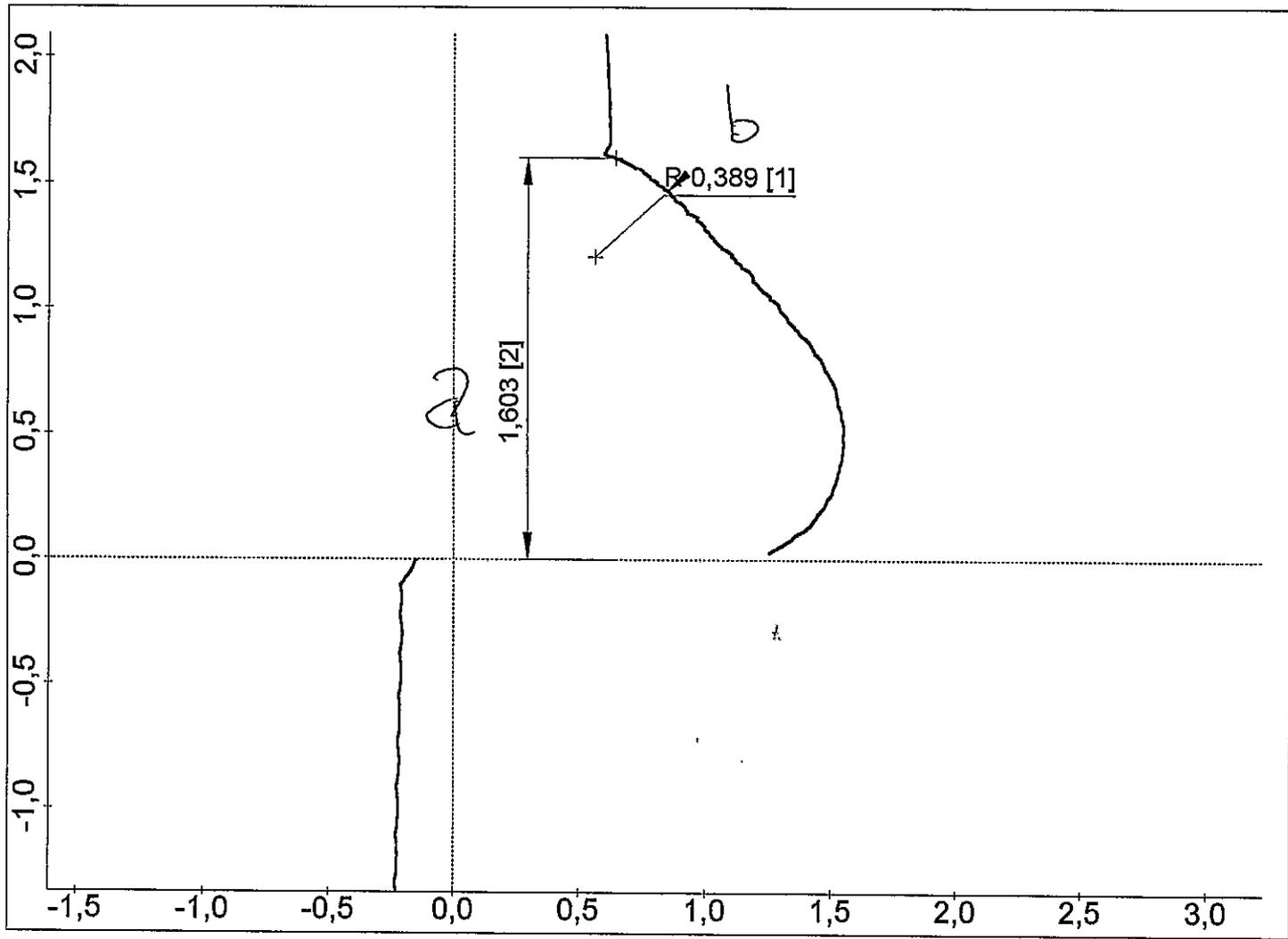
Valutazione Profilo

OK

NOK

N°BADGE ODP RICEVENTE

Oggetto:	OS 1
Numero:	1096 PZ N.5
Operatore:	TURNO C
Data, ora:	11.12.2017, 12:04
Nota:	PART. W
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	<input type="checkbox"/>
NOK	<input type="checkbox"/>
N°BADGE ODP RICEVENTE	
<input type="text"/>	



Docum.archiviato elettronicamente.
Archiviazione cartacea non necessaria



Operatore: Amministratore: admin	data: 19-03-18 8-46-21	Numero di Lotto: PZ_01	Nr: 1	La configurazione: .Archive\Z_Z_SERVIZIO\ modello OS1_GOLE_1296_FINITO
-------------------------------------	------------------------------	---------------------------	-------	---

Nota di programma:	Nota:
--------------------	-------

BARCODE:

GRAP.	tipo	Descrizione	Nominale	Misura	Scostamento	FUORI TOL.	TOL. INF.	TOL. SUP.
	H	DIS	3.000	3.038	0.038		-0.500	0.500
	H	DIS AMPIEZZA	3.000	3.066	0.066		-0.500	0.500
■	H	PROFONDITA'	0.200	0.144	-0.056		-0.100	0.000



Docum.archiviato elettronicamente
Archiviazione cartacea non necessaria



Operatore: Amministratore: admin	data: 19-03-18 8-47-52	Numero di Lotto: PZ_02 Unità di misura: [mm, °]	La configurazione modello: .Archivel_Z_SERVIZIO OS1_GOLE_1296_FINITO
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Nota di programma: _____ Nota: _____

BARCODE: _____

GRAP.	tipo	Descrizione	Nominale	Misura	Scostamento	FUORI TOL.	TOL. INF.	TOL. SUP.
	H	DIS	3.000	3.022	0.022		-0.500	0.500
■	H	DIS AMPIEZZA	3.000	3.121	0.121		-0.500	0.500
■	H	PROFONDITA'	0.200	0.149	-0.051		-0.100	0.000



Docum.archiviato elettronicamente.
Archiviazione cartacea non necessaria



Operatore: Amministratore: admin	data: 19-03-18 8-49-20	Numero di Lotto: Nr. 1 PZ_03	La configurazione: Archivio: Z SERVO modello: OS1_GOLE_1296_FINITO
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Nota di programma:	Nota:
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BARCODE:

GRAP.	tipo	Descrizione	Nominale	Misura	Scostamento	FUORI-TOL.	TOL. INF.	TOL. SUP.
	H	DIS	3.000	3.034	0.034		0.500	0.500
	H	DIS AMPIEZZA	3.000	3.086	0.086		0.500	0.500
■	H	PROFONDITA'	0.200	0.143	-0.057		0.100	0.000



Docum.archiviato elettronicamente.
Archiviazione cartacea non necessaria



Operatore: Amministratore: admin	data: 19-03-18 8-50-22	Numero di Lotto: PZ_04	Nr: 1	La configurazione: .Archive\Z_Z_SERVIZIO\ modello: OS1_GOLE_1296_FINITO
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Nota di programma:	Nota:
--------------------	-------

BARCODE:

GRAP.	tipo	Descrizione	Nominale	Misura	Scostamento	FUORI TOL.	TOL. INF.	TOL. SUP.
	H	DIS	3.000	3.013	0.013		-0.500	0.500
	H	DIS AMPIEZZA	3.000	3.098	0.098		-0.500	0.500
■	H	PROFONDITA'	0.200	0.144	-0.056		-0.100	0.000



Docum.archiviato elettronicamente.
Archiviazione cartacea non necessaria



Operatore: Amministratore: admin	data: 19-03-18 8-53-55	Numero di Lotto: PZ_05	Nr: 1	La configurazione: .Archive\Z_Z_SERVIZIO\ modello: OS1_GOLE_1296_FINITO
-------------------------------------	------------------------------	---------------------------	-------	--

Nota di programma:	Nota:
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BARCODE:

GRAP.	tipo	Descrizione	Nominale	Misura	Scostamento	FUORI TOL.	TOL. INF.	TOL. SUP.
	H	DIS	3.000	3.002	0.002		-0.500	0.500
	H	DIS AMPIEZZA	3.000	3.108	0.108		-0.500	0.500
■	H	PROFONDITA'	0.200	0.146	-0.054		0.000	0.000

LABORATORY REPORT

GETRAG S.p.A. - B/WLQ 2

MAGNA GETRAG

REPORT 18/037

Date: 21/03/2018
Author: M. de Dato

Reason for analysis: <i>Motivo dell'indagine:</i>	PPAP
---	------

Requester: <i>Richiedente:</i>	WLQ - M. Vicenti
--	------------------

Part Name: <i>Nome particolare:</i>	OS1
Material: <i>Materiale:</i>	GCG_805000 Part 2
State of part: <i>Stato del particolare:</i>	Finito

P/N:	251.6.1296.35
S/N:	-
Customer: <i>Cliente:</i>	Daimler

Result: <i>Risultato:</i>	OK
-------------------------------------	----

Distribution list: <i>Lista di distribuzione:</i>	WLQ - M. Vicenti
---	------------------

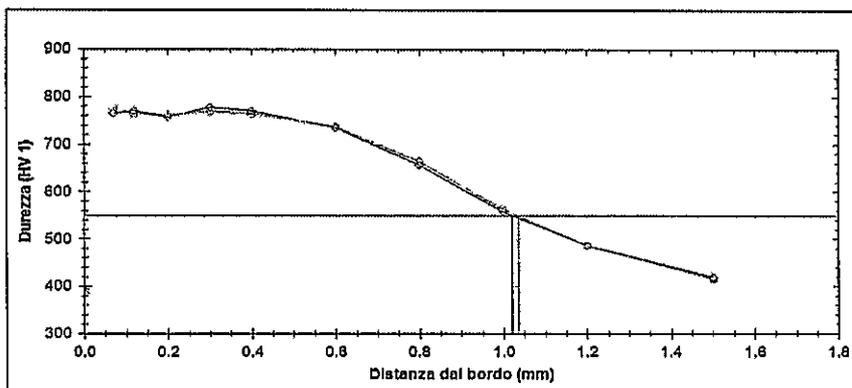
Notes: <i>Note:</i>	Gearset 21H
-------------------------------	-------------

Surface hardness verification (verifica durezza superficiale)

Component	Scale	Position	Measured Value	Range
Shaft	HRC	M1	62,0	-
Shaft	HRA	M1	82,4	80.5 + 2.5

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

Component	Scale	Sample #	Position	Measured Value	Range
Shaft	CHD 550 HV1	1326/18	M2 (tooth flank)	1,04	0.70+0.50 mm
Shaft	CHD 550 HV1	1326/18	M3	1,02	0.50 mm min.
Shaft	Core hardness HV10	1326/18	M4 (tooth core)	393	≥ 300



Picture 1: profili di durezza.

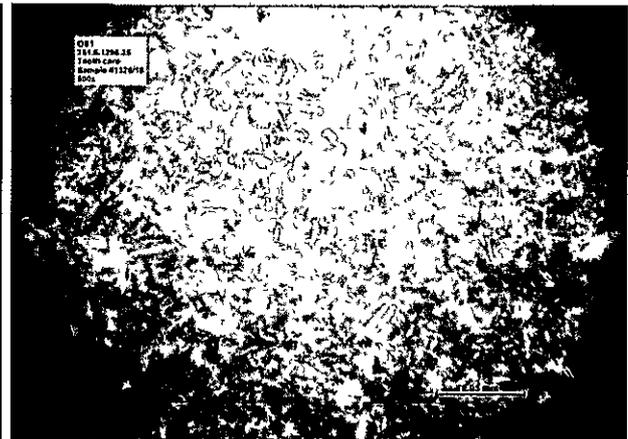
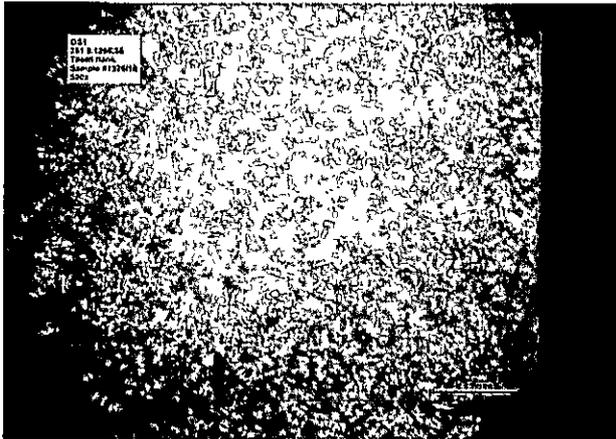


REPORT 18/037

Date: 21/03/2018
Author: M. de Dato

Microstructure analysis (analisi della microstruttura)

Sample #	1326/18
Shaft - Tooth flank surface structure:	Martensite e austenite residua (15%)
Shaft - Tooth base core structure:	Martensite, bainite



Picture 2: Microstruttura sul fianco dente (a sinistra) ed a cuore sulla base dente (a destra).

Component	Operation	Machine	Part Number	Transferability	Items	Spec.	hrs	ORI	Target Cm	Cmk	CM Last Update	Pat Pp	PeK	PP Last Update
OUTPUT1	Power Honing	HNW11006	251.6.1296.35	21H	Fr	32	x	PPAP	1.67	3.15	20/03/2018	-	2.76	22/03/2018
OUTPUT1	Power Honing	HNW11006	251.6.1296.35	21H	MEDIO M1-M3	Max. 59.044Min. 57.984	x	PPAP	1.67	SIM	20/03/2018	3.73	SIM	22/03/2018
OUTPUT2	Power Honing	HNW11007	251.6.1298.35	21H	Fr	32	x	PPAP	1.67	3.03	20/03/2018	-	3.45	22/03/2018
OUTPUT2	Power Honing	HNW11007	251.6.1298.35	21H	MEDIO M1-M3	Min. 56.728Max. 56.778	x	PPAP	1.67	SIM	20/03/2018	2.45	SIM	22/03/2018
R.GEAR	Grind Gear Teeth	SLW11046	251.1.1300.50	21H	Fr	32	x	PPAP	1.67	1.89	20/03/2018	-	3.95	22/03/2018
R.GEAR	Grind Gear Teeth	SLW11046	251.1.1300.50	21H	MEDIO M1-M3	min 211.162max:211.233	x	PPAP	1.67	SIM	20/03/2018	2.33	SIM	22/03/2018

Part Submission Warrant

Part Name <u>Output Shaft I</u>		Cust. Part Number <u>2516129680</u>	090/17
Shown on Drawing No. <u>2516129680</u>		Org. Part Number _____	
Engineering Change Level _____	b	Dated <u>10. Okt 17</u>	
Additional Engineering Changes _____		Dated _____	
Safety and/or Government Regulation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Purchase Order No. <u>5500039785</u>	Weight (kg) <u>1,941</u>	
Checking Aid No. <u>2516129680_b_KP</u>	Checking Aid Engineering Change Level <u>b</u>	Dated <u>30. Okt 17</u>	

ORGANIZATION MANUFACTURING INFORMATION <u>GeWiS Slovakia s.r.o. Prievidza 90090</u> Organization Name & Supplier/Vendor Code <u>Vápenická 30</u> Street Address <u>Prievidza Slovakia 971 01 Slovakia</u> City Region Postal Code Country	CUSTOMER SUBMITTAL INFORMATION <u>Getrag</u> Customer Name/Division <u>1/1001</u> Buyer/Buyer Code _____ Application
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MATERIALS REPORTING
 Has customer-required Substances of Concern information been reported? Yes No n/a
 Submitted by IMDS or other customer format: 698066632 / 0.01

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

REASON FOR SUBMISSION (Check at least one)

<input checked="" type="checkbox"/> Initial Submission	<input type="checkbox"/> Change to Optional Construction, or Material
<input type="checkbox"/> Engineering Change(s)	<input type="checkbox"/> Supplier or Material Source Change
<input type="checkbox"/> Tooling: Transfer, Replacement, Refurbishment, or additional	<input type="checkbox"/> Change in Part Processing
<input type="checkbox"/> Correction of Discrepancy	<input type="checkbox"/> Parts Produced at Additional Location
<input type="checkbox"/> Tooling Inactive > than 1 year	<input type="checkbox"/> 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 2516129680_b_PFD

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 74 / 8 hours.
 I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from the declaration below.

EXPLANATION/COMMENTS:

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

Organization Authorized Signature *Andrej Balaz* Date 08. Nov 17

Print Name Ing. Andrej Balaz Phone No. 00421/0465117-479 Fax No. -310

Title QS E-mail abalaz@qewis.eu

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: Approved Rejected Other

Customer Signature *A. Hettinger* Date 08.12.17

Print Name A. Hettinger Customer Tracking Number (optional) 17-01322

based on CFG-1001 PPAP Vesloň 4



