Part Submission Warrant MAGNA GETRAG 3M461

Part Name:	Ring Gear	Cust. Part No.:	251.1.1300.50
Shown on Drawing No.:	251.1.1300.50	Org. Part No.:	251.1.1300.50
Engineering Change Level:	3 Index "b" (C011951MIP2)	Dated:	25/01/2018
Additional Engineering Changes:	na	Dated:	na
Safety and/or Government Regulation:	☐ Yes ☑ No — Purchase Order No.:	Weight (kg):	2.939
Checking Aid No.:	na — Checking Aid Engineering Change Level: na	Dated:	na

ORGANIZATION MANUFACTURING INFORMATION

Getrag S.p.A.
Organization Name & Supplier / Supplier Code

Via dei Ciclamini, 4
Street Address

Modugno (Ba) Puglia — 70026 — Italy
City — Region — Postal Code — Country

CUSTOMER SUBMITTAL INFORMATION

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
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts Produced at Other or Additional Location
- ☐ 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 Appearrance 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 251.1.1080.50)
- inside geometry on differential side, surface where to calculate parallelism under the bolt head, bore chamfer
- shot peening standard change
- Identification groove

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

Organization Authorized Signature: [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: [signature] Date: 23.03.18

Print Name: Customer Tracking No.:

New P/N introduction - 1300.50
Short description: Initial PPAP (only differences from 1080)

	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	n.a.		
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	n.a.		
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	n.a.		
18	Part Submission Warrant (PSW)	Yes		Yes

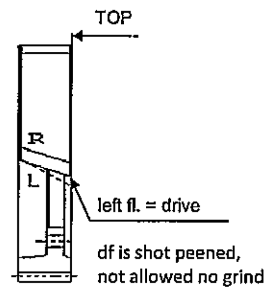
	Other requirements			
1	PSW Raw part	Yes		Yes
2	PSW E.P. part	NO		
3	PSW Engagement Rings	NO		

23/03/2018

STIRNRAD / GEAR	außenverzahnt / external
Zähnezahl / Number of teeth, z	70
Modul / Normal module, m_n	2.650000
Eingriffswinkel / Normal pressure angle, α_n	20° 0' 0"
Schrägungswinkel / Helix angle, β	24° 0' 0"
Steigungsrichtung / Hand of helix	RECHTS
Profilverschiebungsfaktor / Addendum modification coeff., x	0.004
Teilkreisdurchmesser / Pitch diameter, d	203.055
Kopfkreisdurchmesser / Outside diameter, d_a	$211.50_{-0.30}$
Kopfnutzkreisd. theo. max. / Tip diam. usable theo., d_{Na}	211.05
Kopfnutzkreisd. theo. min. / Tip diam. usable theo., d_{Na}	210.70
Fußkreisdurchmesser / Root diameter, d_f	$195.45_{-0.30}$
Fußnutzkreisdurchmesser / Root diameter usable, d_{Nf}	199.17
Grundkreisradius / Base circle radius, r_b	94.317
Grundkreisdurchmesser / Base diameter, d_b	188.635
Normalzahndicke max. / Normal tooth thickness, s_n	4.093
Normalzahndicke min. / Normal tooth thickness, s_n	4.068
Meßzähnezahl / Number of teeth spanned, k	11
Zahnweite max. / Base tangent length, W_k	85.438
Zahnweite min. / Base tangent length, W_k	85.414
Meßkugeldurchmesser / Ball diameter, D_M	4.0000
Diam. Zweikugelmaß max. / Measurement o. balls, M_{dK}	207.122
Diam. Zweikugelmaß min. / Measurement o. balls, M_{dK}	207.053
Verdrehflankenspiel theo. / Circumferential backlash	0.065 0.168

Toleranzen der Verzahnung (DIN 3961 vom Aug. 1978) gültig für Werte am Einzelzahn (7)
Tolerances of gearing (DIN 3961 of Aug. 1978) valid for values at individual tooth

	linke Fl. / left flank	rechte Fl. / right flank		
Profil-Formabweichung / Profile form error, $f_{f\alpha}$	0.005		Eingriffsteilungs-Abweich. / Normal pitch error, f_{pe}	0.011
Profil-Gesamtabweichung / Total profile error, F_α			Teilungs-Einzelabweichung / Adjacent pitch error, f_p	0.011
Profil-Winkelabweichung / Profile angle error, $f_{H\alpha}$	- 0.019 ± 0.009	- 0.011 ± 0.009	Teilungssprung / Diff. bet. adjacent pitches, f_u	0.014
Flankenl.-Winkelabweich. / Tooth alignment error, $f_{H\beta}$	+0.005 ± 0.008	0.000 ± 0.008	Teilungs-Summenabweich. / Cumulative circ. pitch error, F_{pk}	
Flankenl.-Gesamtabweich. / Total alignment error, F_β			Rundlaufabweichung / Radial run-out, F_r	0.032
Flankenl.-Formabweich. / Longitudinal alignment err., $f_{f\beta}$	0.005		Zahndickenschwankung / Range of tooth thickn. error, R_s	
Teilungs-Gesamtabweich. / Cumulative pitch error, F_p	0.045			
Einf.-Wälzabweichung / Tangential composite error, F_i'			Zweifl.-Wälzabweichung / Radial composite error, F_i''	0.036
Einflanken-Wälzsprung / Tang. tooth to tooth comp. err., f_i'			Zweifl.-Wälzsprung / Radial tooth to tooth comp. err., f_i''	0.016
Radbreite im Meßkreis d_M / Facewidth in meas. diam., b	30.30		Meßkreis Krümmungsradius / Radius of curvature meas. diam., ρ_{dM}	37.61

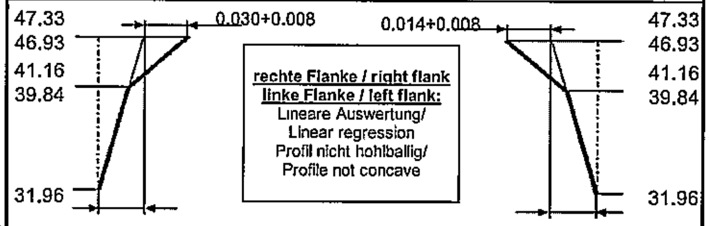


#Waviness evaluation (fitted sine) in profile and helix direction until 4th gear order to be documented according to G_00_05_S_0012
Order referenced to the considered gear
(a)

Bezugsprofil-Schleifscheibe
Grinding tool data
Schleifscheibenkopfhöhe / Grinding wheel tip height h_{aP0S} = 3.300
Schleifscheibenkopfradius / Grinding wheel tip radius ρ_{aP0S} = 0.600
Schleifdurchmesser / grinding diameter = $197.63_{-0.30}$ ≡ 29.47

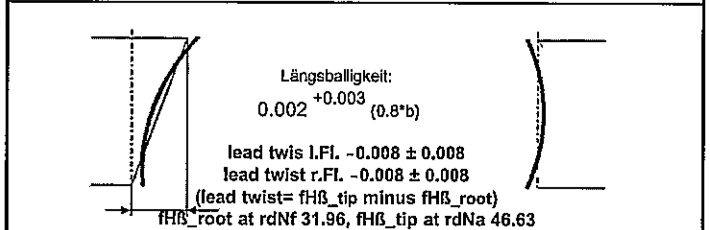
Vorbearbeitungsdaten siehe Verzahnungsblatt Vorbearbeitung gleicher Nr.
For pre-machining dimensions, see gear data sheet same number

Wkz-Profil siehe Werkzeugdatenblatt Nr. / For Tooth profile, see tool data sheet number: 251.1.0784.51



$f_{H\alpha}$ = - 0.019 ± 0.005 average values before assembling $f_{H\alpha}$ = - 0.011 ± 0.005

* Schreibbeginn / * Start of checking Ø = $197.63_{-0.30}$ ≡ 29.47



$f_{H\beta}$ = + 0.005 ± 0.004 average values before assembling $f_{H\beta}$ = 0.000 ± 0.004

* ffαf (zwischen dNf und dem Schreibbeginn ds) max ffα/2, jedoch 0.003 zulässig
* ffαf (between dNf and start of checking ds) max ffα/2, 0.003 allowable.

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

Profile and helix checking according to G_808006 and VDI/VDE 2612
Tooth trace testing area Lβ = 0.8*b calculated to 1.0*b
Terms of the tooth system according to DIN (German Industrial Standards) No. 868, 3960, 3998

Buch.	Anz.	Änd.Nr.		Datum	Name
a	1	C011518	See CO	20171108	Cricenti

Verteiler:

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

Abbildungen sind unmaßstäblich. / Diagrams not to scale.

Ersatz für:
Erstverwendung bei Getriebetype: 251

Remark:

	Datum	Name
gez.	03.05.2017	Fabrizio, Cricenti
gepr.		

Verzahnungsblatt Endkontrolle
Final Check Gear Data

Benennung: / Naming: Zahnkranz

Zeichnungsnummer: / Drawing number: **251.1.1300.50**

RG_7DCT300_Gearset_1A-21A_&_21H

Soft Turning
Weisser DRA-10058
Weisser DRA-10059

drilling
Chiron BOA-10394

hobbing
Pfauter FRW-10073
Pfauter FRW-10189

deburring
Tecnomacchine EGW-11005

heat treatment
ECM Furnace 7

shot peening
Pangborn OKU-10418

hard turning
Emag DRA-10096
Emag DRA-10190

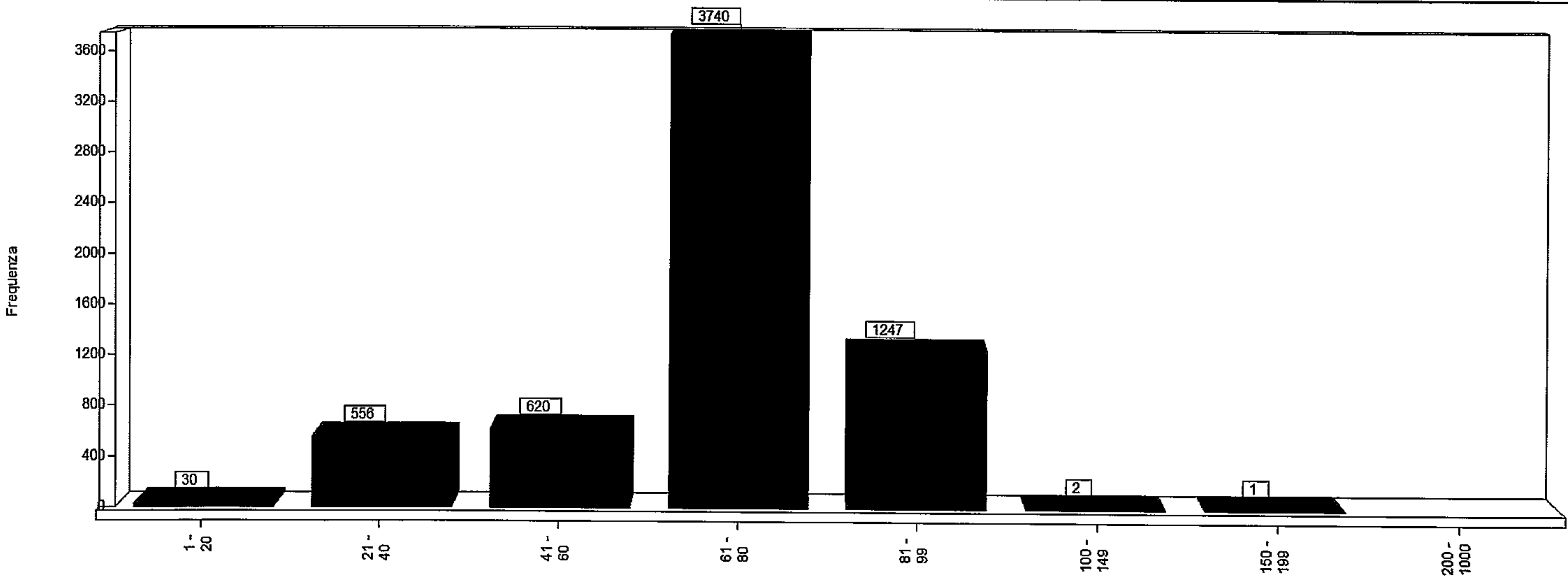
grinding gear teeth
Reishauer RZ303 SLW - 11046

washing
Duerr ORE-11033

Packing

DCT300 – GEASRSET: PFMEA RPN Status

GETRAG	FMEA Processo		Numero: 1.2.1.1.1.1 Pagina:
Tipo/Modello/Produzione/Lotto: 7DCT300	Numero Disegno: Gearset 1A + 21A + 21H 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., Terlizzese, Landriscina, Guerra, Sinibaldi, Caponio, Vicenti, Picerno, Pierro Ditta:	Emesso: 13/01/2017 Modificato: 06/03/2018



Actions ongoing – RPN > 100:

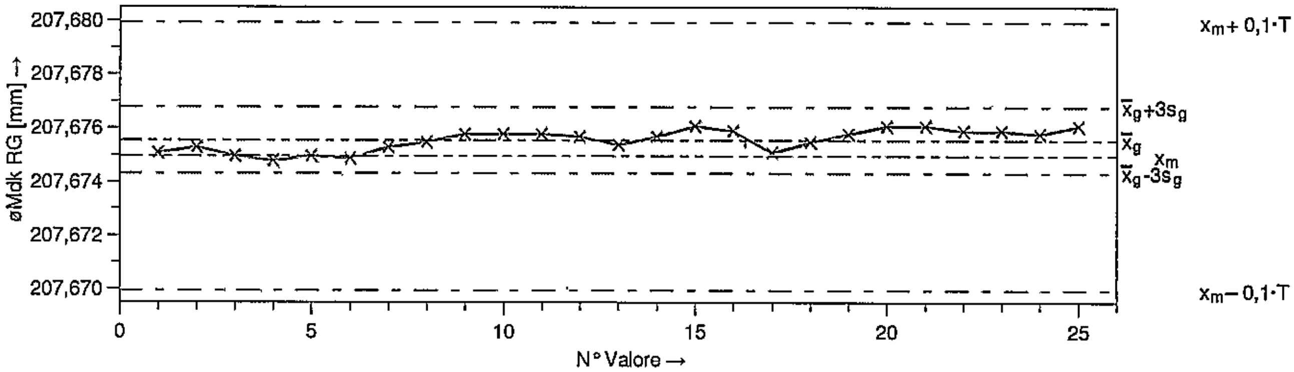
Chr. Classification	Project	Component	Operation	Chr. Description	Actual RPN S	Actual RPN O	Actual RPN D	Actual RPN RPN	Action	Resp.	Due date	Min. RPN expected S	Min. RPN expected O	Min. RPN expected D	Min. RPN expected RPN
<M>	DCT300	SG1	Hard Turning	Clutch body Height	7	4	4	112	Final drawing tolerance 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	112	New part workstop 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	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	20-Apr-18	8	3	5	(120)
									New machine Junker implementation for Diam. grinding operation		31-Aug-18	8	2	5	(80)

Q-DAS	# Capacità strumenti di misura	Pagina 1 / 1

Data/ora 16/03/2018	Nome oper. mario.bozza	Reparto/Area/Prod. WLQ	Posto di prova Dentatura RG

Calibro		Master		Caratteristica			
Desc. calibro	Banchetto in acciaio	Desc. mast.	Master RG	Desc. Car.	øMdk RG		
N° calibro	MVZ 406001 013	N° master	MVZ 400616 001	N° Caratt.	2511130050_21H		
Ris. calibro	0,0001	Valore reale mast.	207,675	Val. Nom.	207,6830	LSS	207,708 ≙ 0,0250
Caus. Pr.	Cg CgK	Unità di misura	mm	Unità di m	mm	LSI	207,658 ≙ -0,0250

Nota



i	x_i	i	x_i	i	x_i	i	x_i	i	x_i
1	207,6751	6	207,6749	11	207,6758	16	207,6759	21	207,6761
2	207,6753	7	207,6753	12	207,6757	17	207,6751	22	207,6759
3	207,6750	8	207,6755	13	207,6754	18	207,6755	23	207,6759
4	207,6748	9	207,6758	14	207,6757	19	207,6758	24	207,6758
5	207,6750	10	207,6758	15	207,6761	20	207,6761	25	207,6761

Valori a disegno			Valori Calcolati			Statistiche		
$x_m+0,1 \cdot T$	=	207,680000	$x_{max\,g}$	=	207,6761	$\bar{x}_g+3s_g$	=	207,676811
x_m	=	207,675000	$x_{min\,g}$	=	207,6748	$\bar{x}_g$	=	207,675576
$x_m-0,1 \cdot T$	=	207,670000	R_g	=	0,0013	$\bar{x}_g-3s_g$	=	207,674341
$0,2 \cdot T$	=	0,010000	n_{tot}	=	25	$6s_g$	=	0,002469
T	=	0,0500				s_g	=	0,000412
Unità di misura	=	mm				|Bi|	=	0,00057600
						n_{eff}	=	25

Test per Bias			Risultati del test : significativo (α ≤ 0,1%)
Bias	=	1,15%	

			Minimo riferimento per sistema di misura capace		
Risoluzione	%RE = 0,20%	0 … 5	$T_{min\,(\%RE)}$	=	0,00200
$C_g = \frac{0,2 \cdot T}{4 \cdot s_g}$	= 4,37 ≤ **6,07** ≤ 7,78	0 … 1 1,33	$T_{min\,(C_g)}$	=	0,0110
$C_{gk} = \frac{0,1 \cdot T - \lvert \bar{x}_g - x_m \rvert}{2 \cdot s_g}$	= 3,85 ≤ **5,37** ≤ 6,90	0 … 1 1,33	$T_{min\,(C_{gk})}$	=	0,0167

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

☐ GETRAG MSA 2017: Capability of measuring system (Type-1 Study)

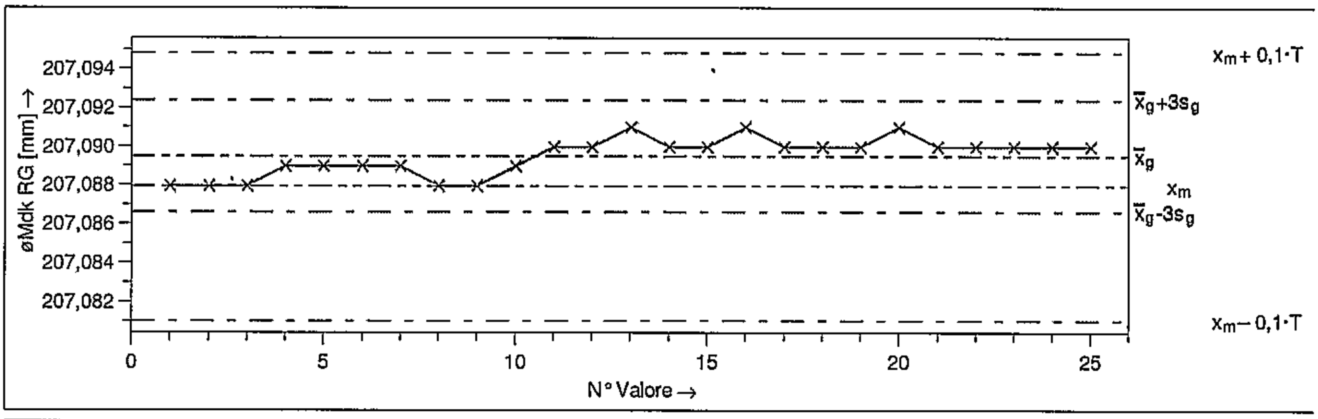
Data ____________ Firma ____________ Dipartimento ____________

Capacità strumenti di misura

Data od. 29/11/2017	Nome oper. mario.bozza	Reparto/Area/Prod. NN	Posto di prova Rettifica denti RG

Calibro		Master		Caratteristica	
Desc. calibro	Banchetto in acciaio	Desc. mast.	BPP	Desc. Car.	øMdk RG
N° calibro	MVZ 406001 037	N° master	MJU 416161 004	N° Caratt.	2511130050_21H
Ris. calibro	0,001	Valore reale mast.	207,088	Val. Nom. 207,0875 LSS	207,122 $\hat{=}$ 0,0345
Caus. Pr.	Cg CgK	Unità di misura	mm	Unità di m mm LSI	207,052 $\hat{=}$ -0,0346

Nota Banchetto øMdk MVZ 406001 037 per ruote dentate hard



i	x_i	i	x_i	i	x_i	i	x_i	i	x_i
1	207,0880	6	207,0890	11	207,0900	16	207,0910	21	207,0900
2	207,0880	7	207,0890	12	207,0900	17	207,0900	22	207,0900
3	207,0880	8	207,0880	13	207,0910	18	207,0900	23	207,0900
4	207,0890	9	207,0880	14	207,0900	19	207,0900	24	207,0900
5	207,0890	10	207,0890	15	207,0900	20	207,0910	25	207,0900

Valori a disegno			Valori Calcolati			Statistiche		
x_m	=	207,088000				$\bar{x}_g$	=	207,089520
LSI	=	207,0529	$x_{min\,g}$	=	207,0880	s_g	=	0,000963
LSS	=	207,1220	$x_{max\,g}$	=	207,0910	$\lvert Bi \rvert = \lvert \bar{x}_g - x_m \rvert$	=	0,0015200
T	=	0,0691	R_g	=	0,0030			
			n_{tot}	=	25	n_{eff}	=	25

Minimo riferimento per sistema di misura capace

$C_g = \frac{0{,}2 \cdot T}{4 \cdot s_g}$	=	3,59	0 1 1,33	$T_{min\,(C_g)}$	=	0,0256
$C_{gk} = \frac{0{,}1 \cdot T - \lvert \bar{x}_g - x_m \rvert}{2 \cdot s_g}$	=	2,80	0 1 1,33	$T_{min\,(C_{gk})}$	=	0,0408
%RE	=	1,45%	0 5	$T_{min\,(\%RE)}$	=	0,0200

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

GETRAG Corp Group 2011: Type 1

Data ____________ Firma ____________ Dipartimento ____________

GETRAG Production Part Approval

DIMENSIONAL TEST RESULTS

Organization:	GETRAG	Part Number:	251.1.1300.50
Supplier/Vendor Code:	GETRAG Modugno	Part Name:	Ring Gear
INSPECTION FACILITY:	NA	Design Record Change Level:	3 Index "b"
		Engineering Change Documents:	C011951MIP2 - 25/01/2018

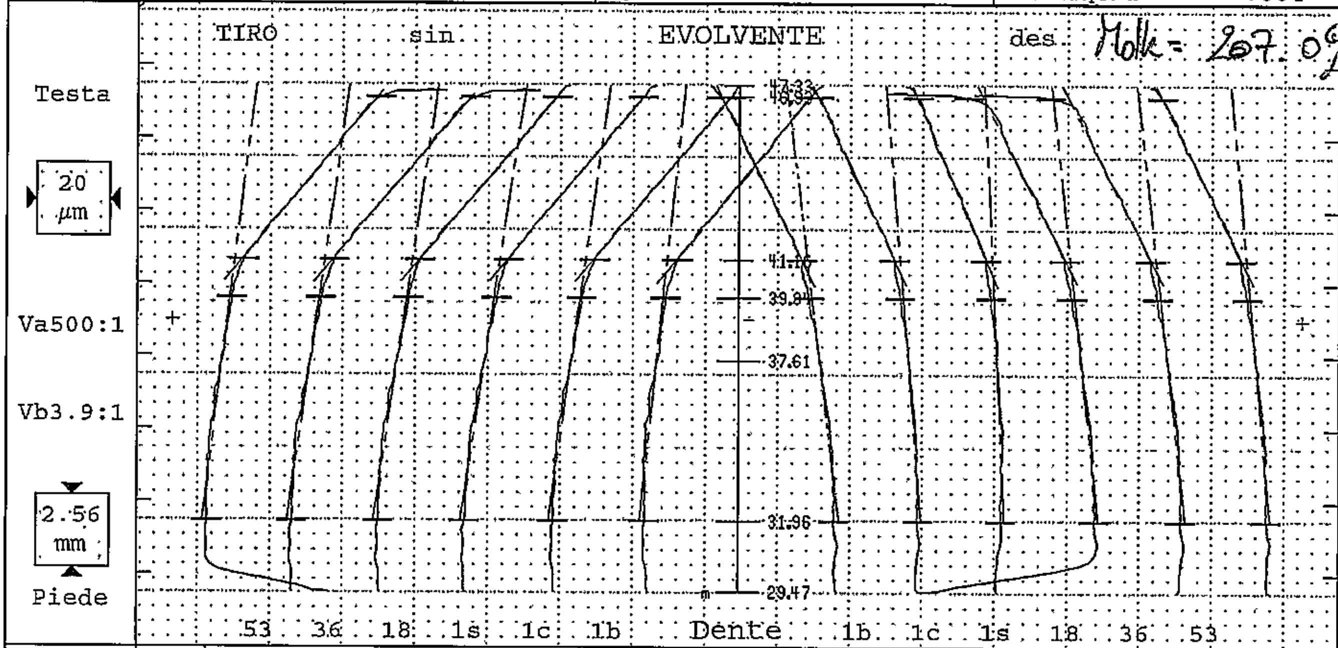
Item	Dimension/Specification	Specification / Limits		Classif.	Qty. Tested	Organization Measurement Results (Data) 1	2	3	4	5	controllo distruttivo	Ok	Not Ok
1	Teeth Profile & Lead, Pitch, Fourier	OK	NOK		5	OK	OK	OK	OK	OK		OK	
2	MdK	207.122	207.053	<M>	5	207.090	207.085	207.092	207.097	207.087		OK	
3	df	195.450	195.150		5	195.263	195.274	195.325	195.311	195.324		OK	
4	da	211.500	211.200		5	211.215	211.288	211.312	211.218	211.205		OK	
5	Fr	32	0	<M>	5	17.5	6.8	15.3	7.5	13.0		OK	
6	Surface Parallelism under bolt head (10x) - Max Value	0.070	0.0		5	0.053	0.051	0.051	0.052	0.052		OK	
7	Residual Stress according G_804010 - Z19	OK	NOK	<M>	1						OK	OK	
8	Bore chamfer width	0.550	0.150		5	0.390	0.478	0.519	0.481	0.452		OK	
9	Bore chamfer angle	23.000	17.000		5	19.839	20.165	20.587	20.787	19.939		OK	
10a	Id. groove position (dist.)	3.300	2.700		5	2.936	2.951	2.962	2.953	3.003		OK	
10b	Id. groove width	1.800	1.200		5	1.683	1.692	1.728	1.756	1.554		OK	
10c	Id. groove R angle	30.500	24.500		5	27.209	26.854	25.223	26.102	24.529		OK	
10d	Id. groove L angle	30.500	24.500		5	26.222	25.721	25.875	28.054	27.417		OK	
10e	Id. groove depth	0.200	0.100		5	0.199	0.180	0.189	0.200	0.199		OK	
10f	Id. groove L radius	1.000	0.700		5	0.853	0.847	0.892	0.829	0.703		OK	
10g	Id. groove R radius	1.000	0.700		5	0.925	0.966	0.926	0.926	0.917		OK	
11	Max int. distance	171.300	170.700		5	171.015	170.981	170.824	171.147	170.983		OK	
12	Int. angle	81.000	75.000		5	78.180	78.068	78.092	77.996	78.068		OK	
13	Int. radius distance	0.300	0.000		5	0.256	0.162	0.279	0.263	0.162		OK	
14	Int. soft radius	4.000	2.000		5	3.249	2.763	3.001	3.092	2.763		OK	
15	Int. machined radius	1.400	1.100		5	1.255	1.345	1.304	1.184	1.345		OK	

SIGNATURE	TITLE	DATE
Vicenti D.	ME	23/03/2018

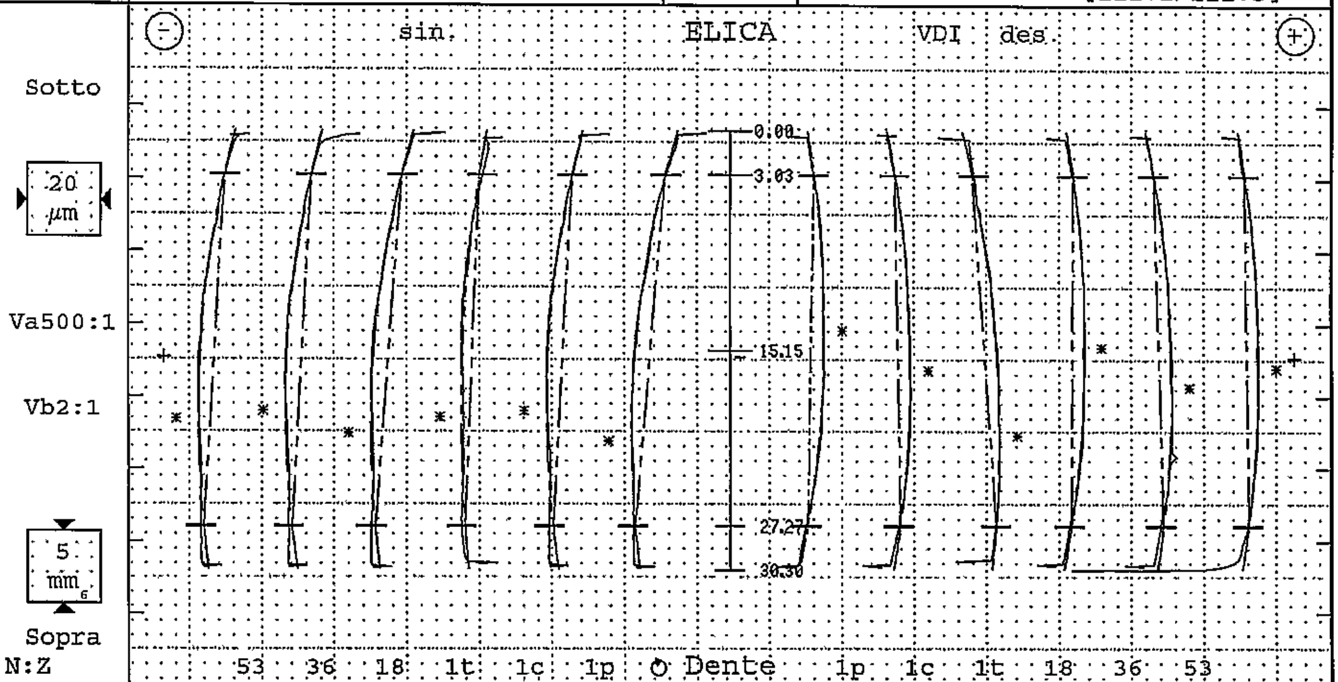
Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0416a04 0 PNC35 B4784	Controllore: TURNO d		Data: 19.01.2018 06:21
Denominazione: ring gear	Numero denti z	70	Largh.fasc.dent. b 30.3mm
Numero disegno.: D51.1.1300.50-IF	Modulo m	2.65mm	Tratto evolv. La 7.88mm
Commessa/serie nr.: 4.DF9-32 -1	Angolo pressione	20°	Tratto elica Lß 24.24mm
Masch.Nr.: M001 Spindel: Formm	Angolo elica	24°	Inizio elab. M1 31.96mm
Untersuchungszweck: Laufende Messung	Ø Base db	188.6348mm	Palpatore Ø (#2)1mm
Werkzeug: Charge:	Ang. Base	22.47°	Fat.scor.pr. x .004

Molk= 207.0%



Tolerance		Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm	-19±5	-16.2	Var a 2.9							-11±5	Var a 3.3						-11.6	
fHα	-19±9	-16.2	-14.3	-16.7	-17.2	-17.3	-16.4	-12.1		-11±9	-14.2	-9.9	-5.4	-12.7	-13.2	-10.6	-11.6	
Fα		3.0	3.5	2.9	2.7	2.3	2.8	4.3			2.6	2.0	3.6	1.9	2.2	1.7	2.0	
ffα	5	2.2	2.1	2.4	2.2	2.0	2.2	2.5		5	2.1	1.7	1.7	1.8	2.0	1.6	1.8	
Cα	-38/-30	-33.7	-33.9	-33.9	-33.3	-32.9	-33.6	-34.8		-22/-14	-18.4	-18.9	-18.7	-19.1	-19.4	-19.2	-19.2	
ffαf	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø[mm]		195.263	[195.15/195.45]								211.215	[211.2/211.5]						



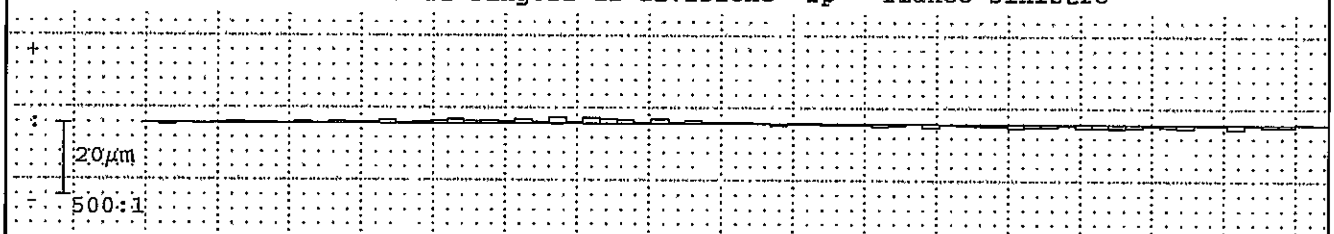
fHßm	5±4	7.5	Var ß 2.7							±4	Var ß 3.9						-1.5	
fHß	5±8	7.5	7.3	6.8	9.3	5.0	6.6	10.4		±8	2.3	-1.8	-8.1	0.6	-3.3	-1.4	-1.5	
Fß		3.6	3.1	3.1	5.0	2.1	3.1	5.3			3.1	2.7	6.3	2.5	5.0	2.4	3.2	
ffß	5	1.5	1.3	1.4	1.7	1.7	1.7	1.0		5	0.8	0.8	0.6	0.9	2.5	0.7	1.2	
Cß	2/5	4.0	3.8	4.0	4.0	2.7	4.0	4.1		2/5	3.7	3.7	3.4	3.5	3.5	3.2	3.5	
Bd	-8±8	-5.4								-8±8							-10.4	

GCG 808006

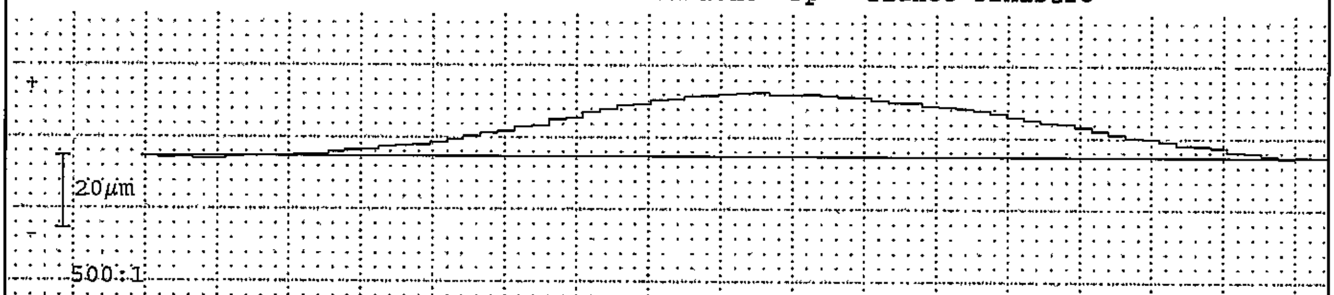
Ruota cilindrica Divisione

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore: TURNO d	Data: 19.01.2018 06:21
Denominazione:	ring gear	Numero denti z 70	Angolo pressione 20°
Numero disegno.:	D51.1.1300.50-IF	Modulo m 2.65mm	Angolo elica 24°
Commessa/serie nr.:	4.DF9-32 -1	Untersuchungszweck: Laufende Messung	
Masch.Nr.:	M001	Spindel: Formmeter 1 Getriebe:	Charge:

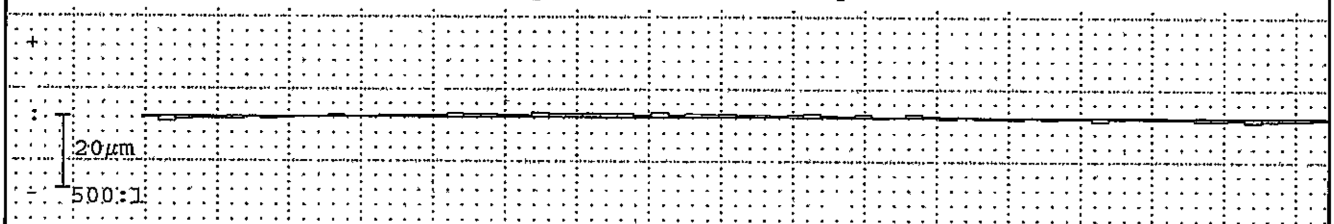
Errori singoli di divisione fp fianco sinistro



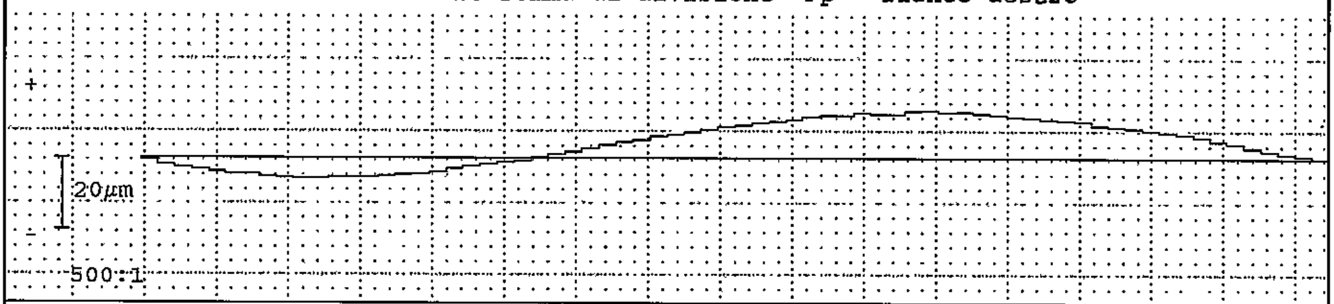
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



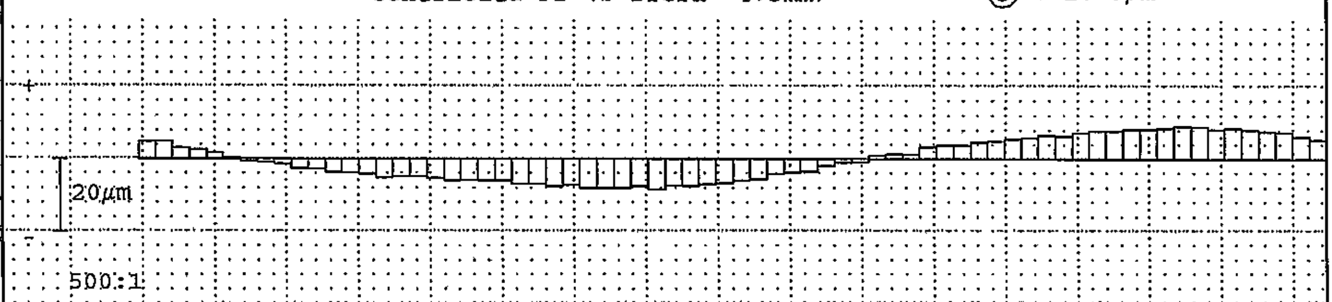
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:203.079 z=15.2mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	1.6		11.0		1.4		11.0	
Gr. salto di passo	fu max	1.1		14.0		1.0		14.0	
Scarto di divisione	Rp	2.8				2.5			
Err. globale di divisione	Fp	18.5		45.0		18.9		45.0	
Err. cordale di divisione	Fpz/8	8.6				7.7			

Centricità Fr (Ø-sfera =4.5mm) ◎ : 16.3µm



Err. di concentricitá	Fr	17.5	32.0	
Variaz. spessore dente	Rs			

KLINGELNBERG

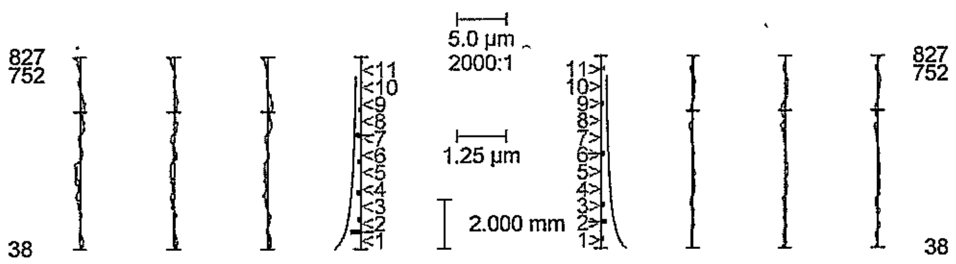
KLINGELNBERG

Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-32 Scopo: Laufende Messung 06:21 / 06:27
Macchina: M001 Mandrino: Formnest 1 z= 70

Evolvente senza modifiche effettive

+/- sinistro Spettro medio 1/2

36 18 1 b 1 b 1 b 1 b 18 36

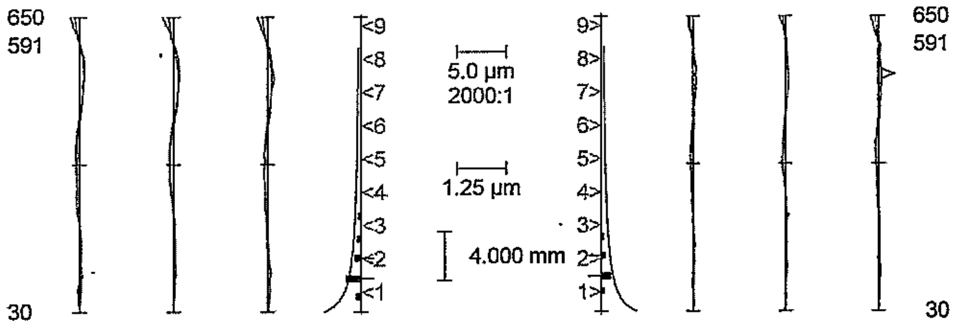


A1	0.25	0.13
A2	0.12	0.08
O(1)	109	147
O(2)	506	427

Elica senza modifiche effettive

+/- sinistro destro -/+

36 18 1 b 1 b 1 b 1 b 18 36



A1	0.37	0.23
A2	0.15	0.10
O(1)	100	104
O(2)	143	147

■ Spettro ■ 4.DF9-32_20180119062106

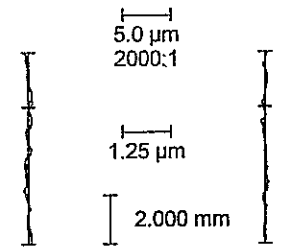
KLINGELNBERG

Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-32 Scopo: Laufende Messung 06:21 / 06:27
Macchina: M001 Mandrino: Formnest 1 z= 70

Evolvente senza modifiche effettive

+/- sinistro Spettro medio 2/2

53 53

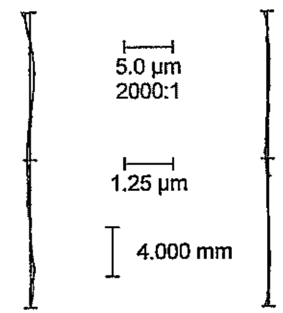


A1
A2
O(1)
O(2)

Elica senza modifiche effettive

+/- sinistro destro -/+

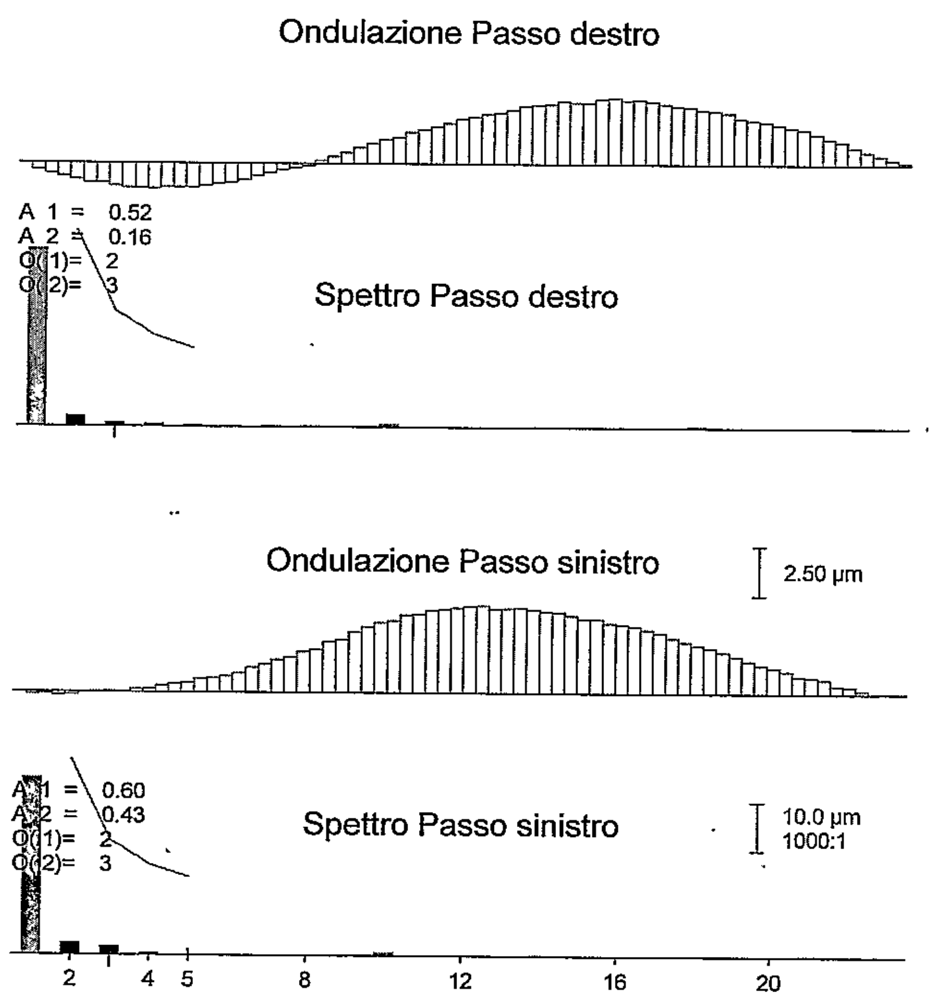
53 53



A1
A2
O(1)
O(2)

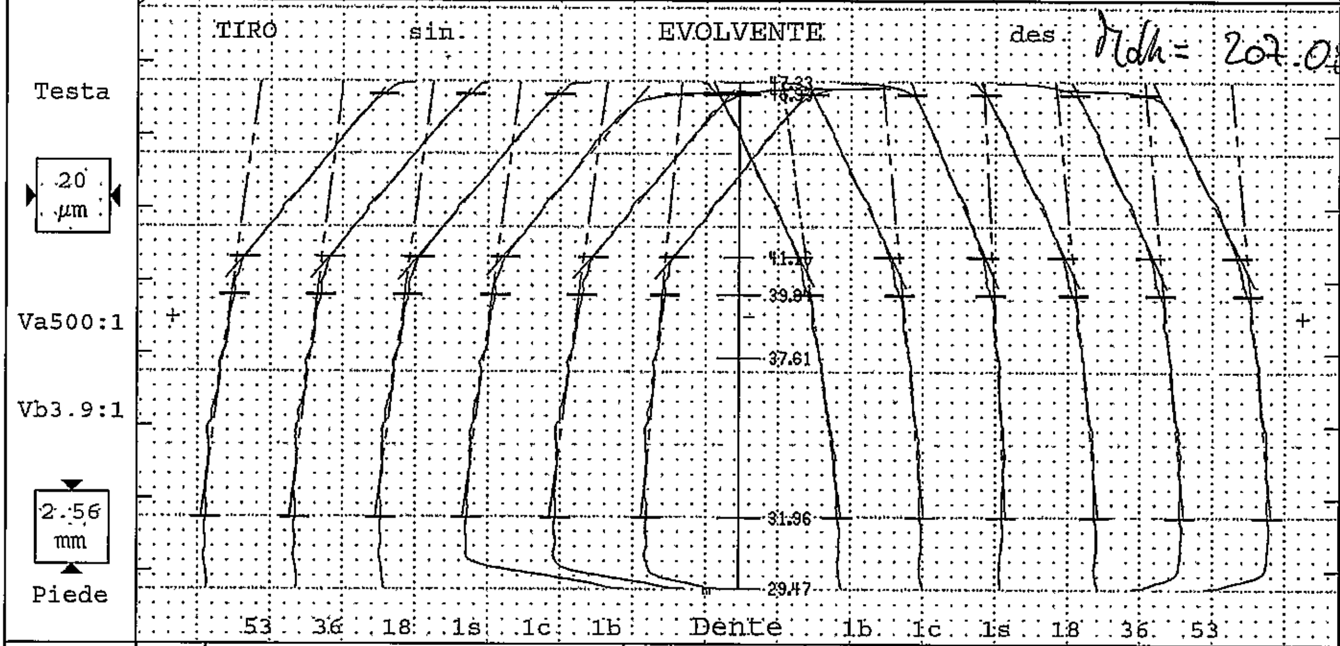
■ Spettro ■ 4.DF9-32_20180119062106

KLINGELNBERG	Numero di disegno: D51.1.1300.50-IF	Denominazione: ring gear	19.01.18
	Serie nr: 4.DF9-32	Scopo: Laufende Messung 08:21	/ 06:27
	Macchina: M001	Mandrino: Formnest 1	z= 70

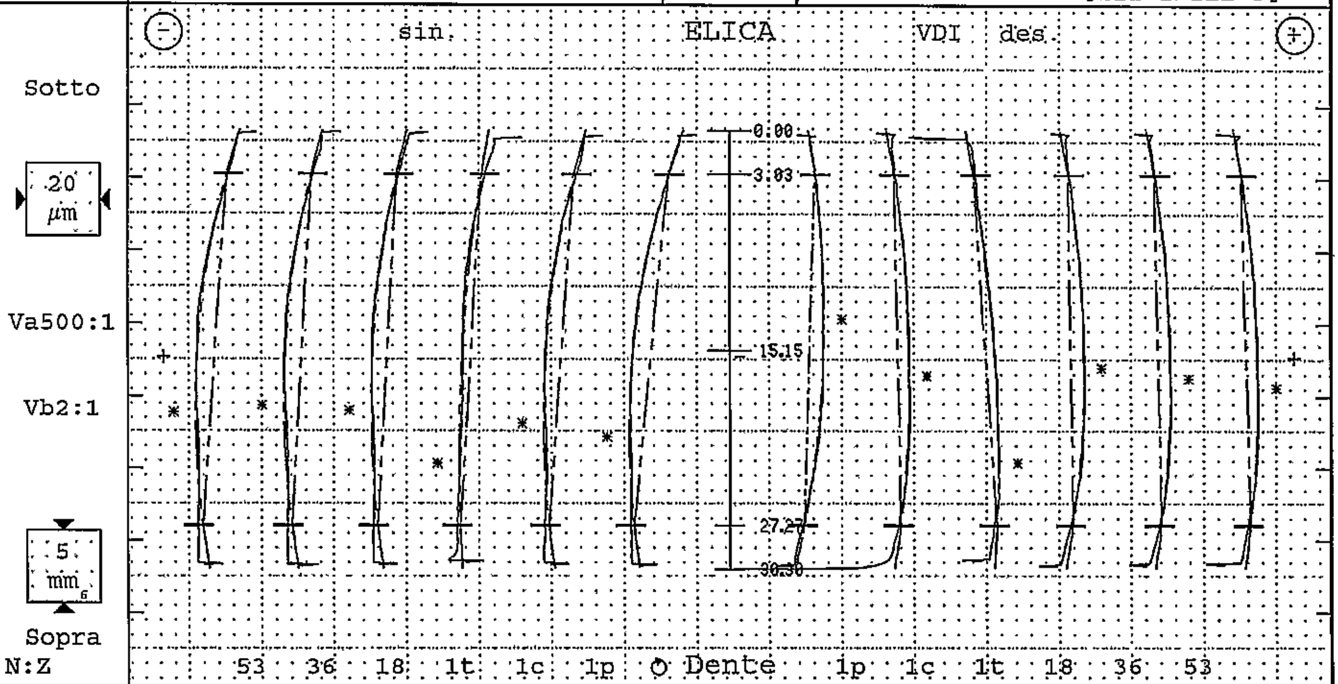


Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore:	TURNO C	Data:	19.01.2018 06:12
Denominazione:	ring gear	Numero denti z	70	Largh.fasc.dent. b	30.3mm
Numero disegno.:	D51.1.1300.50-IF	Modulo m	2.65mm	Tratto evolv. Lα	7.88mm
Commessa/serie nr.:	4.DF9-31 -2	Angolo pressione	20°	Tratto elica Lß	24.24mm
Masch.Nr.:	M001 Spindel: Formmess	Angolo elica	24°	Inizio elab. M1	31.96mm
Untersuchungszweck:	Laufende Messung	Ø Base db	188.6348mm	Palpatore Ø	(#2)1mm
Werkzeug:	Charge:	Ang. Base	22.47°	Fat.scor.pr. x	.004



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm -19±5	-15.2	Var a 1.5							-11±5	Var a 0.9						-11.0	
fHα -19±9	-15.2	-15.8	-14.3	-15.4	-15.4	-15.2	-10.7		-11±9	-15.9	-11.2	-5.9	-11.4	-10.5	-10.7	-11.0	
Fα	3.8	3.6	4.0	3.6	3.4	4.0	5.6			3.3	1.7	3.5	1.7	1.9	1.9	1.8	
ffα 5	2.9	2.9	2.7	2.8	2.2	3.2	2.6		5	1.8	1.7	1.7	1.7	1.8	1.8	1.8	
Ca -38/-30	-34.2	-33.6	-34.4	-34.2	-33.8	-34.4	-34.5		-22/-14	-17.8	-19.3	-19.0	-19.3	-19.0	-20.2	-19.5	
ffαf 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø[mm]	195.274	[195.15/195.45]								211.288	[211.2/211.5]						



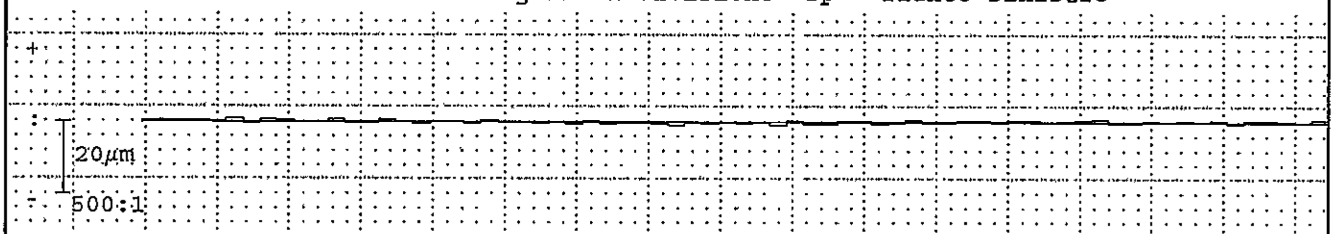
Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHßm 5±4	7.6	Var ß 2.0							±4	Var ß 1.5						-2.4	
fHß 5±8	7.6	8.3	6.7	6.6	7.4	8.6	11.9		±8	3.7	-2.3	-8.1	-1.7	-2.5	-3.2	-2.4	
Fß	4.5	4.9	3.9	3.5	6.6	5.6	6.9			4.5	2.6	5.9	2.4	2.6	3.1	2.7	
ffß 5	1.9	1.9	1.8	1.8	1.7	1.9	1.4		5	0.9	0.9	1.2	1.1	0.9	0.9	1.0	
Cß 2/5	4.4	4.8	4.5	4.0	2.3	4.2	4.9		2/5	3.9	3.5	2.5	3.8	3.5	3.2	3.5	
Bd -8±8	-4.5								-8±8							-11.8	

GCG 808006

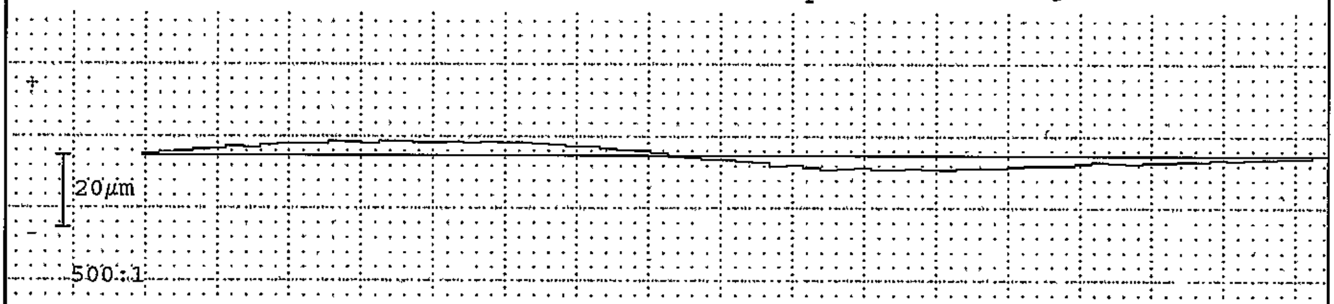
Ruota cilindrica Divisione

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore:	TURNO C	Data:	19.01.2018 06:12
Denominazione:	ring gear	Numero denti z	70	Angolo pressione	20°
Numero disegno.:	D51.1.1300.50-IF	Modulo m	2.65mm	Angolo elica	24°
Commessa/serie nr.:	4.DF9-31 -2	Untersuchungszweck:	Laufende Messung		
Masch.Nr.:	M001 Spindel: Form[illegible]			Charge:	

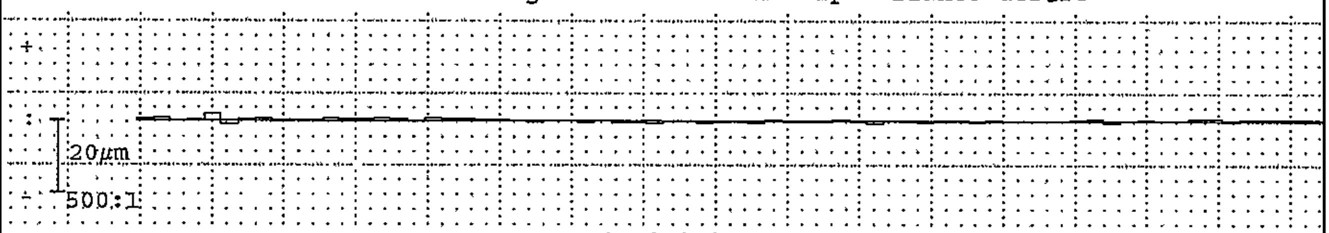
Errori singoli di divisione fp fianco sinistro



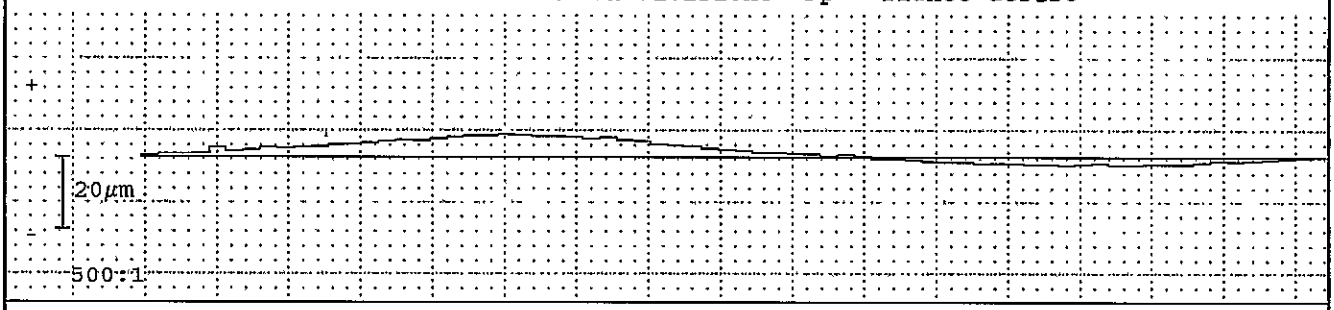
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



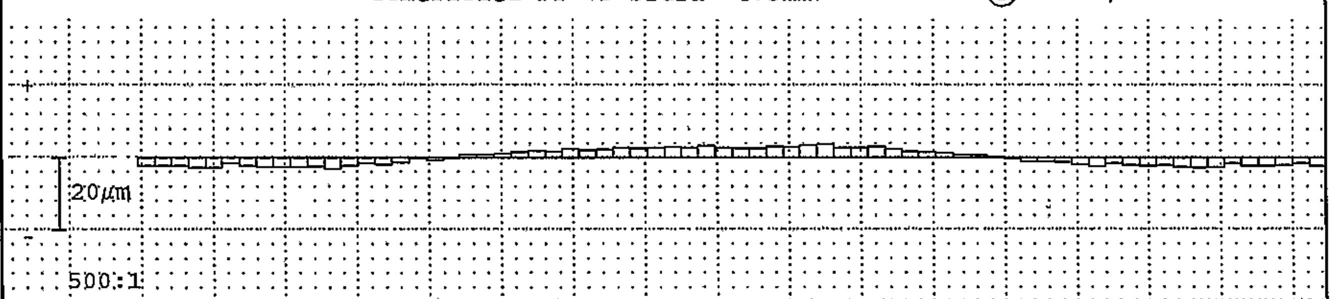
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:203.079 z=15.2mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	0.9		11.0		1.8		11.0	
Gr. salto di passo	fu max	1.3		14.0		2.8		14.0	
Scarto di divisione	Rp	1.7				2.8			
Err. globale di divisione	Fp	8.1		45.0		8.6		45.0	
Err. cordale di divisione	Fpz/8	4.4				4.1			

Centricità Fr (Ø-sfera =4.5mm) ◎ : 5.9µm



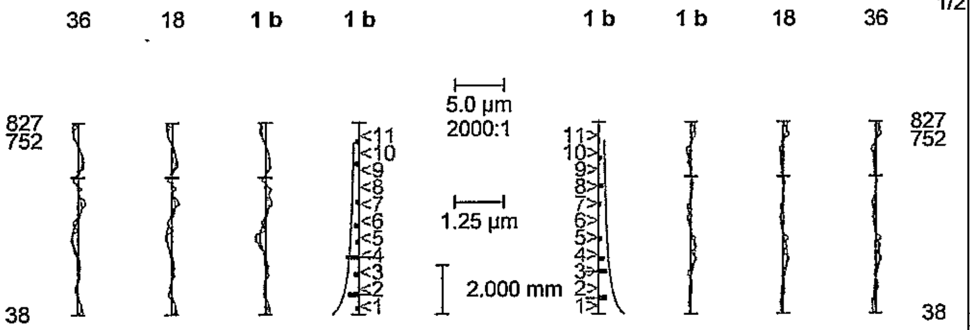
Err. di concentricitá	Fr	6.8	32.0	
Variaz. spessore dente	Rs			

KLINGELNBERG

KLINGELNBERG

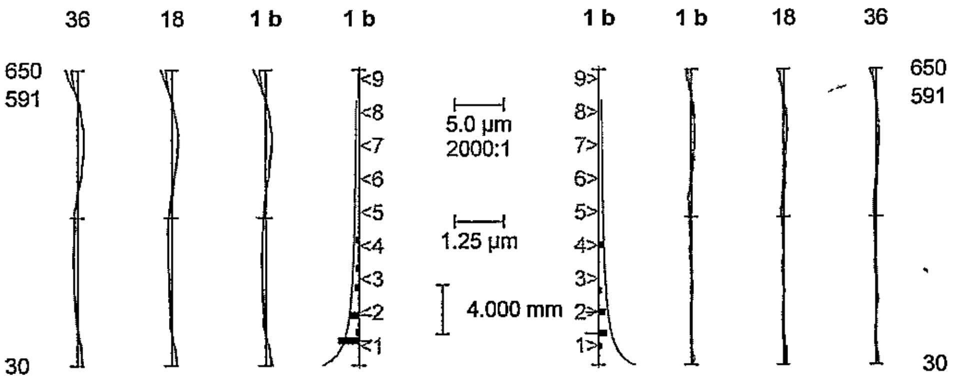
Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-31 Scopo: Laufende Messung 06:12 / 06:18
Macchina: M001 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 1/2



A1	0.30	0.20
A2	0.25	0.19
O(1)	273	213
O(2)	119	103

+/- sinistro **Elica senza modifiche effettive** destro -/+



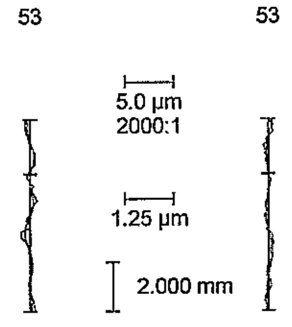
A1	0.51	0.18
A2	0.20	0.15
O(1)	82	96
O(2)	135	140

■ Spettro ■ 4.DF9-31_20180119061207

KLINGELNBERG

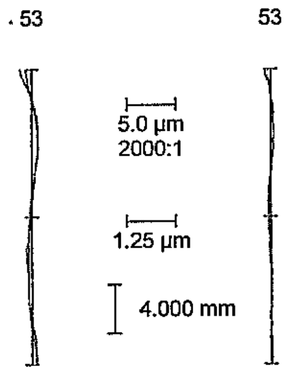
Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-31 Scopo: Laufende Messung 06:12 / 06:18
Macchina: M001 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 2/2



A1
A2
O(1)
O(2)

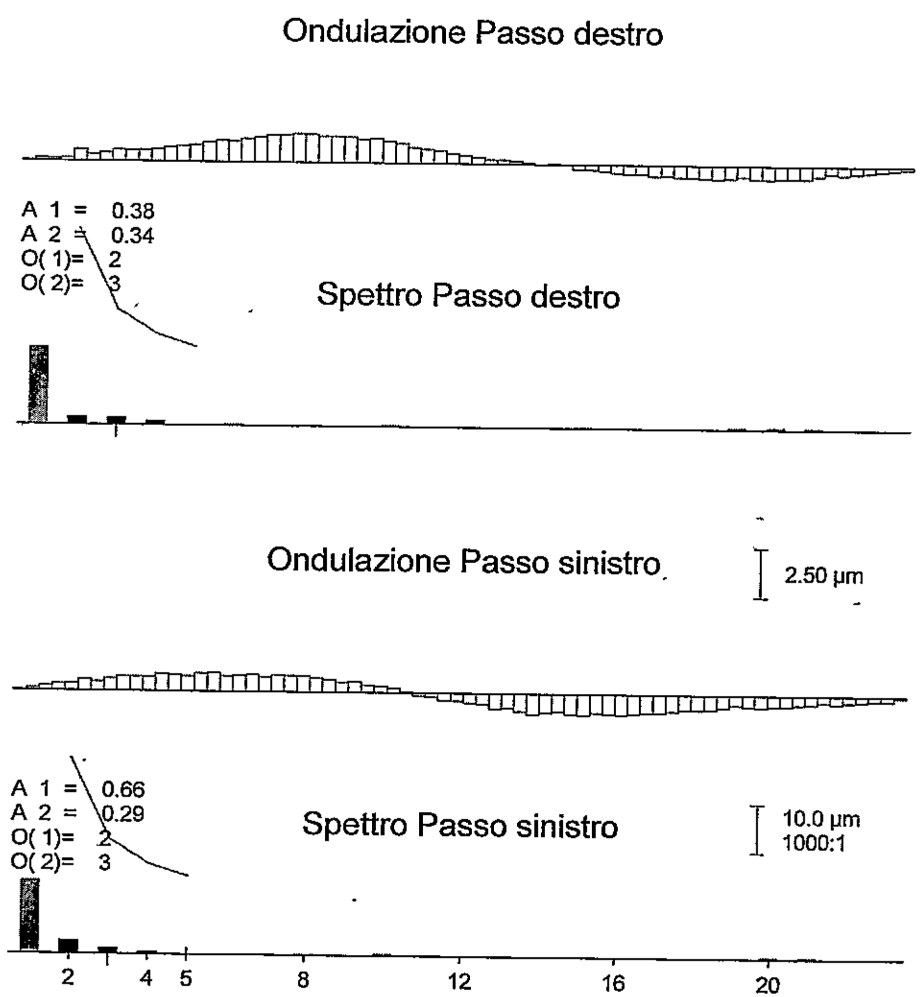
+/- sinistro **Elica senza modifiche effettive** destro -/+



A1
A2
O(1)
O(2)

■ Spettro ■ 4.DF9-31_20180119061207

KLINGELNBERG	Numero di disegno: D51.1.1300.50-IF	Denominazione: ring gear	19.01.18
	Serie nr: 4.DF9-31	Scopo: Laufende Messung 08.12	/ 06:18
	Macchina: M001	Mandrino: Formnest 1	z= 70



Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore:	TURNO C	Data:	19.01.2018 06:04
Denominazione:	ring gear	Numero denti z	70	Largh.fasc.dent. b	30.3mm
Numero disegno.:	D51.1.1300.50-IF	Modulo m	2.65mm	Tratto evolv. Lα	7.88mm
Commessa/serie nr.:	4.DF9-30 -3	Angolo pressione	20°	Tratto elica Lß	24.24mm
Masch.Nr.:	M001 Spindel: Formnest	Angolo elica	24°	Inizio elab. M1	31.96mm
Untersuchungszweck:	Laufende Messung	Ø Base db	188.6348mm	Palpatore Ø	(#2)1mm
Werkzeug:	Charge:	Ang. Base	22.47°	Fat.scor.pr. x	.004

Testa

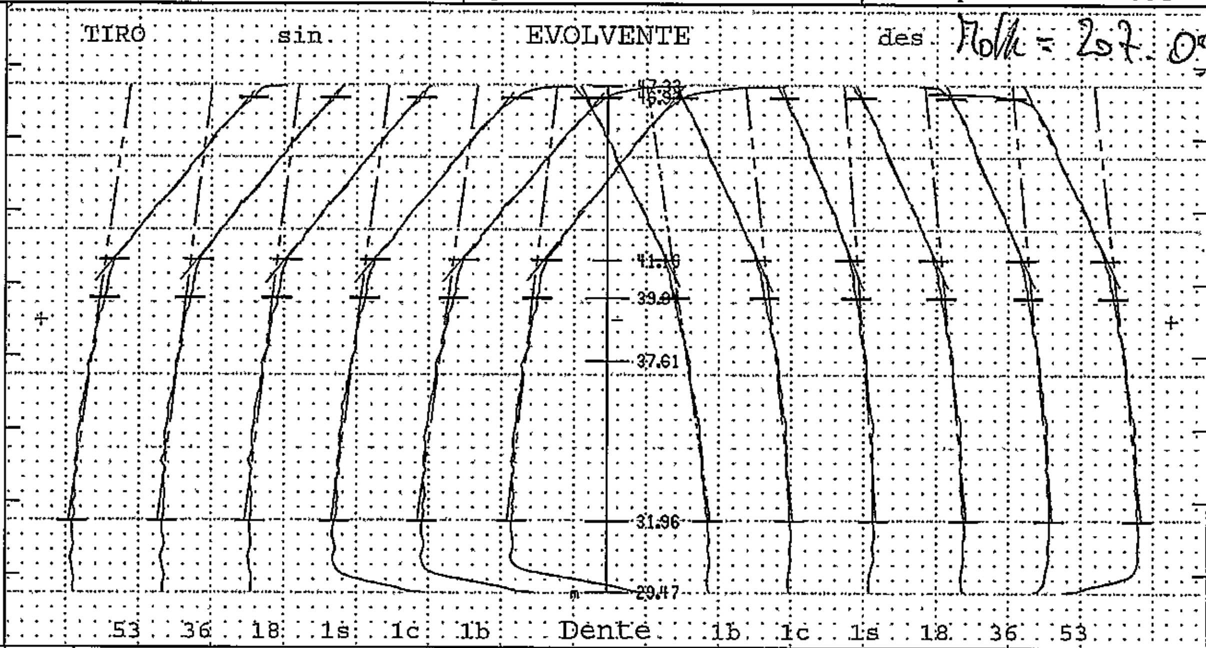
20 µm

Va500:1

Vb3.9:1

2.56 mm

Piede



Tolerance		Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm	-19±5	-15.3	Var a 2.1							-11±5	Var a 2.1						-11.9	
fHα	-19±9	-15.3	-16.4	-14.4	-14.3	-15.3	-16.0	-13.2		-11±9	-17.1	-13.0	-8.8	-11.1	-10.9	-12.7	-11.9	
Fα		3.4	2.9	3.6	3.9	3.3	3.3	4.3			3.7	2.9	2.5	2.1	1.9	2.5	2.4	
ffα	5	2.5	2.2	2.5	2.6	2.5	2.7	2.3		5	1.7	2.3	2.1	2.1	2.0	2.0	2.1	
Cα	-38/-30	-33.6	-33.3	-33.5	-33.4	-33.7	-34.2	-32.9		-22/-14	-17.2	-17.8	-16.1	-17.6	-17.0	-18.2	-17.7	
ffαf	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø[mm]		195.325	[195.15/195.45]								211.312	[211.2/211.5]						

Sotto

20 µm

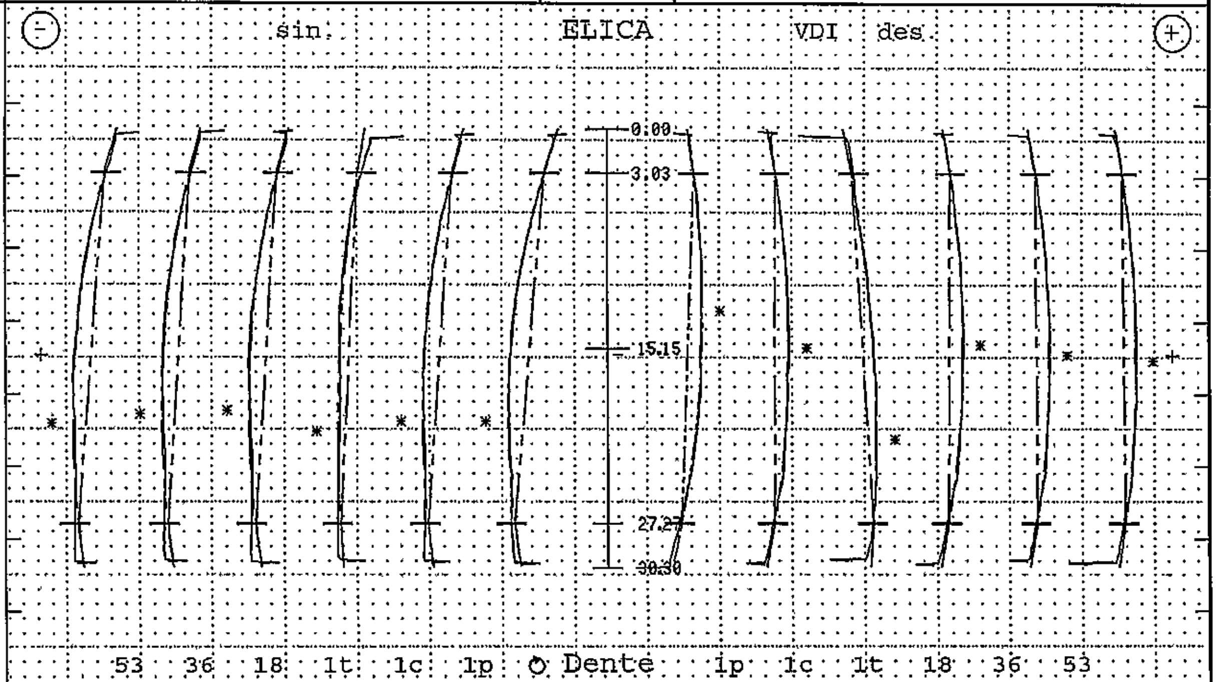
Va500:1

Vb2:1

5 mm

Sopra

N:Z



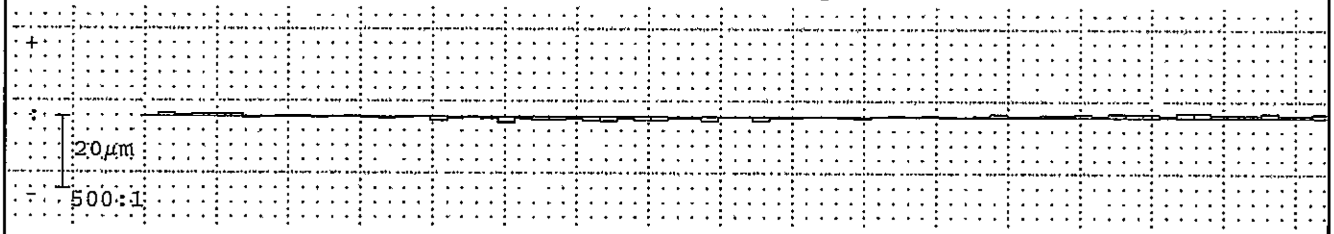
fHßm	5±4	8.2	Var ß 1.7							±4	Var ß 1.6						-0.1	
fHß	5±8	8.2	9.2	7.5	7.5	6.0	8.4	10.3		±8	4.4	0.4	-7.4	0.7	-0.5	-0.9	-0.1	
Fß		4.5	5.3	4.0	4.1	3.1	4.7	5.7			4.7	2.5	5.3	2.9	2.0	2.1	2.4	
ffß	5	1.5	1.5	1.6	1.7	1.9	1.3	1.6		5	0.9	1.0	0.9	1.0	0.8	0.9	0.9	
Cß	2/5	4.2	4.4	4.1	4.3	2.6	4.1	5.1		2/5	3.8	4.0	2.9	3.8	3.7	3.4	3.7	
Bd	-8±8	-4.3								-8±8							-11.8	

GCG 808006

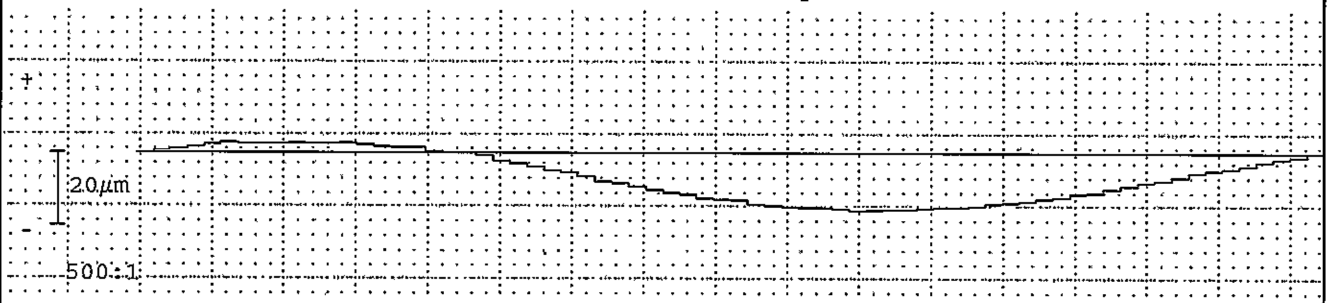
Ruota cilindrica Divisione

Nr. prog.: STI0416a04 0 PNC35 B4784	Controllore: TURNO C		Data: 19.01.2018 06:04
Denominazione: ring gear	Numero denti z: 70		Angolo pressione: 20°
Numero disegno.: D51.1.1300.50-IF	Modulo m: 2.65mm		Angolo elica: 24°
Commessa/serie nr.: 4.DF9-30 ~3	Untersuchungszweck: Laufende Messung		
Masch.Nr.: M001 Spindel: Formmeat 1	Werkzeug:		Charge:

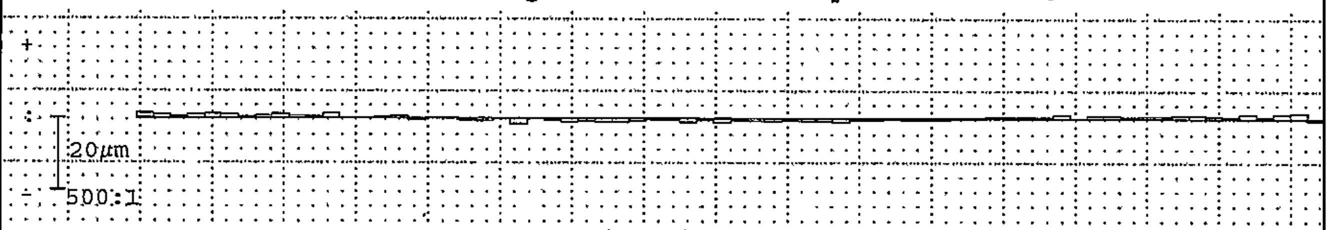
Errori singoli di divisione fp fianco sinistro



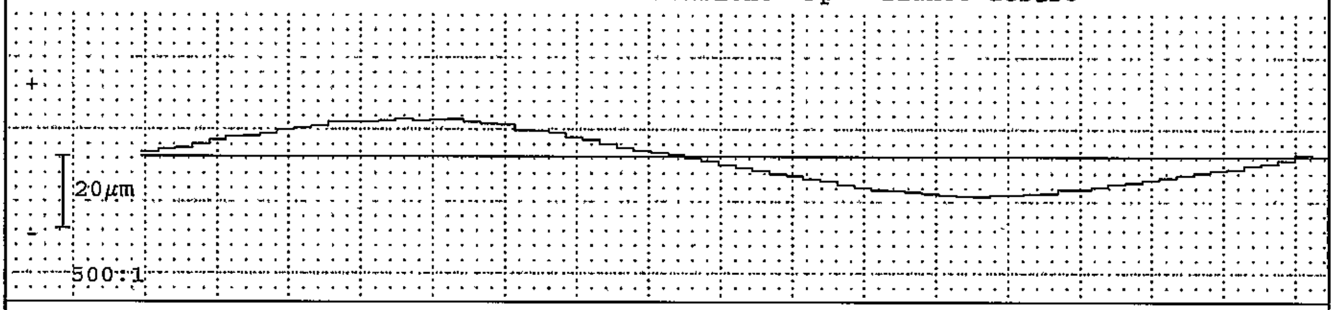
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



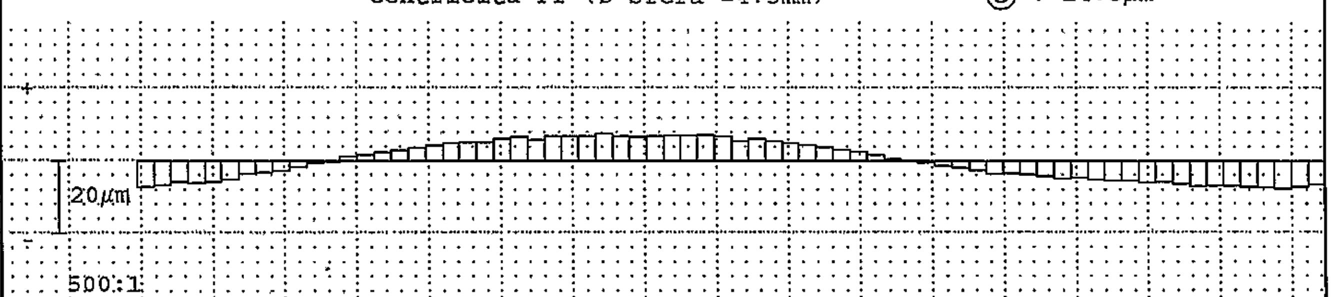
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:203.079 z=15.2mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	1.6		11.0		1.6		11.0	
Gr. salto di passo	fu max	1.1		14.0		2.1		14.0	
Scarto di divisione	Rp	2.8				3.1			
Err. globale di divisione	Fp	18.8		45.0		21.4		45.0	
Err. cordale di divisione	Fpz/8	8.6				7.9			

Centricità Fr (Ø-sfera =4.5mm) ◎ : 14.8µm



Err. di concentricitá	Fr	15.3	32.0	
Variaz. spessore dente	Rs			

KLINGELNBERG

KLINGELNBERG

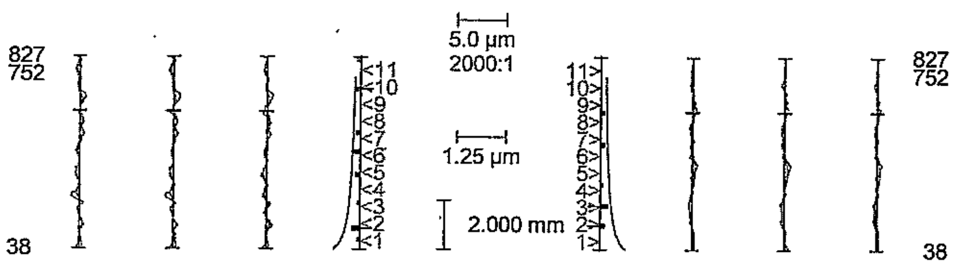
Numero di disegno: D51.1.1300.50-IF
Serie nr: 4.DF9-30
Macchina: M001

Denominazione: ring gear
Scopo: Laufende Messung 04
Mandrino: Formnest 1

19.01.18 / 06:10
z= 70

Evolvente senza modifiche effettive

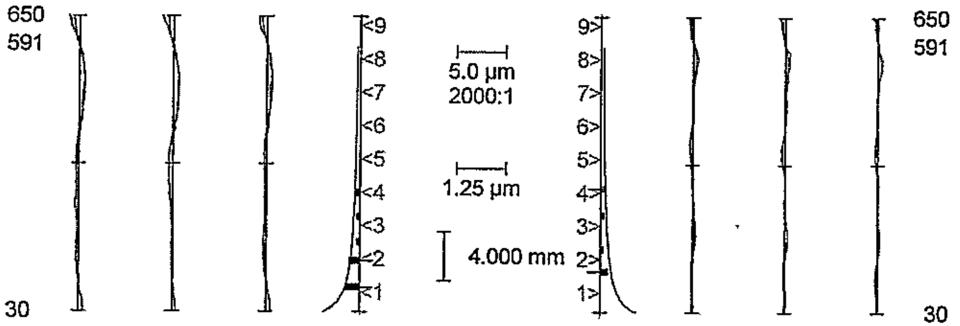
+/- sinistro Spettro medio 1/2



A1	0.18	0.19
A2	0.14	0.11
O(1)	123	216
O(2)	694	137

Elica senza modifiche effettive

+/- sinistro destro -/+



A1	0.36	0.18
A2	0.25	0.12
O(1)	82	115
O(2)	137	289

■ Spettro ■ 4.DF9-30_20180119060401

KLINGELNBERG

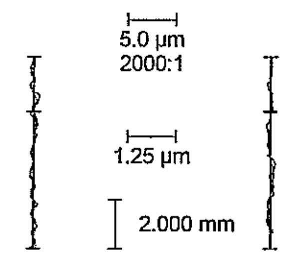
Numero di disegno: D51.1.1300.50-IF
Serie nr: 4.DF9-30
Macchina: M001

Denominazione: ring gear
Scopo: Laufende Messung 04
Mandrino: Formnest 1

19.01.18 / 06:10
z= 70

Evolvente senza modifiche effettive

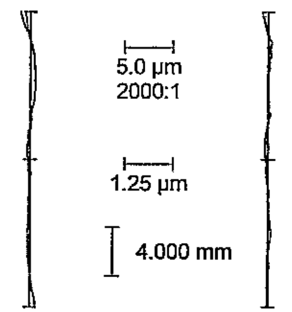
+/- sinistro Spettro medio 2/2



A1
A2
O(1)
O(2)

Elica senza modifiche effettive

+/- sinistro destro -/+



A1
A2
O(1)
O(2)

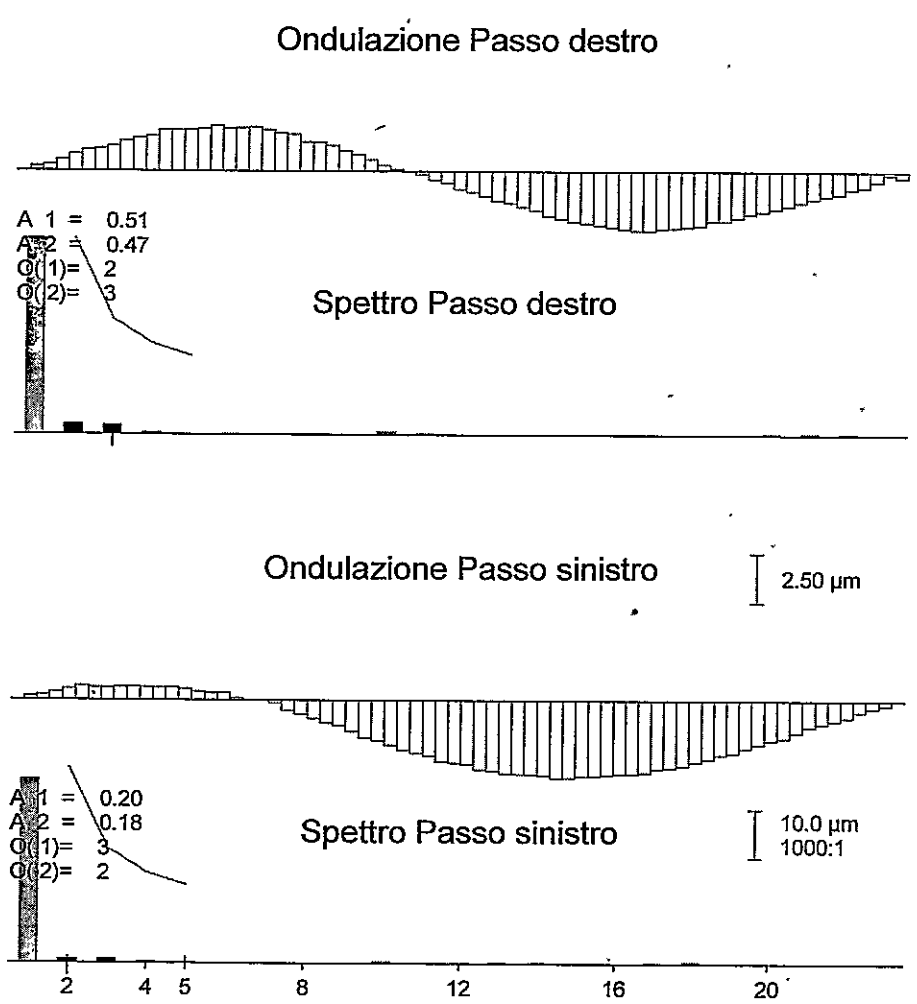
■ Spettro ■ 4.DF9-30_20180119060401

KLINGELNBERG

Numero di disegno: D51.1.1300.50-IF
Serie nr: 4.DF9-30
Macchina: M001

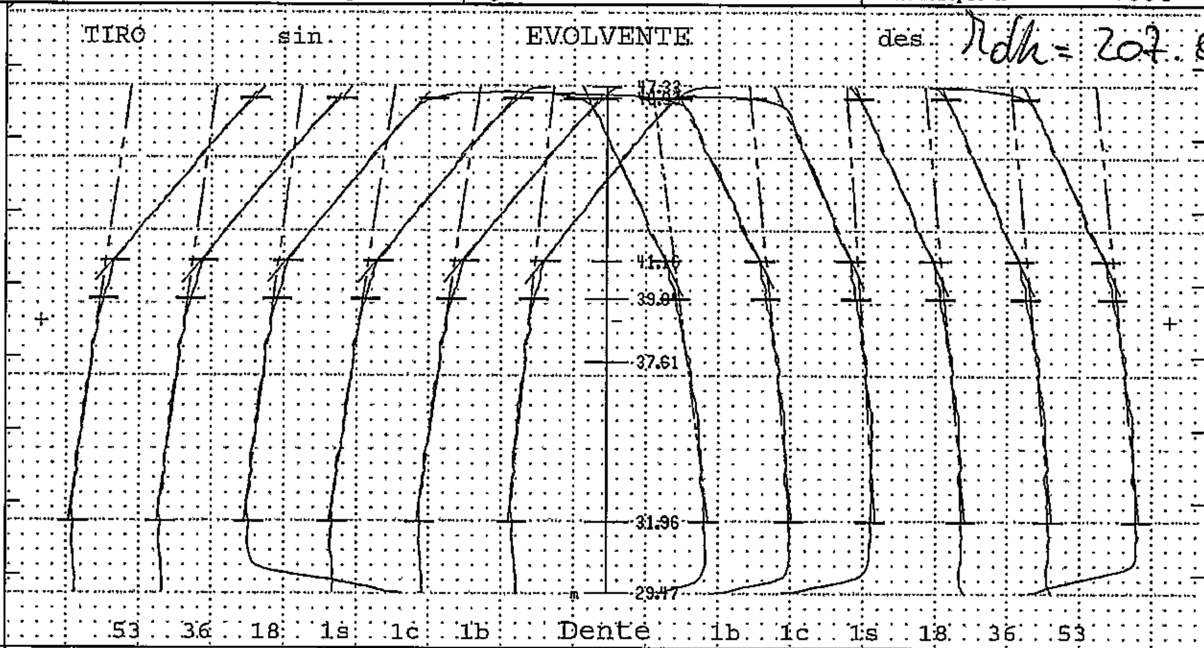
Denominazione: ring gear
Scopo: Laufende Messung
Mandrino: Formnest 1

19.01.18
06.04 / 06:10
z= 70

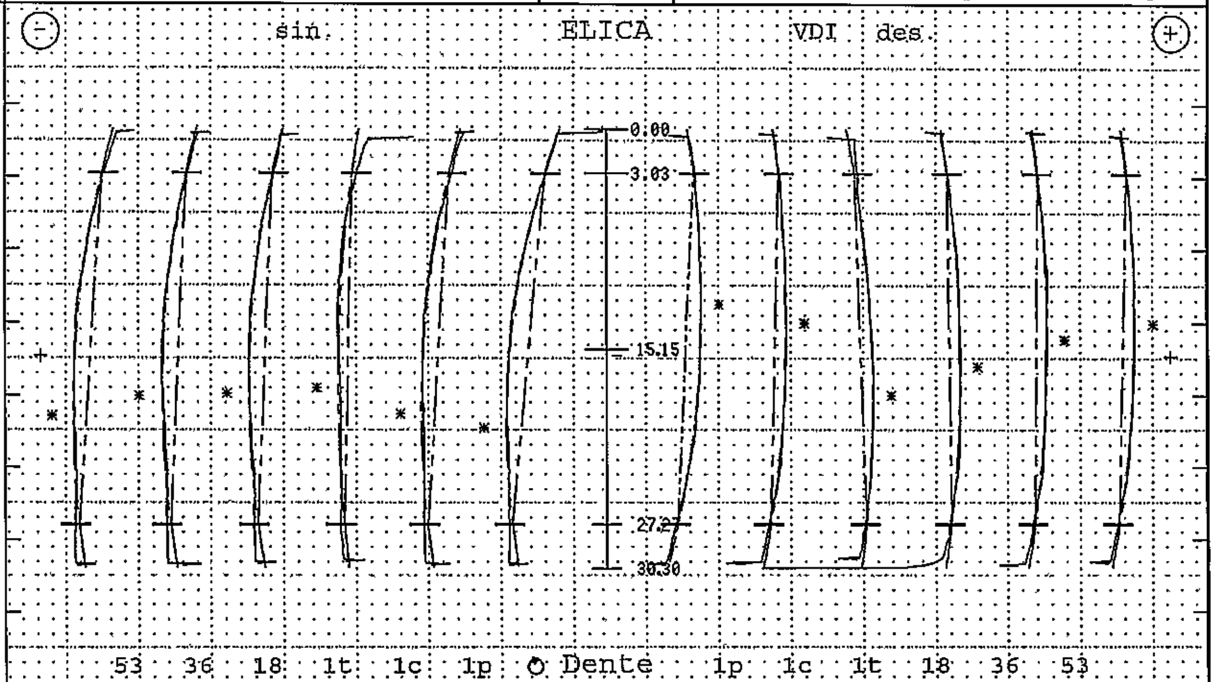


Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0416a04 0 PNC35 B4784	Controllore: TURNO C	Data:	19.01.2018 05:53
Denominazione: ring gear	Numero denti z 70	Largh.fasc.dent. b	30.3mm
Numero disegno.: D51.1.1300.50-IF	Modulo m 2.65mm	Tratto evolv. La	7.88mm
Commessa/serie nr.: 4.DF9-29 – 4	Angolo pressione 20°	Tratto elica Lß	24.24mm
Masch.Nr.: M001 Spindel: Formmesst	Angolo elica 24°	Inizio elab. Ml	31.96mm
Untersuchungszweck: Laufende Messung	ø Base db 188.6348mm	Palpatore ø	(#2)1mm
Werkzeug: Charge:	Ang. Base 22.47°	Fat.scor.pr. x	.004



Tolerance	Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm -19±5	-16.4	Var a 1.5							-11±5	Var a 0.8						-11.3	
fHα -19±9	-16.4	-16.7	-16.2	-15.5	-17.4	-17.0	-12.0		-11±9	-15.1	-11.6	-7.8	-10.8	-11.0	-11.6	-11.3	
Fα	2.8	2.6	2.9	3.4	2.0	2.4	4.6			3.3	2.4	3.3	2.0	2.2	2.3	2.2	
ffα 5	1.8	1.7	1.8	2.0	1.5	1.6	1.8		5	2.1	2.3	2.5	2.1	2.2	2.1	2.2	
Ca -38/-30	-33.7	-33.8	-33.6	-33.9	-33.2	-33.4	-33.5		-22/-14	-18.0	-19.3	-18.7	-18.2	-18.2	-18.6	-18.6	
ffαf 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø[mm]	195.311	[195.15/195.45]								211.218	[211.2/211.5]						



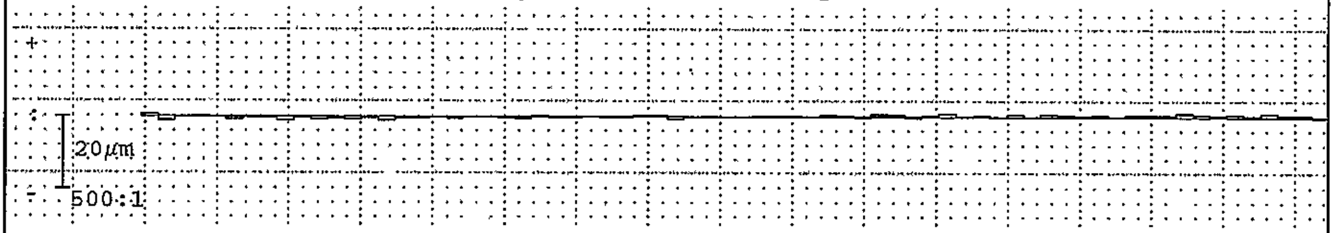
Tolerance	Medio							Qual	Tolerance							Medio	Qual
fHßm 5±4	6.4	Var ß 2.8							±4	Var ß 4.0						1.3	
fHß 5±8	6.4	7.9	5.3	5.1	2.8	7.4	11.3		±8	5.5	2.7	-4.0	-1.3	1.1	2.5	1.3	
Fß	3.6	4.5	3.0	2.9	2.0	4.1	6.8			5.4	3.4	3.2	1.9	4.3	3.8	3.4	
ffß 5	1.6	1.6	1.6	1.6	2.2	1.7	1.4		5	1.1	0.9	1.1	0.9	0.9	0.8	0.9	
Cß 2/5	4.3	4.3	4.2	4.3	2.7	4.2	5.2		2/5	4.1	3.3	3.2	3.1	3.0	3.2	3.2	
Bd -8±8	-8.5								-8±8							-9.5	

GCG 808006

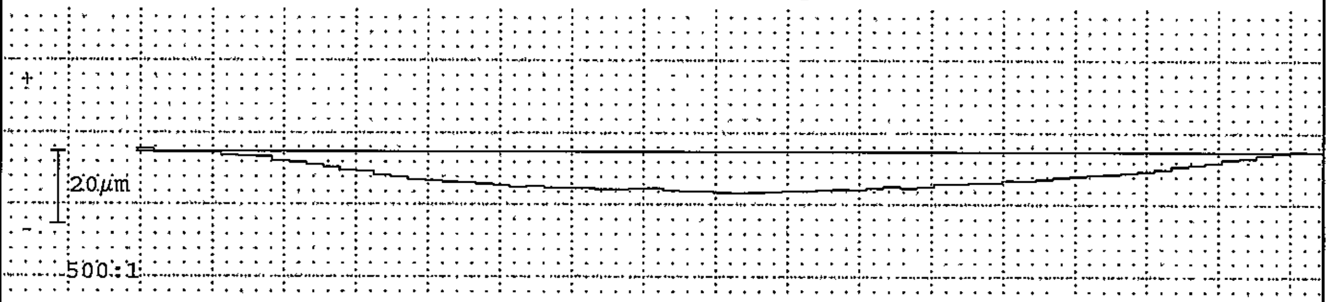
Ruota cilindrica Divisione

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore: TURNO C	Data: 19.01.2018 05:53
Denominazione: ring gear		Numero denti z 70	Angolo pressione 20°
Numero disegno.: D51.1.1300.50-IF		Modulo m 2.65mm	Angolo elica 24°
Commessa/serie nr.: 4.DF9-29 - 4		Untersuchungszweck: Laufende Messung	
Masch.Nr.: M001	Spindel: Formr	Werkzeug:	Charge:

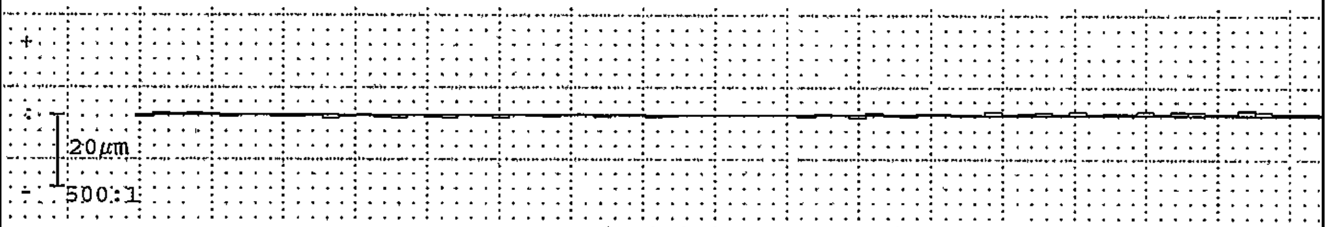
Errori singoli di divisione fp fianco sinistro



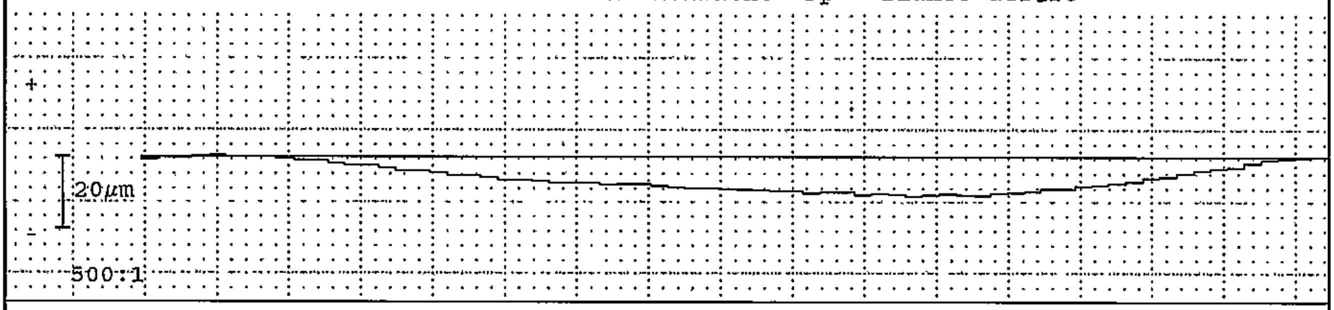
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



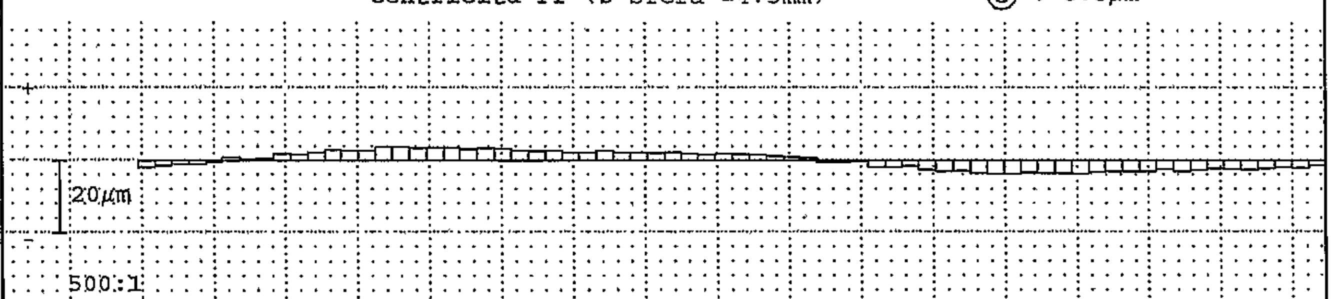
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:203.079 z=15.2mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	1.2		11.0		1.2		11.0	
Gr. salto di passo	fu max	1.7		14.0		1.2		14.0	
Scarto di divisione	Rp	2.1				2.0			
Err. globale di divisione	Fp	12.0		45.0		11.3		45.0	
Err. cordale di divisione	Fpz/8	6.2				6.4			

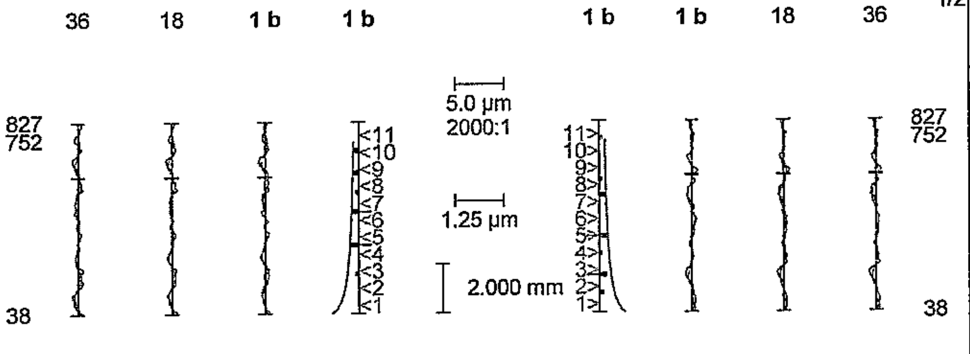
Centricità Fr (Ø-sfera =4.5mm) ◎ : 6.8µm



Err. di concentricitá	Fr	7.5	32.0	
Variaz. spessore dente	Rs			

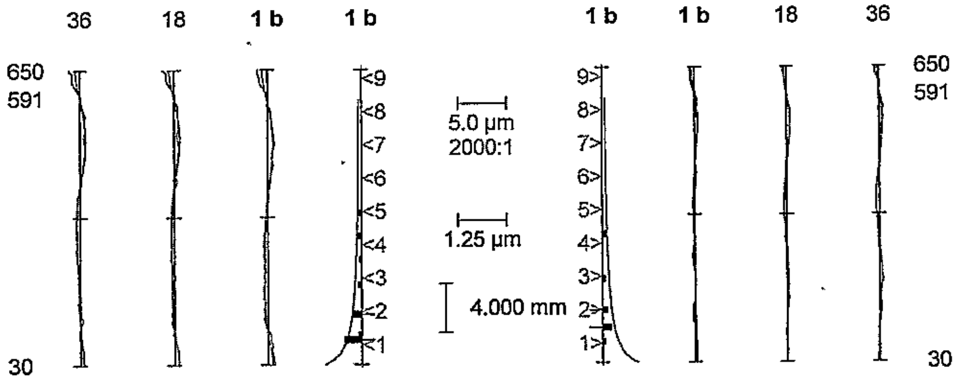
KLINGELNBERG	Numero di disegno: D51.1.1300.50-IF Serie nr: 4.DF9-29 Macchina: M001	Denominazione: ring gear 19.01.18 Scopo: Laufende Messung 05:53 / 06:00 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 1/2



A1	0.22	0.21
A2	0.13	0.17
O(1)	320	352
O(2)	458	191

+/- sinistro **Elica senza modifiche effettive** destro -/+

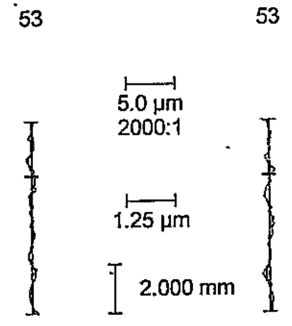


A1	0.43	0.21
A2	0.20	0.12
O(1)	82	104
O(2)	135	140

■ Spettro ■ 4.DF9-29_20180119055340

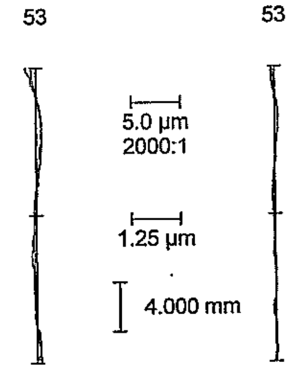
KLINGELNBERG	Numero di disegno: D51.1.1300.50-IF Serie nr: 4.DF9-29 Macchina: M001	Denominazione: ring gear 19.01.18 Scopo: Laufende Messung 05:53 / 06:00 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 2/2



A1
A2
O(1)
O(2)

+/- sinistro **Elica senza modifiche effettive** destro -/+

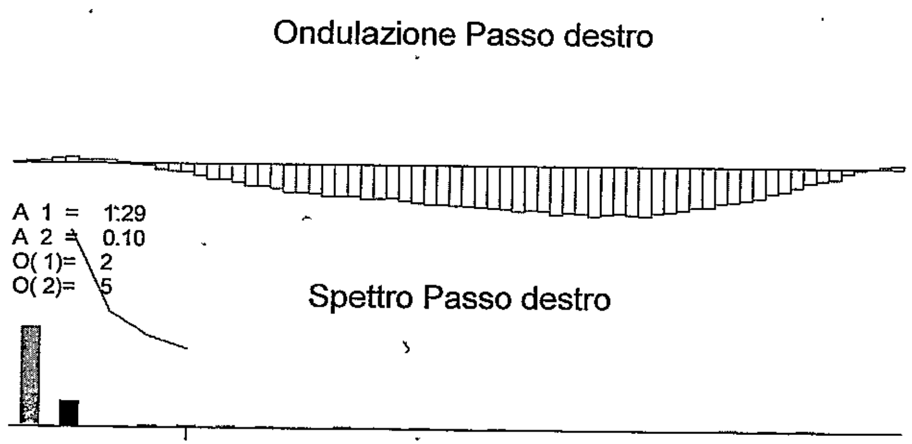


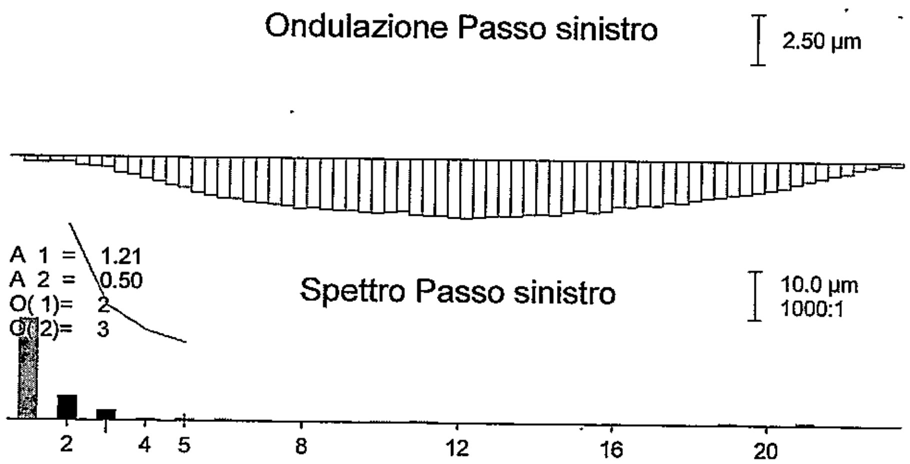
A1
A2
O(1)
O(2)

■ Spettro ■ 4.DF9-29_20180119055340

KLINGELNBERG

Numero di disegno: D51.1.1300.50-IF	Denominazione: ring gear		19.01.18
Serie nr: 4.DF9-29	Scopo: Laufende Messung	05:53 /	06:00
Macchina: M001	Mandrino: Formnest 1		z= 70

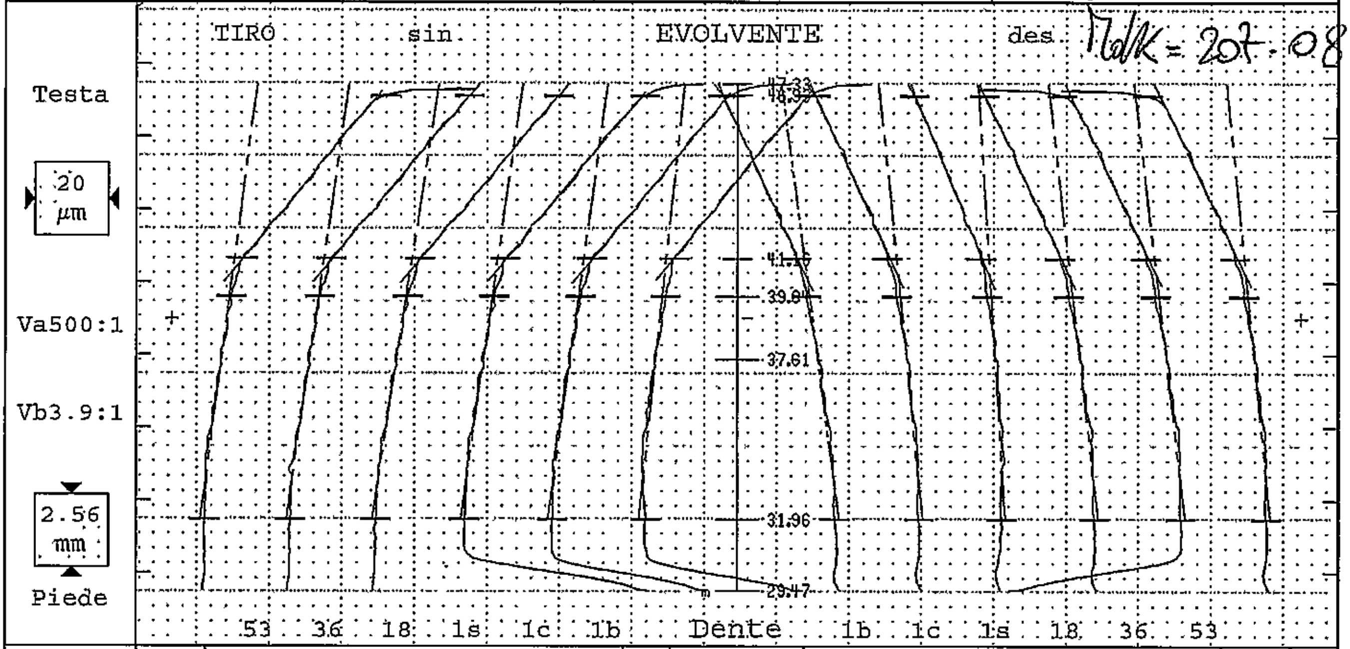




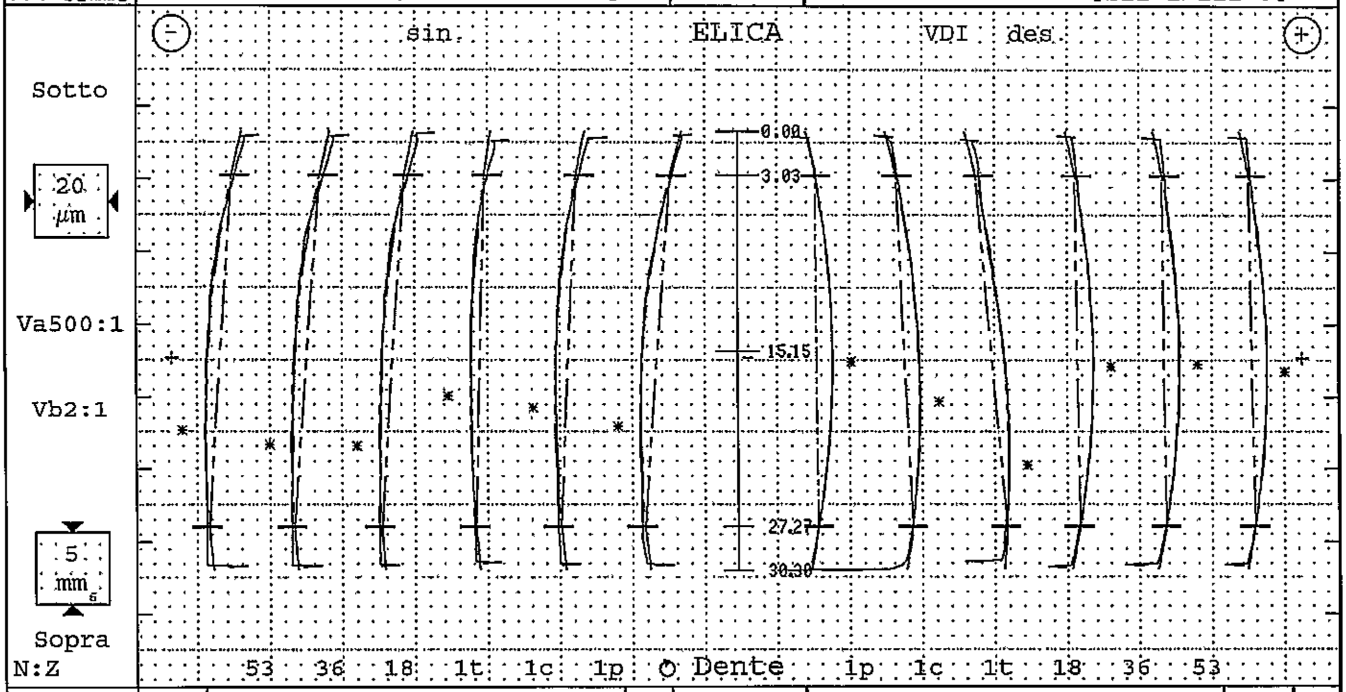
Ruota cilindrica Evolvente/Elica

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore:	TURNO C	Data:	19.01.2018 05:25
Denominazione:	ring gear	Numero denti z	70	Largh.fasc.dent. b	30.3mm
Numero disegno.:	D51.1.1300.50-IF	Modulo m	2.65mm	Tratto evolv. La	7.88mm
Commessa/serie nr.:	4.DF9-26 -5	Angolo pressione	20°	Tratto elica Lß	24.24mm
Masch.Nr.:	M001 Spindel: Formmess	Angolo elica	24°	Inizio elab. Ml	31.96mm
Untersuchungszweck:	Laufende Messung	Ø Base db	188.6348mm	Palpatore Ø	(#2)1mm
Werkzeug:	Charge:	Ang. Base	22.47°	Fat.scor.pr. x	.004

Mdk = 207.087



Tolerance		Medio	Val.misur[µm]						Qual	Tolerance	Val.misur[µm]						Medio	Qual
fHαm	-19±5	-16.5	Var a 2.6							-11±5	Var a 2.0						-12.7	
fHα	-19±9	-16.5	-15.2	-16.9	-17.8	-16.5	-16.0	-12.2		-11±9	-15.5	-12.0	-7.2	-13.4	-13.7	-11.7	-12.7	
Fα		2.6	3.0	2.5	2.0	2.5	2.8	4.7			3.3	2.2	3.1	3.1	3.2	2.3	2.7	
ffα	5	2.0	1.9	2.2	1.7	1.9	2.0	2.9		5	2.1	2.0	2.1	2.5	2.5	2.2	2.3	
Ca	-38/-30	-33.6	-33.7	-33.5	-33.6	-33.5	-33.7	-34.3		-22/-14	-16.5	-17.7	-17.7	-17.8	-18.0	-18.8	-18.1	
ffαf	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
P/T-ø[mm]		195.324			[195.15/195.45]						211.205				[211.2/211.5]			



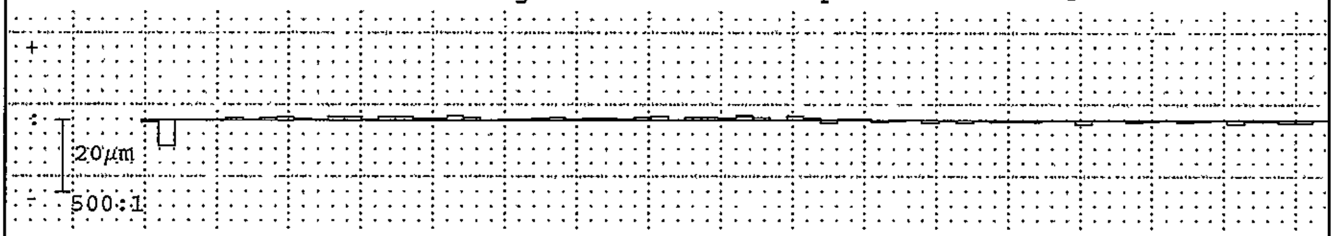
fHßm	5±4	7.5	Var ß 3.6							±4	Var ß 4.4						-2.7	
fHß	5±8	7.5	7.9	8.9	7.9	3.0	5.3	8.7		±8	-1.0	-5.7	-10.7	-1.6	-1.3	-2.1	-2.7	
Fß		4.1	4.1	5.3	4.5	1.8	2.5	4.4			2.7	5.0	7.4	2.7	2.2	2.7	3.2	
ffß	5	1.7	1.4	1.8	1.8	1.2	1.6	1.4		5	0.4	0.5	1.5	0.9	1.0	0.8	0.8	
Cß	2/5	3.3	3.5	3.4	3.0	2.5	3.4	4.1		2/5	4.4	4.1	3.3	4.4	4.2	4.1	4.2	
Bd	-8±8	-5.7								-8±8							-9.7	

GCG 808006

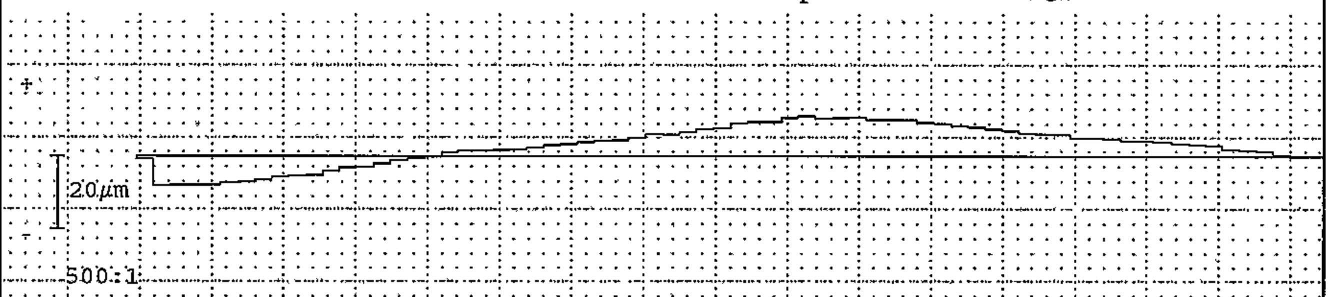
Ruota cilindrica Divisione

Nr. prog.: STI0416a04 0	PNC35 B4784	Controllore:	TURNO C	Data:	19.01.2018 05:25
Denominazione:	ring gear	Numero denti z	70	Angolo pressione	20°
Numero disegno.:	D51.1.1300.50-IF	Modulo m	2.65mm	Angolo elica	24°
Commessa/serie nr.:	4.DF9-26 - 5	Untersuchungszweck:	Laufende Messung		
Masch.Nr.:	M001 Spindel: Formmeatz1	Werkzeug:		Charge:	

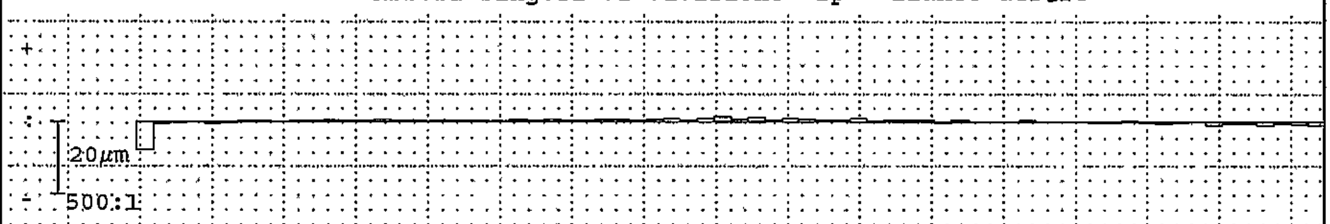
Errori singoli di divisione fp fianco sinistro



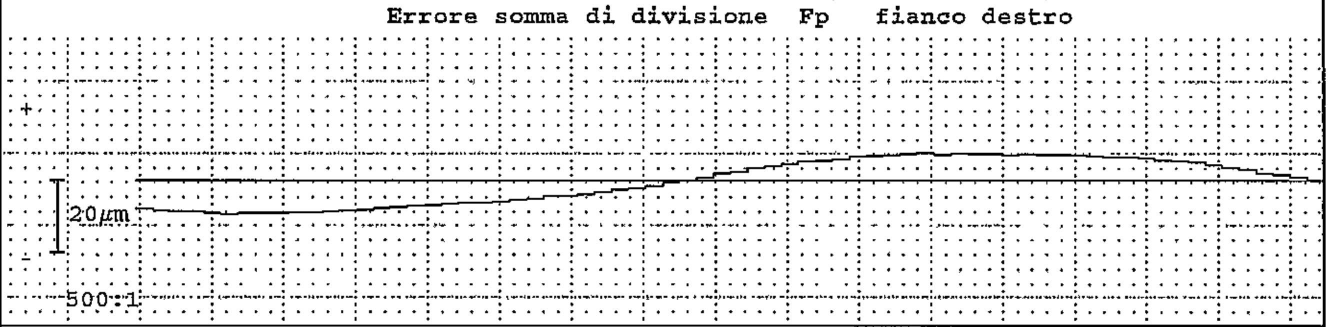
Errore somma di divisione Fp fianco sinistro



Errori singoli di divisione fp fianco destro



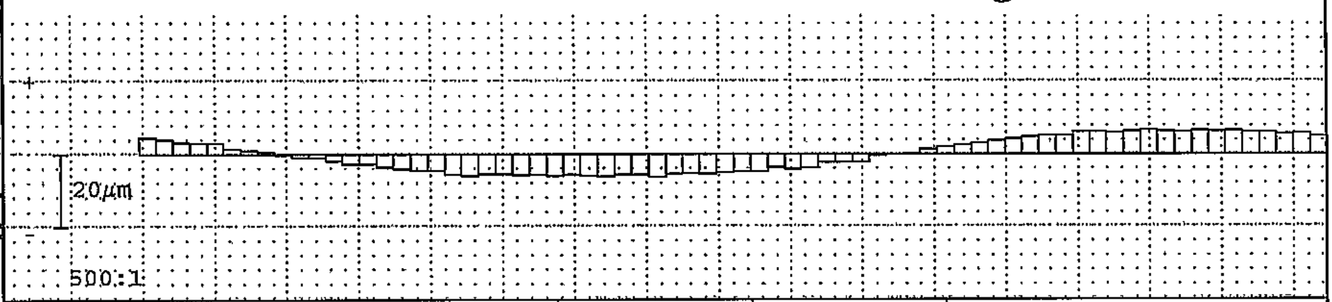
Errore somma di divisione Fp fianco destro



Corsa per misura divis.:203.079 z=15.2mm

		fianco sinistro / TIRO				fianco destro			
		Val.misur	Qual.	Val. amm	Qual.	Val.misur	Qual.	Val. amm	Qual.
Gr. err. singoli divisione	fp max	7.3		11.0		7.7		11.0	
Gr. salto di passo	fu max	7.4		14.0		7.2		14.0	
Scarto di divisione	Rp	8.5				9.0			
Err. globale di divisione	Fp	19.0		45.0		17.0		45.0	
Err. cordale di divisione	Fpz/8	11.1				13.6			

Centricità Fr (Ø-sfera =4.5mm)   ◎ : 13.1µm

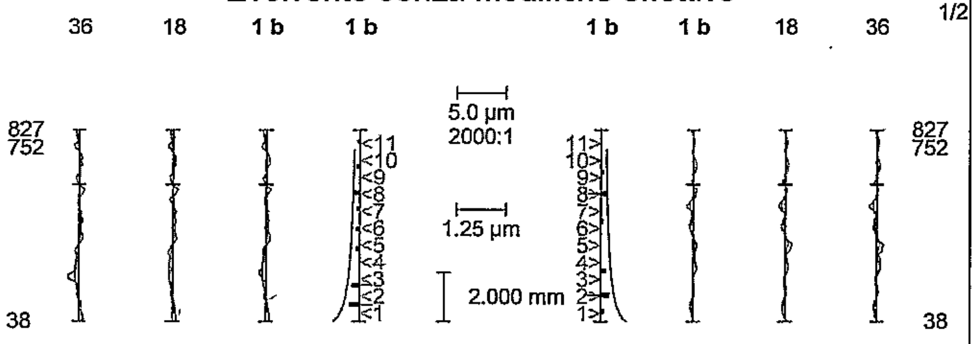


Err. di concentricità	Fr	13.0	32.0	
Variaz. spessore dente	Rs			

KLINGELNBERG

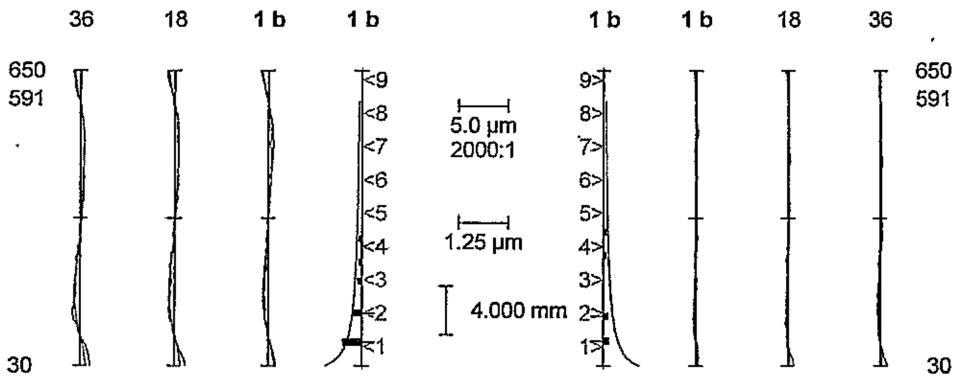
Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-26 Scopo: Laufende Messung 05:25 / 05:31
Macchina: M001 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 1/2



A1	0.22	0.21
A2	0.17	0.15
O(1)	108	147
O(2)	188	565

+/- sinistro **Elica senza modifiche effettive** destro -/+



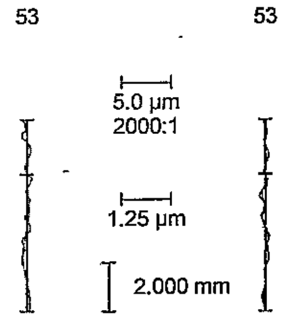
A1	0.47	0.13
A2	0.19	0.10
O(1)	80	82
O(2)	141	134

■ Spettro ■ 4.DF9-26_20180119052509

KLINGELNBERG

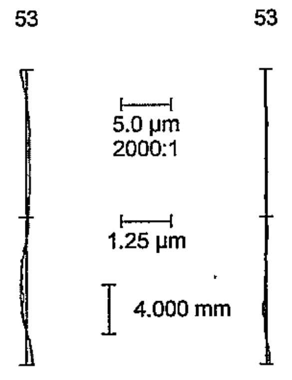
Numero di disegno: D51.1.1300.50-IF Denominazione: ring gear 19.01.18
Serie nr: 4.DF9-26 Scopo: Laufende Messung 05:25 / 05:31
Macchina: M001 Mandrino: Formnest 1 z= 70

+/- sinistro **Evolvente senza modifiche effettive** Spettro medio 2/2



A1
A2
O(1)
O(2)

+/- sinistro **Elica senza modifiche effettive** destro -/+



A1
A2
O(1)
O(2)

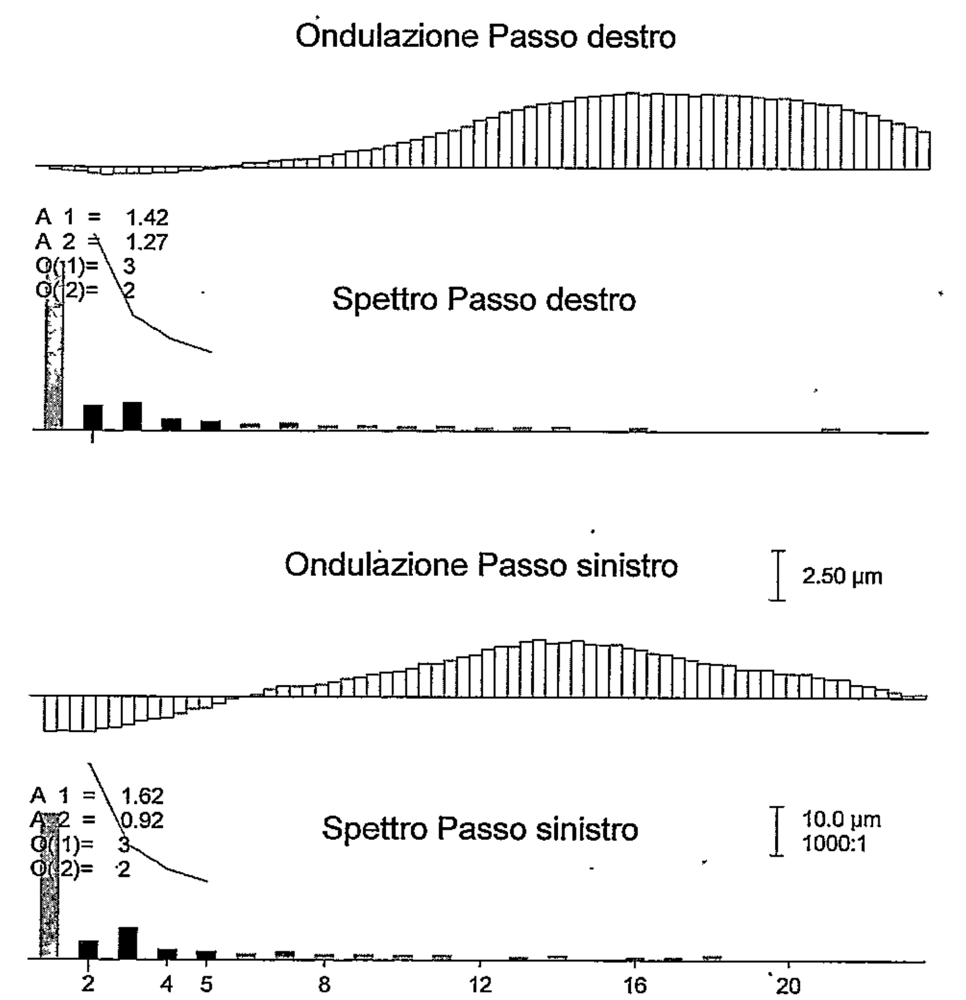
■ Spettro ■ 4.DF9-26_20180119052509

KLINGELNBERG

Numero di disegno: D51.1.1300.50-IF
Serie nr: 4.DF9-26
Macchina: M001

Denominazione: ring gear
Scopo: Laufende Messung
Mandrino: Formnest 1

19.01.18
05.25 / 05:31
z= 70



Protocollo di Collaudo ZEISS Calypso

Nome piano
RG_2511130050_FINITO

Codice Pezzo
RG_2511130050

Operatore
-

Turno
Turno A

Operazione
FINITO

Codice Dati
PZ. N.1

Data
22 Marzo 2018

Ora
10:33:01

Durata misurazione
00:07:24,0

Commento:

Nome Caratteristica	ID	Attuale	Nominale	Tol +	Tol -	Diff	<--|-->
DIA_001	D	116.015	116.000	0.022	0.000	0.015	|--
DIS_050	Y	11.034	11.000	0.100	-0.100	0.034	|--
PAR_051_1	Par	0.024	0.000	0.070		0.024	|--
PAR_051_2	Par	0.044	0.000	0.070		0.044	|---
PAR_051_3	Par	0.053	0.000	0.070		0.053	|----
PAR_051_4	Par	0.050	0.000	0.070		0.050	|---
PAR_051_5	Par	0.043	0.000	0.070		0.043	|---
PAR_051_6	Par	0.025	0.000	0.070		0.025	|--
PAR_051_7	Par	0.021	0.000	0.070		0.021	|--
PAR_051_8	Par	0.027	0.000	0.070		0.027	|--
PAR_051_9	Par	0.029	0.000	0.070		0.029	|--
PAR_051_10	Par	0.026	0.000	0.070		0.026	|--
PLA_052	Plan	0.021	0.000	0.050		0.021	|--
PLA_052_1	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_2	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_3	Plan	0.009	0.000	0.050		0.009	|-
PLA_052_4	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_5	Plan	0.014	0.000	0.050		0.014	|--
PLA_052_6	Plan	0.009	0.000	0.050		0.009	|-
PLA_052_7	Plan	0.010	0.000	0.050		0.010	|-
PLA_052_8	Plan	0.007	0.000	0.050		0.007	|-
PLA_052_9	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_10	Plan	0.014	0.000	0.050		0.014	|--
PER_059	Perp	0.002	0.000	0.020		0.002	|-
DIS_053	DistCart	14.406	14.450	0.050	-0.050	-0.044	----|
DIS_019	DistCart	15.847	15.850	0.050	-0.050	-0.003	-|

Protocollo di Collaudo ZEISS Calypso

MAGNA GETRAG ZEISS

Nome piano
RG_2511130050_FINITO
Codice Pezzo
RG_2511130050
Operatore
-
Turno
Turno A

Operazione
FINITO
Codice Dati
PZ. N.2

Data
22 Marzo 2018

Ora
10:46:22

Durata misurazione
00:07:12,0

Commento:

Nome Caratteristica	ID	Attuale	Nominale	Tol +	Tol -	Diff	<--l-->
DIA_001	D	116.015	116.000	0.022	0.000	0.015	I--
DIS_050	Y	11.032	11.000	0.100	-0.100	0.032	I--
PAR_051_1	Par	0.030	0.000	0.070		0.030	I--
PAR_051_2	Par	0.028	0.000	0.070		0.028	I--
PAR_051_3	Par	0.026	0.000	0.070		0.026	I--
PAR_051_4	Par	0.045	0.000	0.070		0.045	I---
PAR_051_5	Par	0.051	0.000	0.070		0.051	I---
PAR_051_6	Par	0.049	0.000	0.070		0.049	I---
PAR_051_7	Par	0.042	0.000	0.070		0.042	I---
PAR_051_8	Par	0.023	0.000	0.070		0.023	I--
PAR_051_9	Par	0.020	0.000	0.070		0.020	I--
PAR_051_10	Par	0.027	0.000	0.070		0.027	I--
PLA_052	Plan	0.023	0.000	0.050		0.023	I--
PLA_052_1	Plan	0.011	0.000	0.050		0.011	I-
PLA_052_2	Plan	0.015	0.000	0.050		0.015	I--
PLA_052_3	Plan	0.012	0.000	0.050		0.012	I-
PLA_052_4	Plan	0.010	0.000	0.050		0.010	I-
PLA_052_5	Plan	0.009	0.000	0.050		0.009	I-
PLA_052_6	Plan	0.010	0.000	0.050		0.010	I-
PLA_052_7	Plan	0.013	0.000	0.050		0.013	I--
PLA_052_8	Plan	0.009	0.000	0.050		0.009	I-
PLA_052_9	Plan	0.009	0.000	0.050		0.009	I-
PLA_052_10	Plan	0.007	0.000	0.050		0.007	I-
PER_059	Perp	0.003	0.000	0.020		0.003	I-
DIS_053	DistCart	14.403	14.450	0.050	-0.050	-0.047	----I
DIS_019	DistCart	15.852	15.850	0.050	-0.050	0.002	I-

Protocollo di Collaudo ZEISS Calypso

MAGNA GETRAG ZEISS

Nome piano
RG_2511130050_FINITO
Codice Pezzo
RG_2511130050
Operatore
-
Turno
Turno A

Operazione
FINITO
Codice Dati
PZ. N.3

Data
22 Marzo 2018

Ora
11:00:03

Durata misurazione
00:06:40,0

Commento:

Nome Caratteristica	ID	Attuale	Nominale	Tol +	Tol -	Diff	<--I-->
DIA_001	D	116.014	116.000	0.022	0.000	0.014	I--
DIS_050	Y	11.036	11.000	0.100	-0.100	0.036	I--
PAR_051_1	Par	0.021	0.000	0.070		0.021	I--
PAR_051_2	Par	0.028	0.000	0.070		0.028	I--
PAR_051_3	Par	0.030	0.000	0.070		0.030	I--
PAR_051_4	Par	0.029	0.000	0.070		0.029	I--
PAR_051_5	Par	0.027	0.000	0.070		0.027	I--
PAR_051_6	Par	0.046	0.000	0.070		0.046	I---
PAR_051_7	Par	0.051	0.000	0.070		0.051	I---
PAR_051_8	Par	0.048	0.000	0.070		0.048	I---
PAR_051_9	Par	0.042	0.000	0.070		0.042	I---
PAR_051_10	Par	0.023	0.000	0.070		0.023	I--
PLA_052	Plan	0.019	0.000	0.050		0.019	I--
PLA_052_1	Plan	0.007	0.000	0.050		0.007	I-
PLA_052_2	Plan	0.007	0.000	0.050		0.007	I-
PLA_052_3	Plan	0.011	0.000	0.050		0.011	I-
PLA_052_4	Plan	0.015	0.000	0.050		0.015	I--
PLA_052_5	Plan	0.011	0.000	0.050		0.011	I-
PLA_052_6	Plan	0.010	0.000	0.050		0.010	I-
PLA_052_7	Plan	0.009	0.000	0.050		0.009	I-
PLA_052_8	Plan	0.009	0.000	0.050		0.009	I-
PLA_052_9	Plan	0.012	0.000	0.050		0.012	I-
PLA_052_10	Plan	0.012	0.000	0.050		0.012	I-
PER_059	Perp	0.004	0.000	0.020		0.004	I-
DIS_053	DistCart	14.405	14.450	0.050	-0.050	-0.045	----I
DIS_019	DistCart	15.851	15.850	0.050	-0.050	0.001	I

Protocollo di Collaudo ZEISS Calypso

Nome piano
RG_2511130050_FINITO
Codice Pezzo
RG_2511130050
Operatore
-
Turno
Turno A

Operazione
FINITO
Codice Dati
PZ. N.4

Data
22 Marzo 2018

Ora
11:12:15

Durata misurazione
00:06:39,0

Commento:

<table>
<tr><th>Nome Caratteristica</th><th>ID</th><th>Attuale</th><th>Nominale</th><th>Tol +</th><th>Tol -</th><th>Diff</th><th><--|--></th></tr>
<tr><td>DIA_001</td><td>D</td><td>116.017</td><td>116.000</td><td>0.022</td><td>0.000</td><td>0.017</td><td>|---</td></tr>
<tr><td>DIS_050</td><td>Y</td><td>11.034</td><td>11.000</td><td>0.100</td><td>-0.100</td><td>0.034</td><td>|--</td></tr>
<tr><td>PAR_051_1</td><td>Par</td><td>0.029</td><td>0.000</td><td>0.070</td><td></td><td>0.029</td><td>|--</td></tr>
<tr><td>PAR_051_2</td><td>Par</td><td>0.027</td><td>0.000</td><td>0.070</td><td></td><td>0.027</td><td>|--</td></tr>
<tr><td>PAR_051_3</td><td>Par</td><td>0.026</td><td>0.000</td><td>0.070</td><td></td><td>0.026</td><td>|--</td></tr>
<tr><td>PAR_051_4</td><td>Par</td><td>0.045</td><td>0.000</td><td>0.070</td><td></td><td>0.045</td><td>|---</td></tr>
<tr><td>PAR_051_5</td><td>Par</td><td>0.052</td><td>0.000</td><td>0.070</td><td></td><td>0.052</td><td>|---</td></tr>
<tr><td>PAR_051_6</td><td>Par</td><td>0.049</td><td>0.000</td><td>0.070</td><td></td><td>0.049</td><td>|---</td></tr>
<tr><td>PAR_051_7</td><td>Par</td><td>0.041</td><td>0.000</td><td>0.070</td><td></td><td>0.041</td><td>|---</td></tr>
<tr><td>PAR_051_8</td><td>Par</td><td>0.023</td><td>0.000</td><td>0.070</td><td></td><td>0.023</td><td>|--</td></tr>
<tr><td>PAR_051_9</td><td>Par</td><td>0.019</td><td>0.000</td><td>0.070</td><td></td><td>0.019</td><td>|--</td></tr>
<tr><td>PAR_051_10</td><td>Par</td><td>0.027</td><td>0.000</td><td>0.070</td><td></td><td>0.027</td><td>|--</td></tr>
<tr><td>PLA_052</td><td>Plan</td><td>0.028</td><td>0.000</td><td>0.050</td><td></td><td>0.028</td><td>|---</td></tr>
<tr><td>PLA_052_1</td><td>Plan</td><td>0.011</td><td>0.000</td><td>0.050</td><td></td><td>0.011</td><td>|-</td></tr>
<tr><td>PLA_052_2</td><td>Plan</td><td>0.015</td><td>0.000</td><td>0.050</td><td></td><td>0.015</td><td>|--</td></tr>
<tr><td>PLA_052_3</td><td>Plan</td><td>0.012</td><td>0.000</td><td>0.050</td><td></td><td>0.012</td><td>|-</td></tr>
<tr><td>PLA_052_4</td><td>Plan</td><td>0.009</td><td>0.000</td><td>0.050</td><td></td><td>0.009</td><td>|-</td></tr>
<tr><td>PLA_052_5</td><td>Plan</td><td>0.008</td><td>0.000</td><td>0.050</td><td></td><td>0.008</td><td>|-</td></tr>
<tr><td>PLA_052_6</td><td>Plan</td><td>0.010</td><td>0.000</td><td>0.050</td><td></td><td>0.010</td><td>|-</td></tr>
<tr><td>PLA_052_7</td><td>Plan</td><td>0.012</td><td>0.000</td><td>0.050</td><td></td><td>0.012</td><td>|-</td></tr>
<tr><td>PLA_052_8</td><td>Plan</td><td>0.010</td><td>0.000</td><td>0.050</td><td></td><td>0.010</td><td>|-</td></tr>
<tr><td>PLA_052_9</td><td>Plan</td><td>0.009</td><td>0.000</td><td>0.050</td><td></td><td>0.009</td><td>|-</td></tr>
<tr><td>PLA_052_10</td><td>Plan</td><td>0.008</td><td>0.000</td><td>0.050</td><td></td><td>0.008</td><td>|-</td></tr>
<tr><td>PER_059</td><td>Perp</td><td>0.002</td><td>0.000</td><td>0.020</td><td></td><td>0.002</td><td>|-</td></tr>
<tr><td>DIS_053</td><td>DistCart</td><td>14.400</td><td>14.450</td><td>0.050</td><td>-0.050</td><td>-0.050</td><td>----|</td></tr>
<tr><td>DIS_019</td><td>DistCart</td><td>15.853</td><td>15.850</td><td>0.050</td><td>-0.050</td><td>0.003</td><td>|-</td></tr>
</table>

Protocollo di Collaudo ZEISS Calypso

MAGNA GETRAG ZEISS

Nomė piano
RG_2511130050_FINITO
Codice Pezzo
RG_2511130050
Operatore
-
Turno
Turno A

Operazione
FINITO
Codice Dati
PZ. N.5

Data
22 Marzo 2018

Ora
11:19:42

Durata misurazione
00:06:38,0

Commento:

Nome Caratteristica	ID	Attuale	Nominale	Tol +	Tol -	Diff	<--|-->
DIA_001	D	116.017	116.000	0.022	0.000	0.017	|---
DIS_050	Y	11.032	11.000	0.100	-0.100	0.032	|--
PAR_051_1	Par	0.019	0.000	0.070		0.019	|--
PAR_051_2	Par	0.028	0.000	0.070		0.028	|--
PAR_051_3	Par	0.030	0.000	0.070		0.030	|--
PAR_051_4	Par	0.027	0.000	0.070		0.027	|--
PAR_051_5	Par	0.026	0.000	0.070		0.026	|--
PAR_051_6	Par	0.045	0.000	0.070		0.045	|---
PAR_051_7	Par	0.052	0.000	0.070		0.052	|---
PAR_051_8	Par	0.049	0.000	0.070		0.049	|---
PAR_051_9	Par	0.043	0.000	0.070		0.043	|---
PAR_051_10	Par	0.023	0.000	0.070		0.023	|--
PLA_052	Plan	0.024	0.000	0.050		0.024	|--
PLA_052_1	Plan	0.008	0.000	0.050		0.008	|-
PLA_052_2	Plan	0.008	0.000	0.050		0.008	|-
PLA_052_3	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_4	Plan	0.015	0.000	0.050		0.015	|--
PLA_052_5	Plan	0.011	0.000	0.050		0.011	|-
PLA_052_6	Plan	0.010	0.000	0.050		0.010	|-
PLA_052_7	Plan	0.009	0.000	0.050		0.009	|-
PLA_052_8	Plan	0.009	0.000	0.050		0.009	|-
PLA_052_9	Plan	0.013	0.000	0.050		0.013	|--
PLA_052_10	Plan	0.009	0.000	0.050		0.009	|-
PER_059	Perp	0.004	0.000	0.020		0.004	|-
DIS_053	DistCart	14.405	14.450	0.050	-0.050	-0.045	----|
DIS_019	DistCart	15.847	15.850	0.050	-0.050	-0.003	-|

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

DAkkS
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. 7000015153

our reference	person in charge	phone: 0049561/804-3657	date:
MPT-I008_rep	Dipl.-Ing. Django Baunack		20 February 2018

Test Report

Object of examination:

One specimen of each part number has been examined. Residual stress measurements have been performed in according to the test standard of G_804010. Position A has 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. A	Measuring Pos. B	Measuring Pos. MP	Depth Profile in µm
1	RG	2511130050	I		X	X	5 µm, 20 µm, 40 µm, 60 µm, 80 µm.
2	RG	2511108050	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 kα
Crystal lattice:	{211}
Crystal orientation (ψ-angle):	0°; ± 18°; ± 27°; ± 33°; ± 39°; ± 45°
Diffraction angle range (2Θ):	148° - 164°
Step-feeding:	0.1°
Primary aperture:	Ø1.0 mm for measuring point A and F 0.5 x 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:	$\Theta_0 = 78.035°$
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
0,006	-680 ± 35	5,89
0,020	-855 ± 45	5,72
0,039	-1040 ± 50	5,68
0,060	-1170 ± 60	5,72
0,080	-1195 ± 65	5,79

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	-800 ± 45	5,97
0,020	-975 ± 50	5,87
0,040	-1170 ± 55	5,95
0,060	-1015 ± 55	5,62
0,810	-955 ± 50	5,97

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	-810 ± 40	5,95
0,023	-1175 ± 55	5,81
0,040	-1225 ± 65	5,66
0,060	-1170 ± 65	5,73
0,079	-1105 ± 55	5,81

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	-885 ± 45	5,82
0,020	-950 ± 50	5,86
0,040	-1105 ± 55	5,87
0,060	-1175 ± 55	5,77
0,080	-910 ± 45	6,06

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

ZERTECH

Zentrum für Randschichtanalytik und -Technik

<u>Annotations:</u>

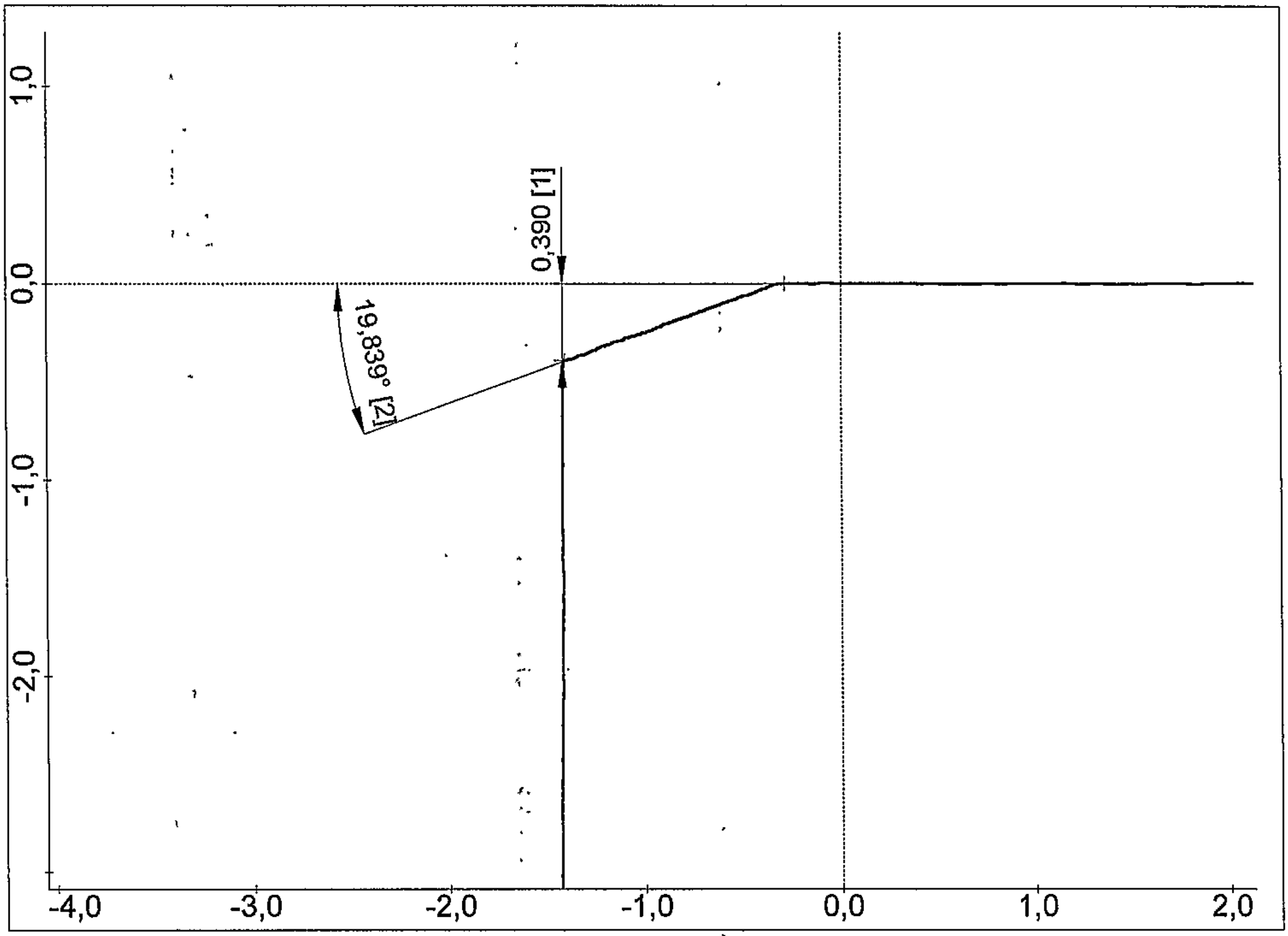
ZerTech is accredited to *DIN EN ISO/IEC 17025* referring to procedures of residual stress analysis by X-ray diffraction (XRD) as well as the Hole Drilling Method (HDM). The X-ray diffraction method is descripted in *DIN EN 15305 Non-destructive testing - Test Method for Residual Stress Analysis by X-ray 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.

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N 1
Operatore:	TURNO D
Data, ora:	16.03.2018, 09:55
Nota:	PART B-B
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



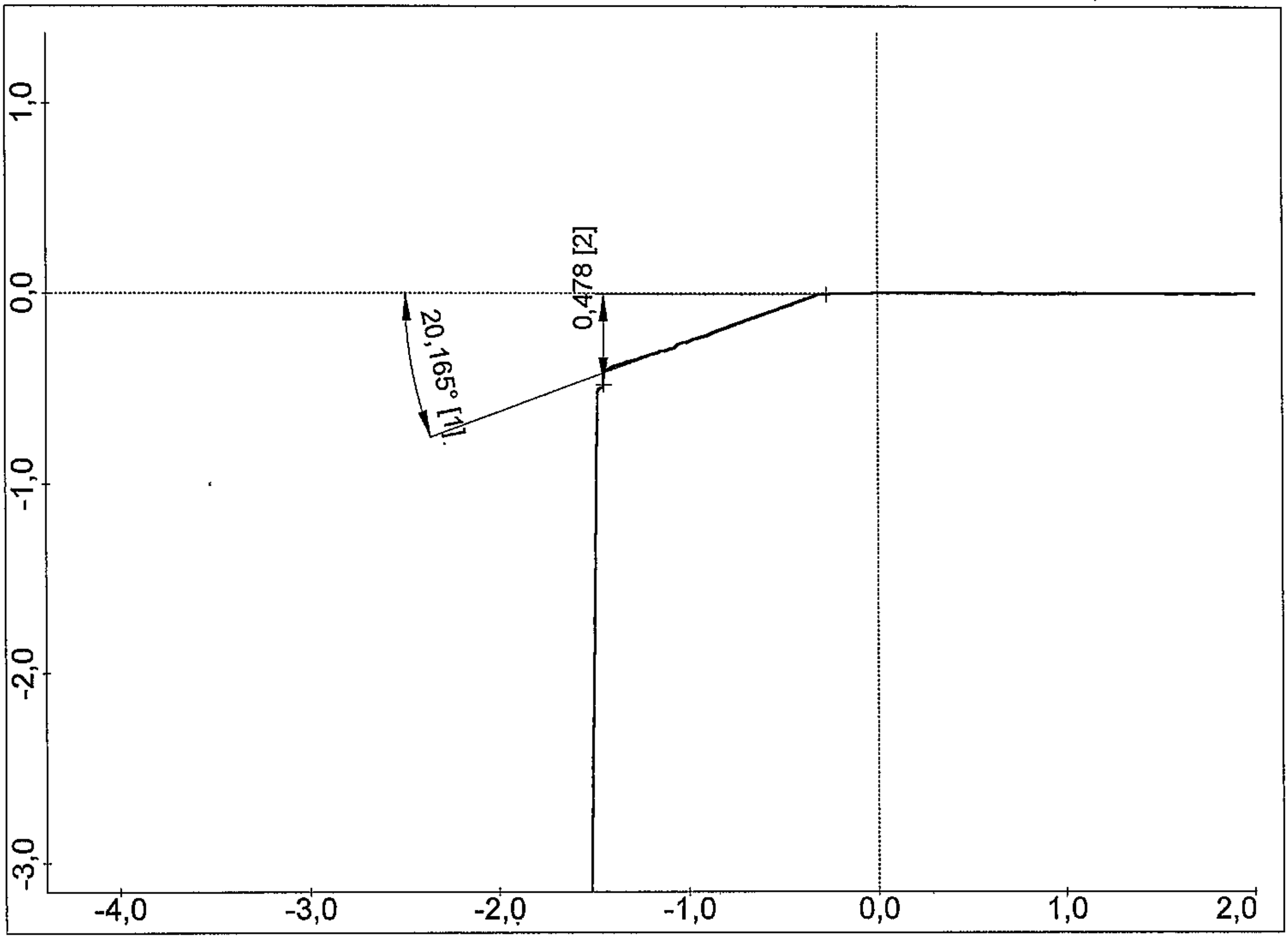
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.2
Operatore:	TURNO D
Data, ora:	16.03.2018, 09:45
Nota:	PART B-B
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



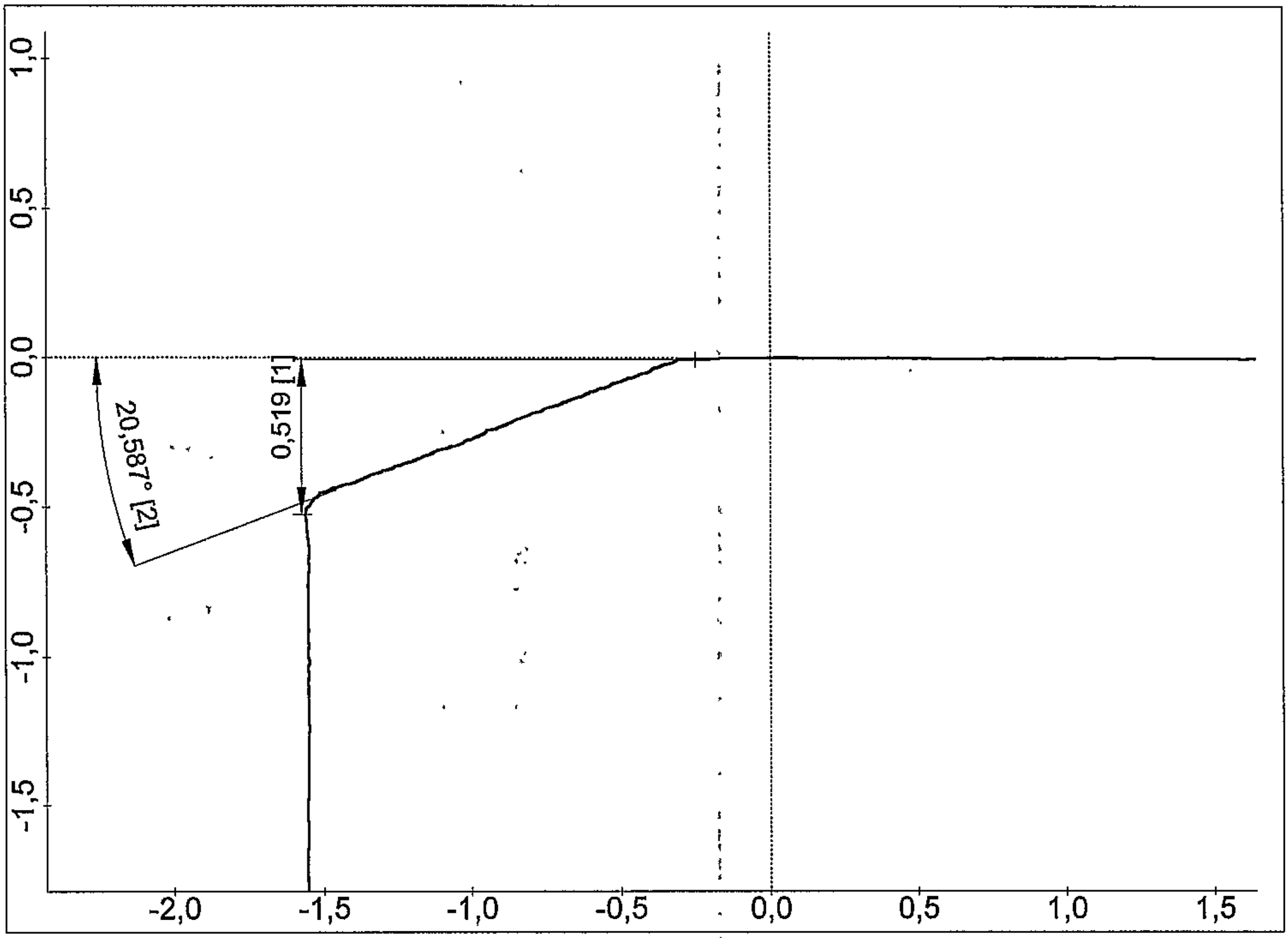
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.3
Operatore:	TURNO D
Data, ora:	16.03.2018, 09:48
Nota:	PART B-B
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



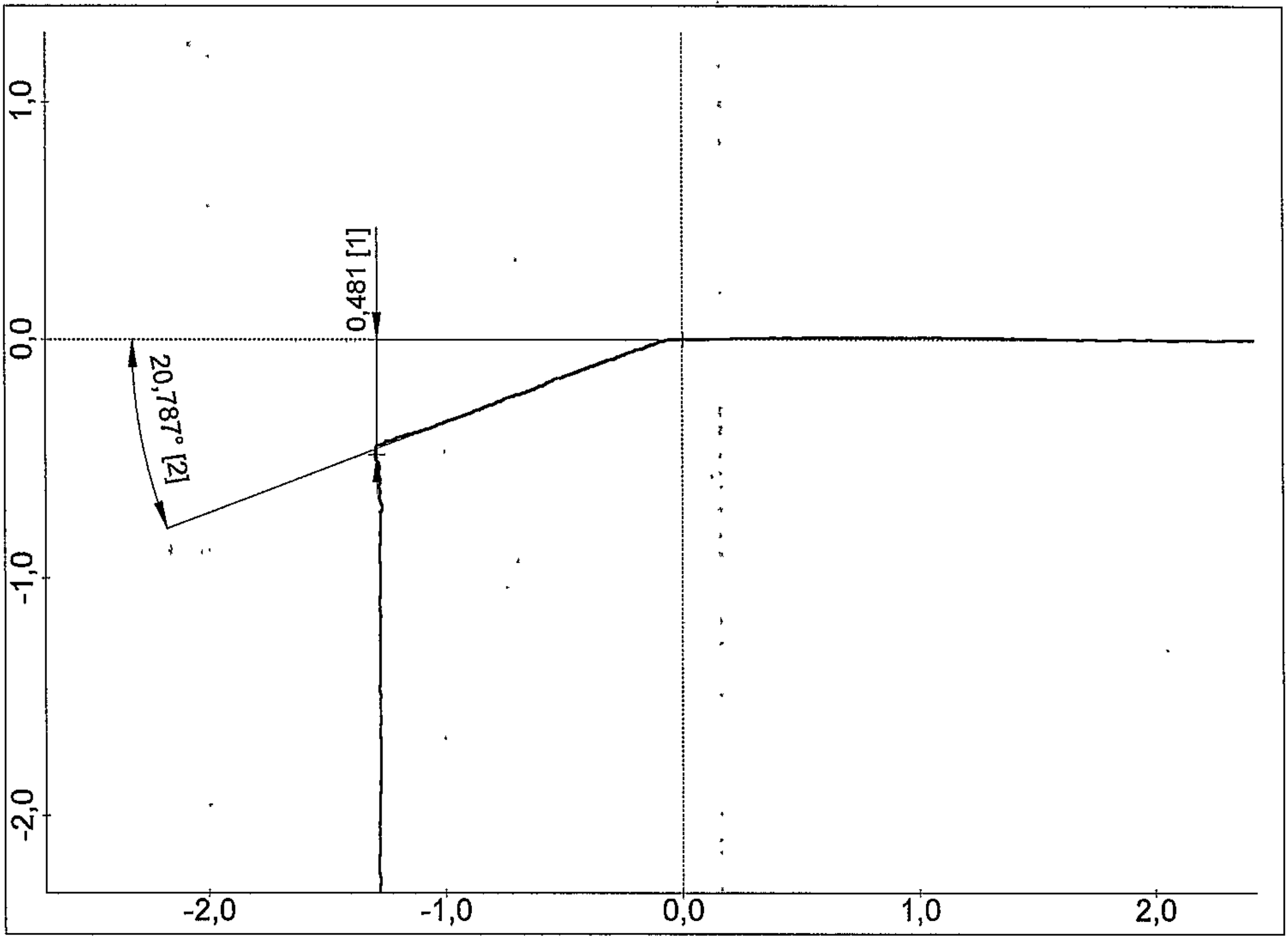
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.4
Operatore:	TURNO D
Data, ora:	16.03.2018, 09:49
Nota:	PART B-B
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



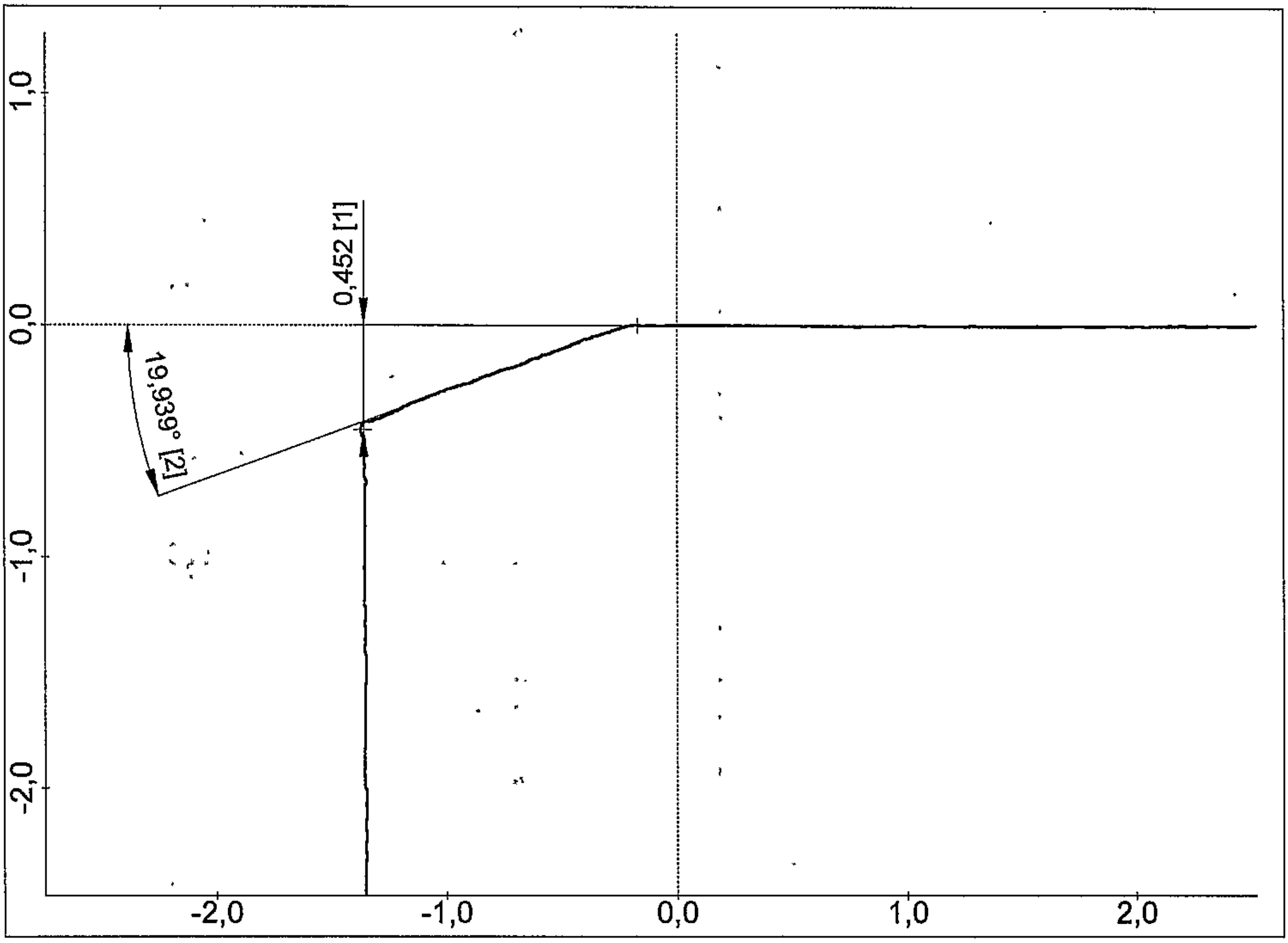
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

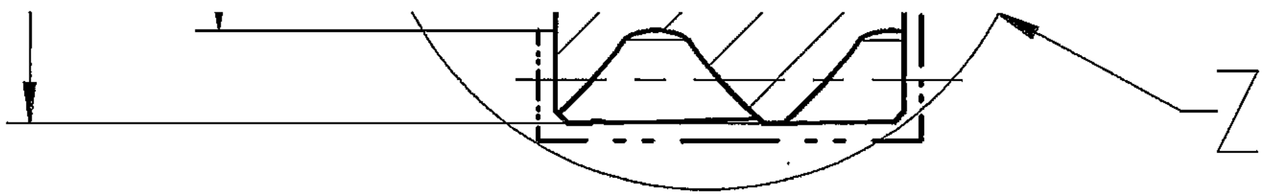
Via dei Ciclamini 4, Modugno (BA)

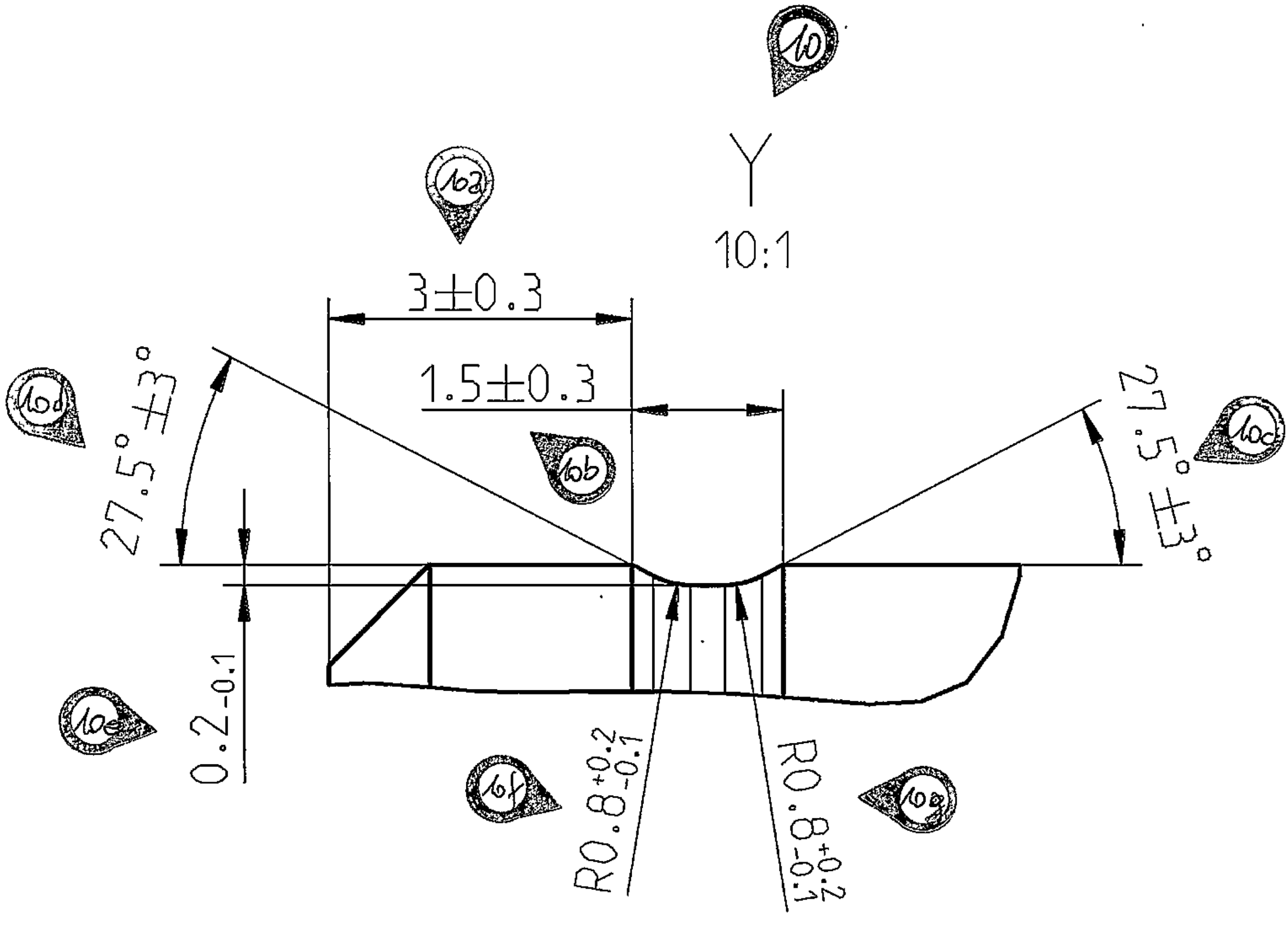
Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.5
Operatore:	TURNO D
Data, ora:	16.03.2018, 09:51
Nota:	PART B-B
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

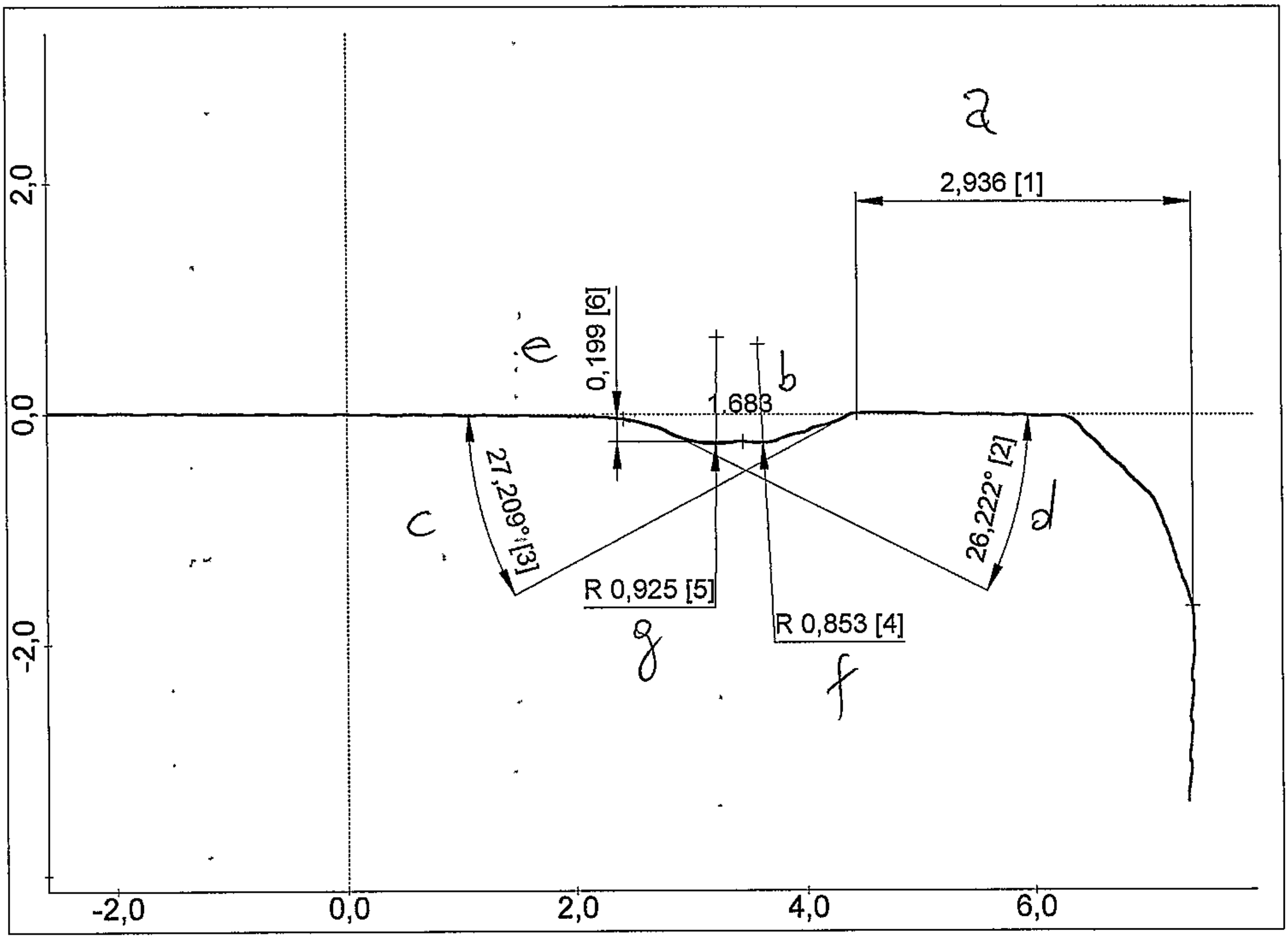

Z


10
Y
10:1
10a
3±0.3
1.5±0.3
27.5° ±3°
10d
10b
27.5° ±3°
10c
0.2-0.1
10e
R0.8+0.2-0.1
10f
R0.8+0.2-0.1
10g

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.1
Operatore:	TURNO D
Data, ora:	16.03.2018, 08:45
Nota:	PART Y
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



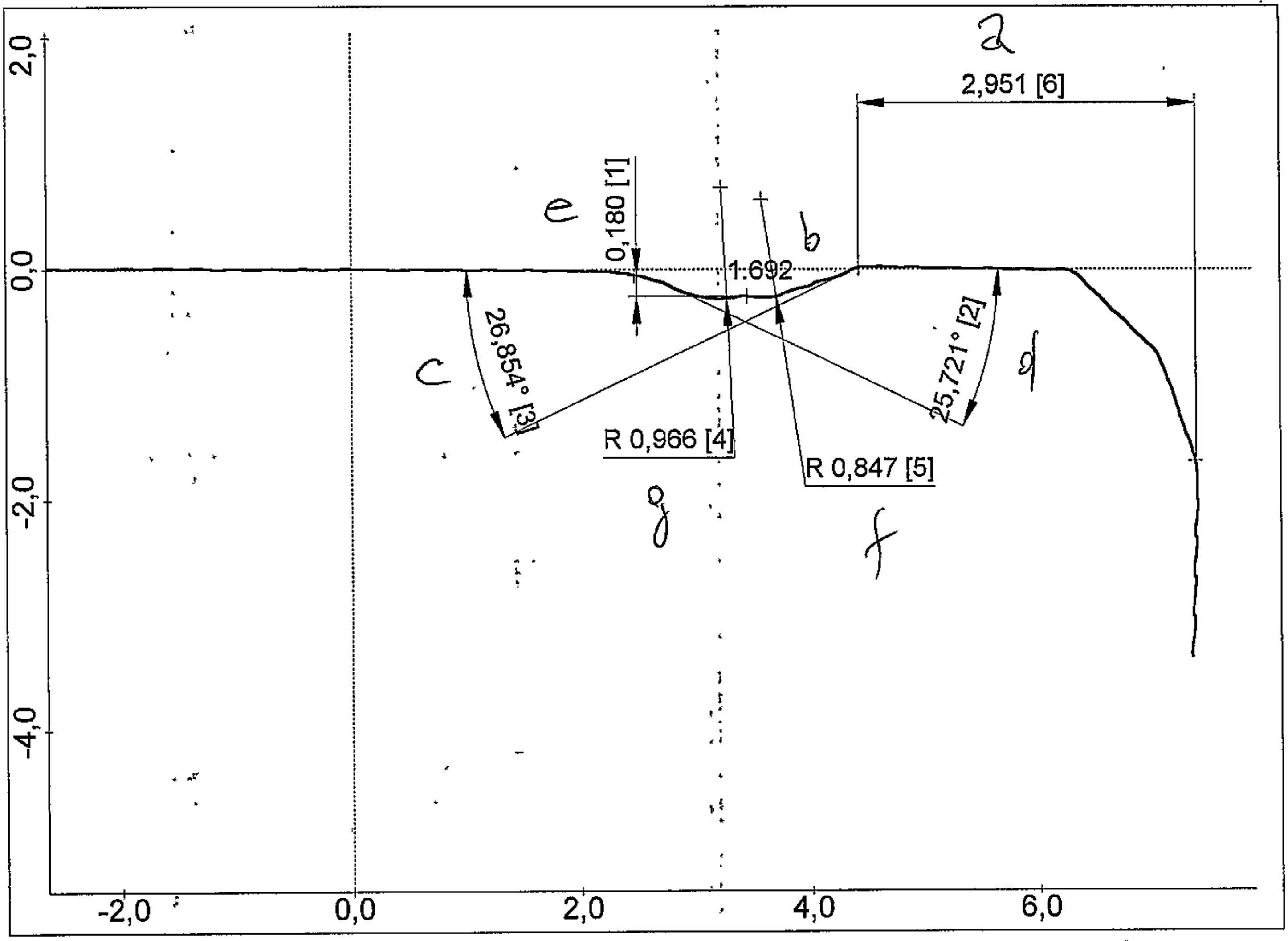
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.2
Operatore:	TURNO D
Data, ora:	16.3.2018, 8:45
Nota:	PART Y
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



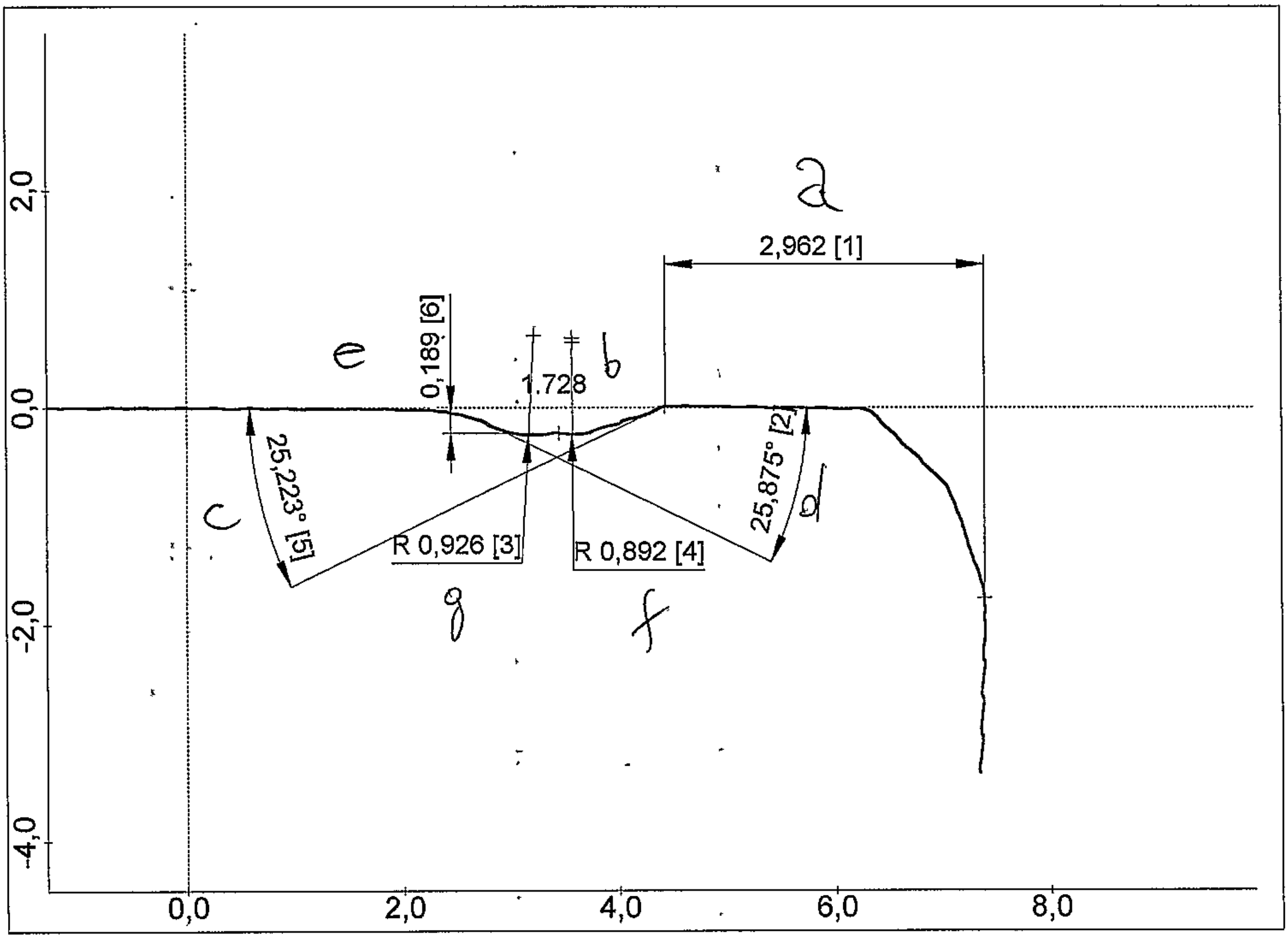
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.3
Operatore:	TURNO D
Data, ora:	16.3.2018, 8:45
Nota:	PART Y
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



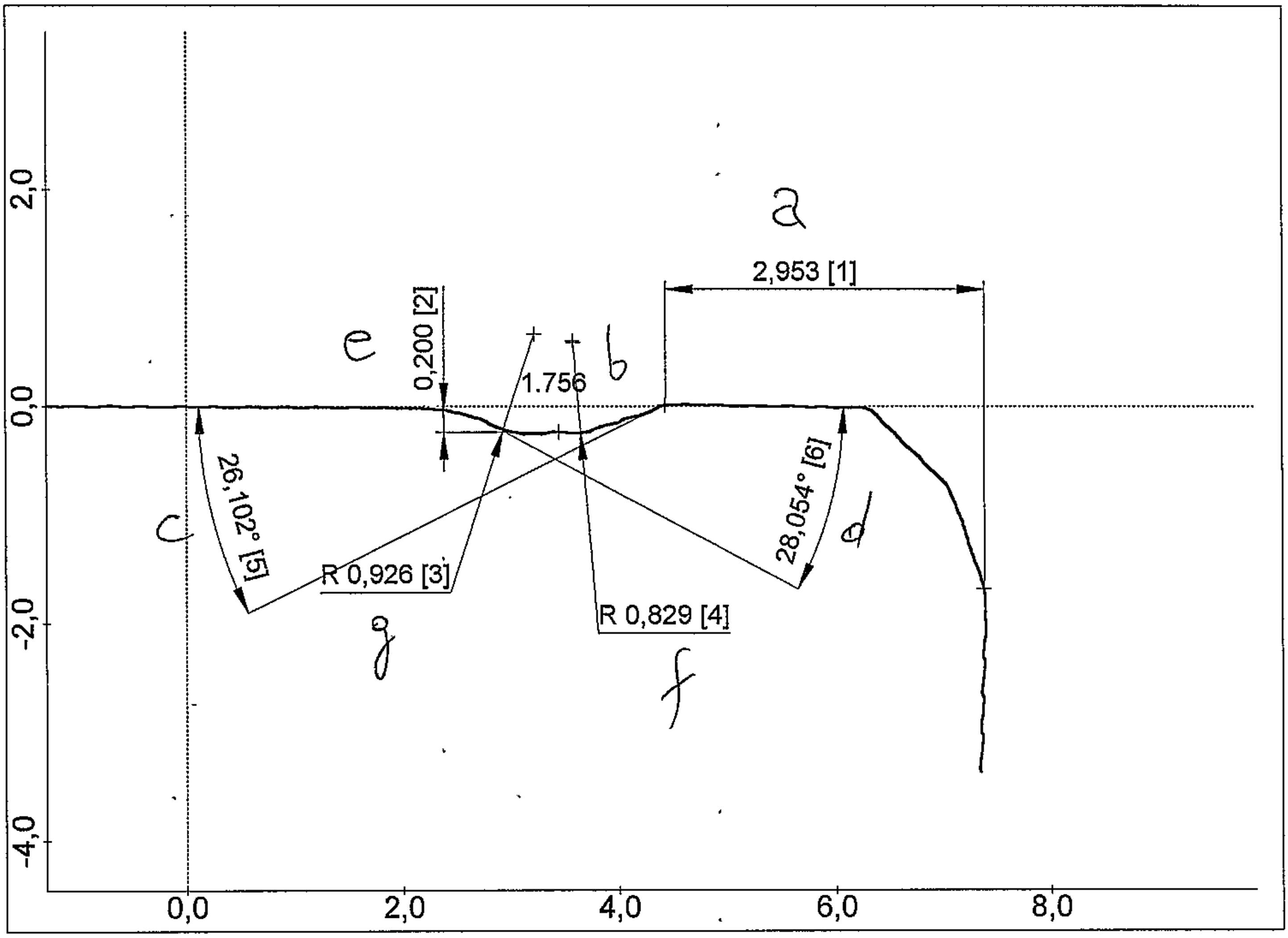
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.4
Operatore:	TURNO D
Data, ora:	16.3.2018, 8:45
Nota:	PART Y
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



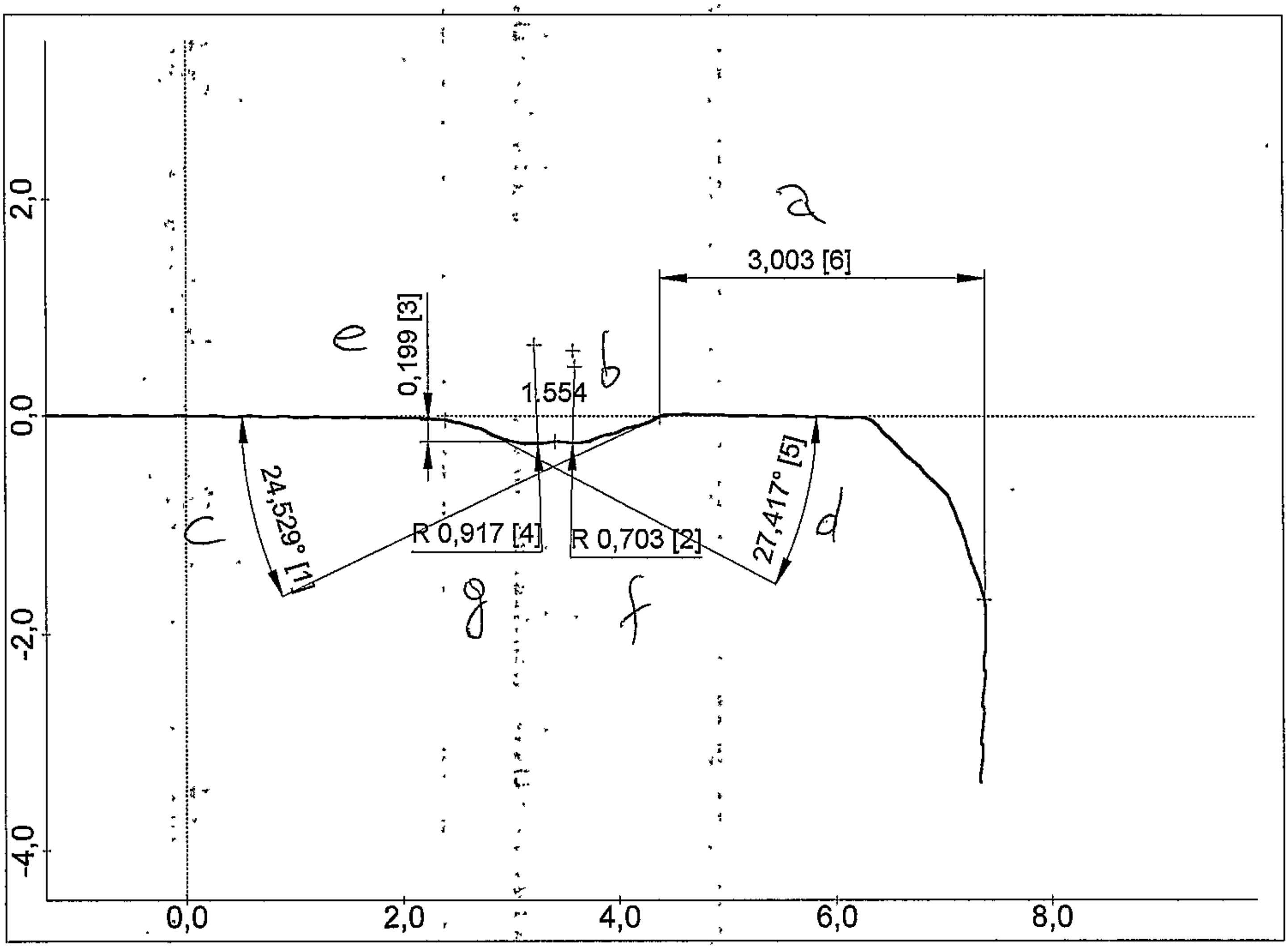
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.5
Operatore:	TURNO D
Data, ora:	16.3.2018, 8:45
Nota:	PART Y
Tastatore:	PCV 350 / 33 mm
Macchina:	*MOA 416120 002*



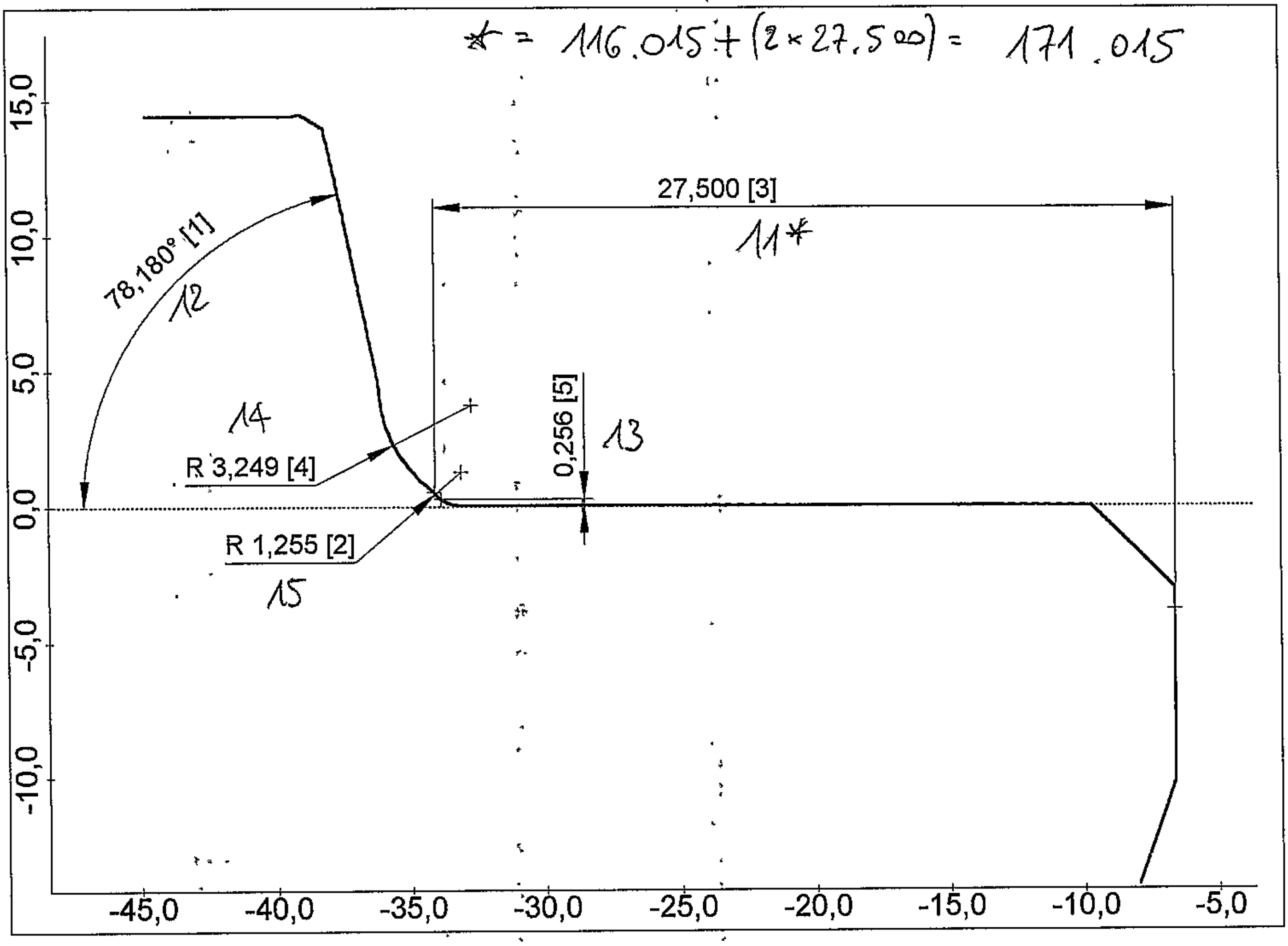
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.1
Operatore:	TURNO D
Data, ora:	16.3.2018, 7:43
Nota:	PART Z
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



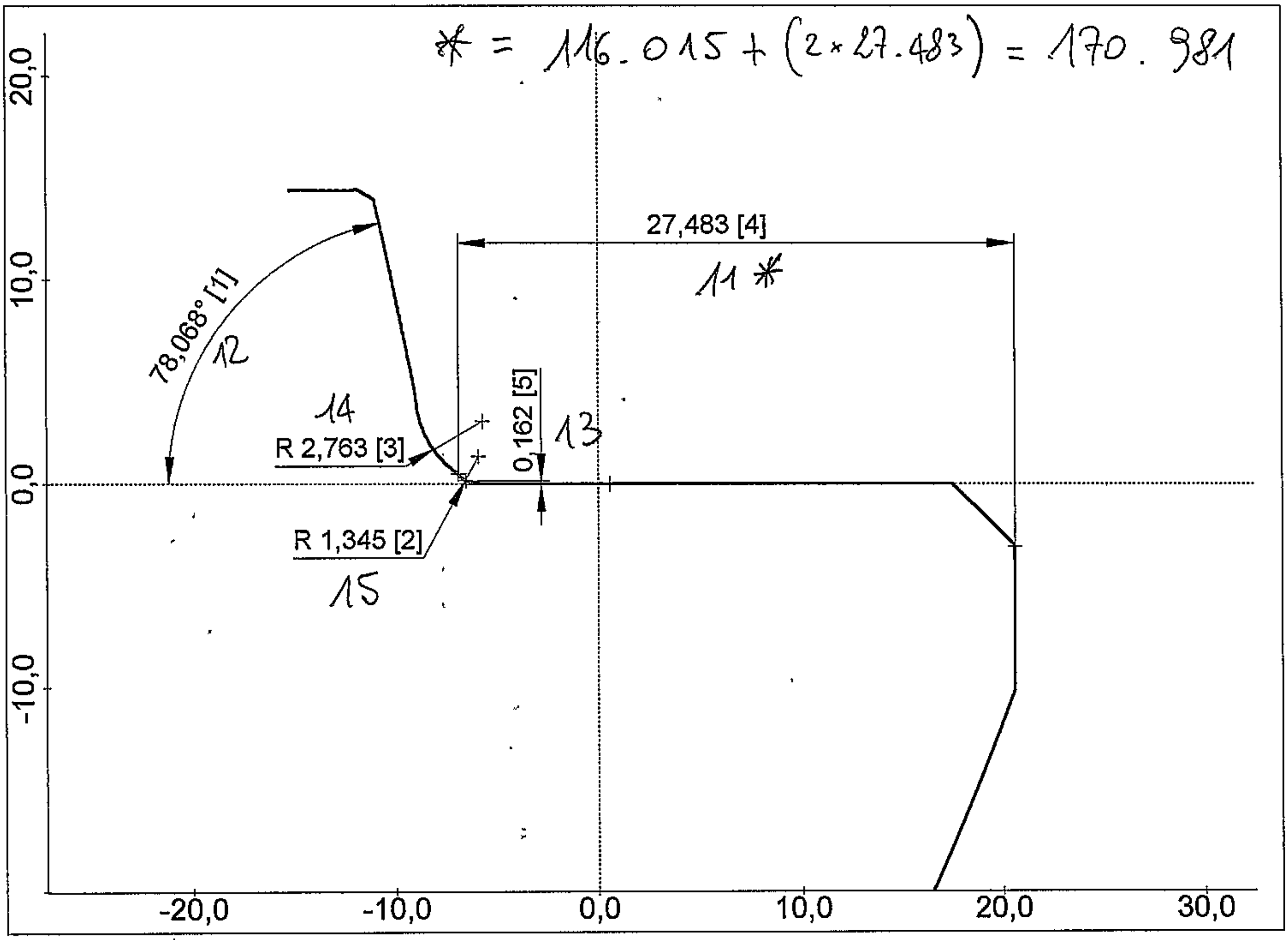
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.2
Operatore:	TURNO D
Data, ora:	16.3.2018, 7:55
Nota:	PART Z
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



PERTHOMETER CONCEPT

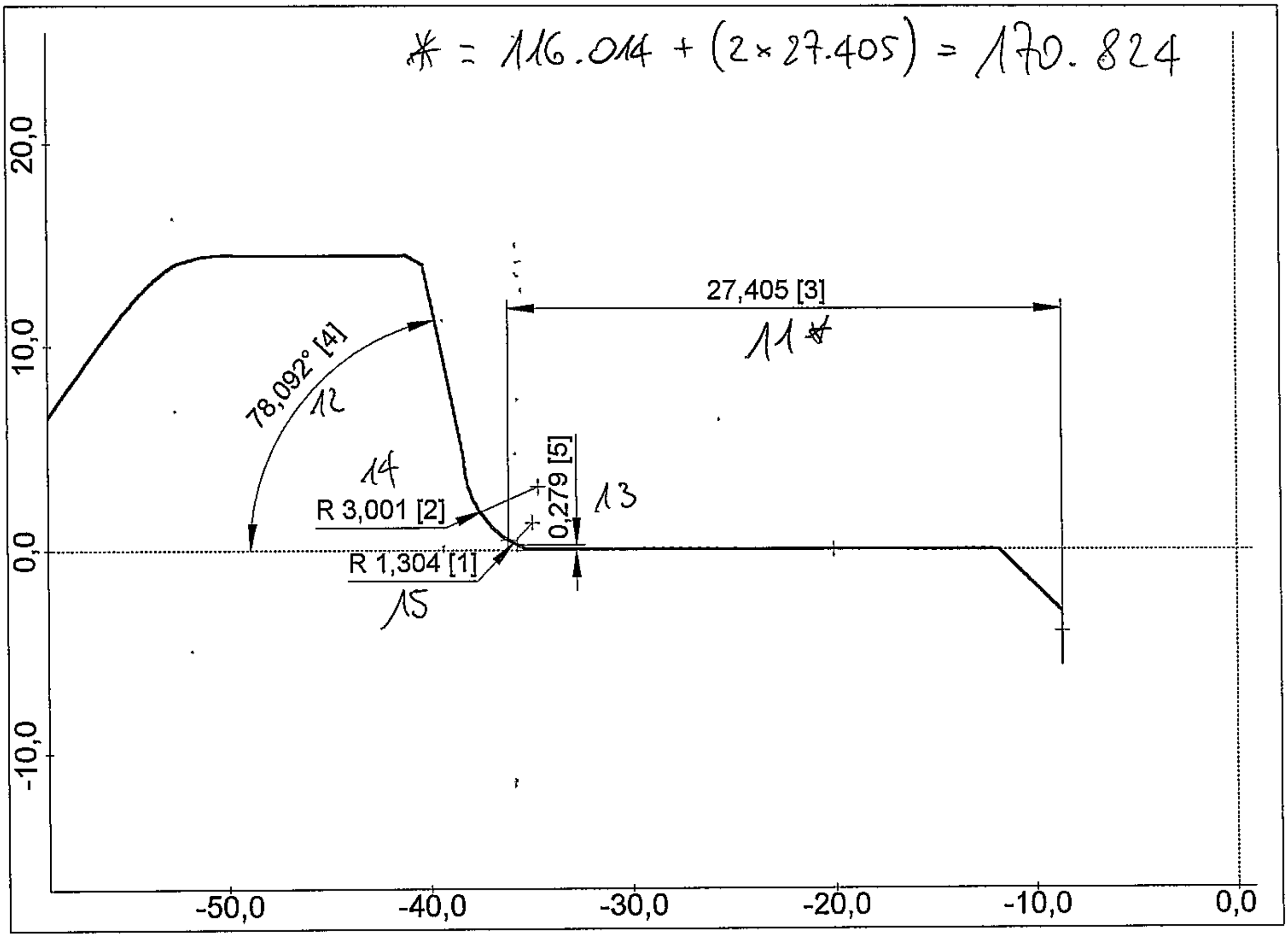
Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.3
Operatore:	TURNO D
Data, ora:	16.3.2018, 7:59
Nota:	PART Z
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002

$* = 116.014 + (2 \times 27.405) = 170.824$



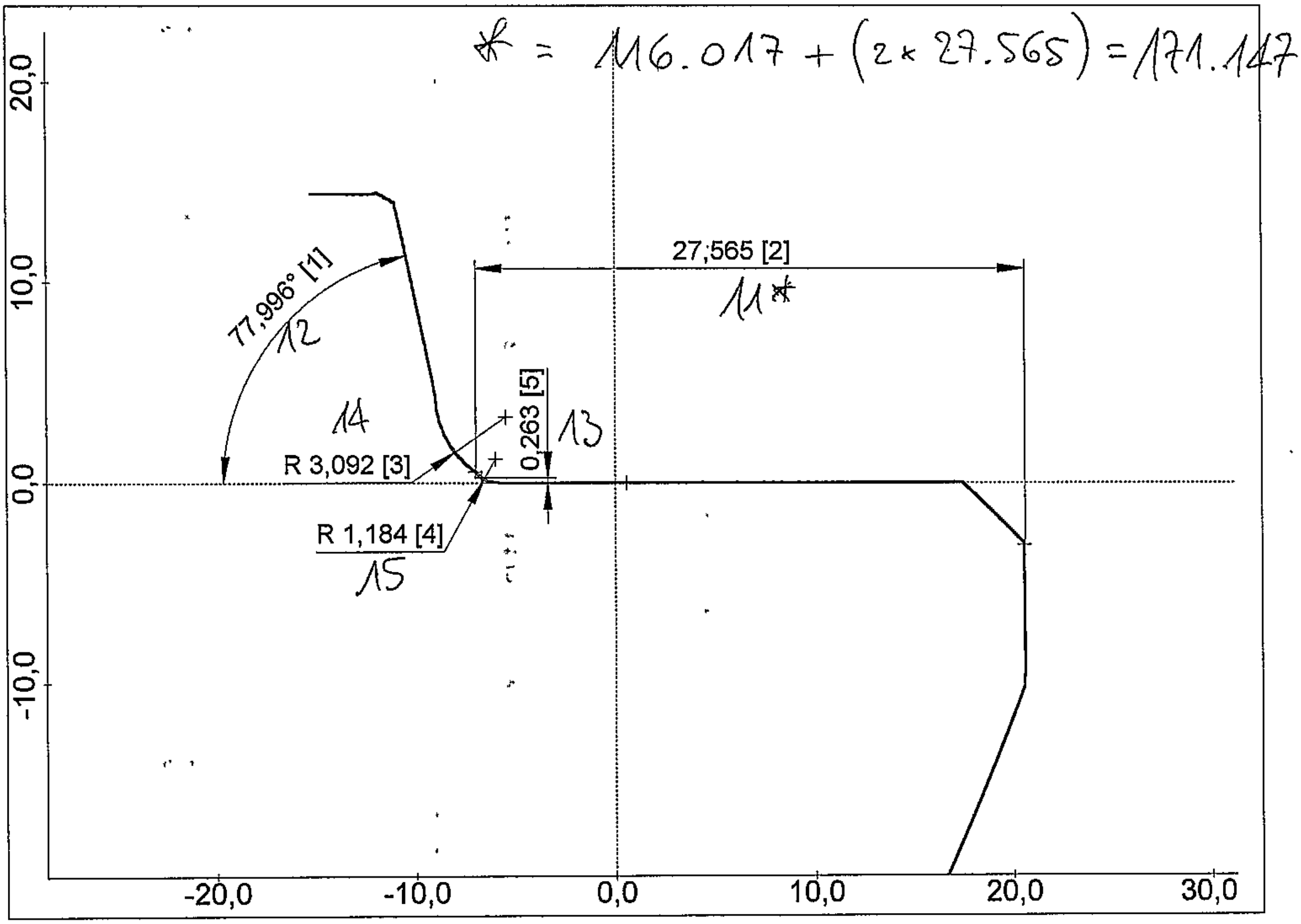
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.4
Operatore:	TURNO D
Data, ora:	16.3.2018, 7:55
Nota:	PART Z
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



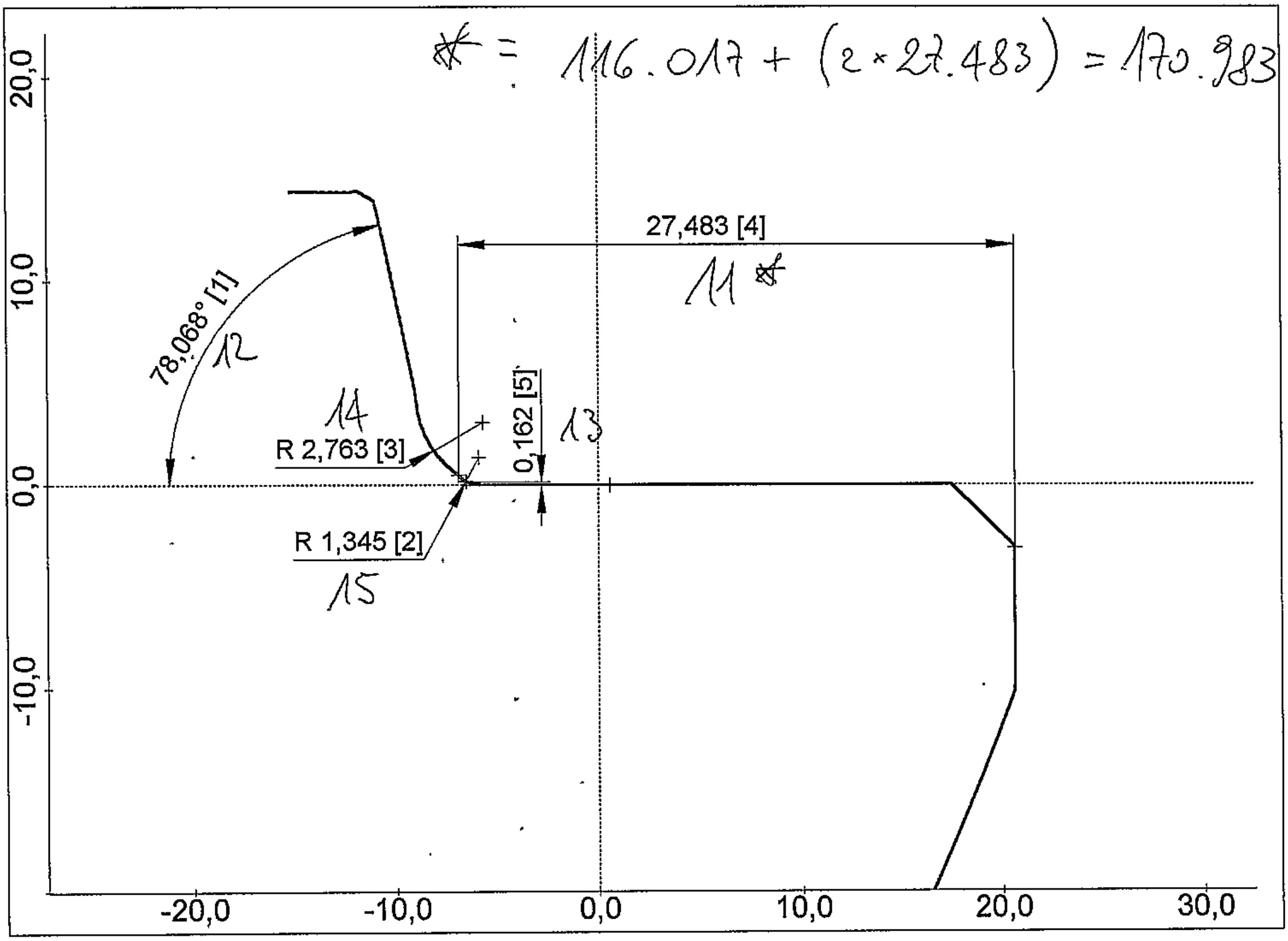
PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

GETRAG

Via dei Ciclamini 4, Modugno (BA)

Oggetto:	ZKR
Numero:	251.1.1300.50 PZ N.5
Operatore:	TURNO D
Data, ora:	16.3.2018, 7:55
Nota:	PART Z
Tastatore:	PCV 350 / 33 mm
Macchina:	MOA 416120 002



PERTHOMETER CONCEPT

Area Riservata alla Produzione	
Valutazione Profilo	
OK	☐
NOK	☐
N°BADGE ODP RICEVENTE	

REPORT 18/039

Date: 22/03/2018
Author: M. de Dato

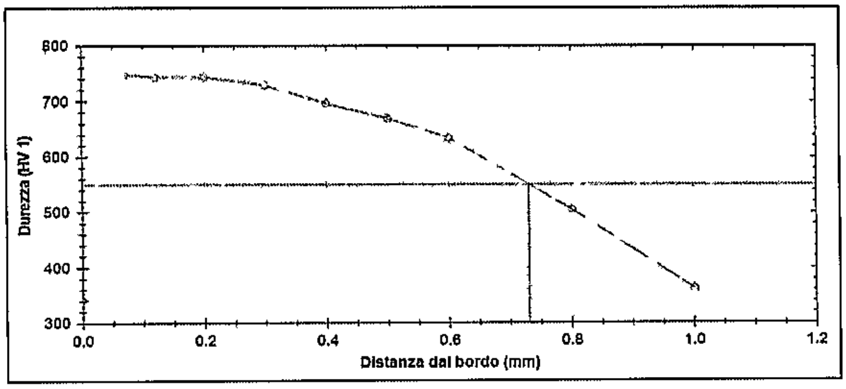
Reason for analysis: *Motivo dell'indagine:*	PPAP
Requester: *Richiedente:*	WLQ - M. Vicenti
Part Name: *Nome particolare:*	Ring Gear
Material: *Materiale:*	GCG_805000 Part 2
State of part: *Stato del particolare:*	Finito
P/N:	251.1.1300.50
S/N:	-
Customer: *Cliente:*	Daimler
Result: *Risultato:*	**OK**
Notes: *Note:*	Gearset 21H
Distribution list: *Lista di distribuzione:*	WLQ - M. Vicenti

Surface hardness verification *(verifica durezza superficiale)*

Component	Scale	Position	Measured Value	Range
Gear	HRC	M1	61,5	-
Gear	HRA	M1	81,7	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	1353/18	M2 (tooth flank)	0,73	0.50+0.40 mm
Gear	Core hardness HV10	1353/18	M3 (tooth core)	341	≥ 300



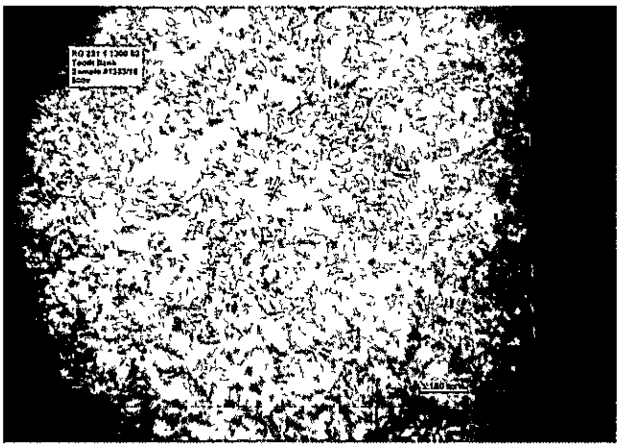
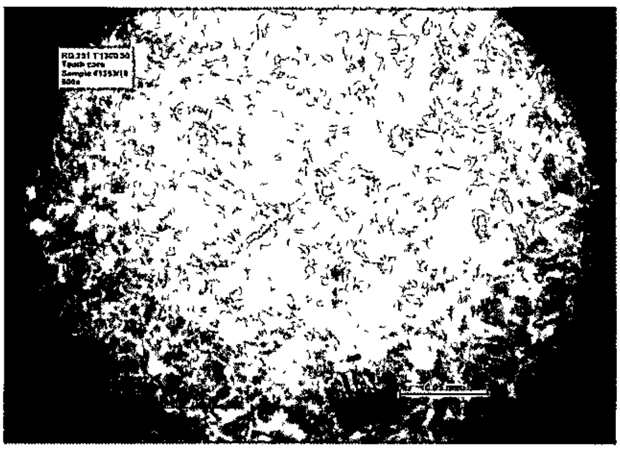
Picture 1: profilo di durezza.

REPORT 18/039

Date: 22/03/2018
Author: M. de Dato

Microstructure analysis *(analisi della microstruttura)*

Sample #	**1353/18**
Gear - Tooth flank surface structure:	Martensite e austenite residua (5%)
Gear - 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	N	Path	Pp	Ppk	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. 58,044Min. 57,984	x	PPAP	1.67	4.08	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	2.14	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	-	1.69	20/03/2018			-	3.35	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	2.23	SIM	20/03/2018			2.23	SIM	22/03/2018

GETRAG

Analisi di similitudine Ppk

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

Macchina da confrontare: **SLW11046**
Capability da confrontare Nr.: 02/03/2017

Data: 22/03/2018
Owner: G.Sette
Abt.: WLQ1

Codice Pezzo di riferimento: 251.1.1080.35

Partnumber in esame: 251.1.1300.35

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					
DIMENSIONI						DIMENSIONI					
Caratteristiche	Unità	Nominale		Deviazione ammessa in %		Nominale		Deviazione %	i.O./n.i.O.		
numero denti Z	---	71		35		70		-1.41	i.O.		
diam.primitivo - Ø	mm	193.496		11		188.635		-2.51	i.O.		
Altezza dentatura	mm	16.050		50		16.050		0.00	i.O.		
diam.testa - Ø (da)	mm	216.200		40		211.500		-2.17	i.O.		

Studio delle specifiche						Studio delle specifiche					
Caratteristiche	Unità	Nominale	Tolleranza T_1	P_p	P_{Pk} (solo per caratteristiche unilaterali)	Nominale	Tolleranza T_2	Target (1,00/1,33/1,67)	i.O./n.i.O.	Min. P_p	Min. P_{pk}
Mdk - Ø	mm	211.198	0.071	2.29		207.088	0.069	1.67	i.O	2.23	
Fr (Eccentricità)	µm	0	32	3.35		0	32	1.67	i.O	3.35	
	µm								---		
	µm								---		
	µm								---		
	µm								---		
	µm								---		
...									---		

Part Submission Warrant

Part Name	Ring Gear Forging	Customer Part Number	25011130090
Shown on Drawing No.	2511130090	Organization Part #	-
Engineering Change Level	no	Dated	30.06.2017
Additional Engineering Changes	-	Dated	17.09.2017

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

Checking Aid No. -   Checking Aid Engineering Change Level -   Dated -

ORGANIZATION MANUFACTURING INFORMATION

Vittone srl
Organization Name & Supplier/Vendor Code

Frz Gallenca 6
Street Address

Valperga | Torino | 10087 | Italy
City | Region | Postal Code | Country

CUSTOMER SUBMITTAL INFORMATION

Getrag
Customer Name/Division

DEQ-STA
Buyer/Buyer Code

Application

MATERIALS REPORTING

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

Submitted by IMDS or other customer format: 698592265

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

REASON FOR SUBMISSION (Check at least one)

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

REQUESTED SUBMISSION LEVEL (Check one)

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

SUBMISSION RESULTS

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

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

Mold / Cavity / Production Process

DECLARATION

I hereby affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 350 / 8 hours. I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION / COMMENTS:

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

Organization Authorized Signature Rolando Massimo   Date 26.10.2017

Print Name   Phone No. 0124373704   Fax No.

Title AQ   E-mail qualita@vittonesrl.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☒ Approved ☐ Rejected ☐ Other

Customer Signature   Date 13.11.17

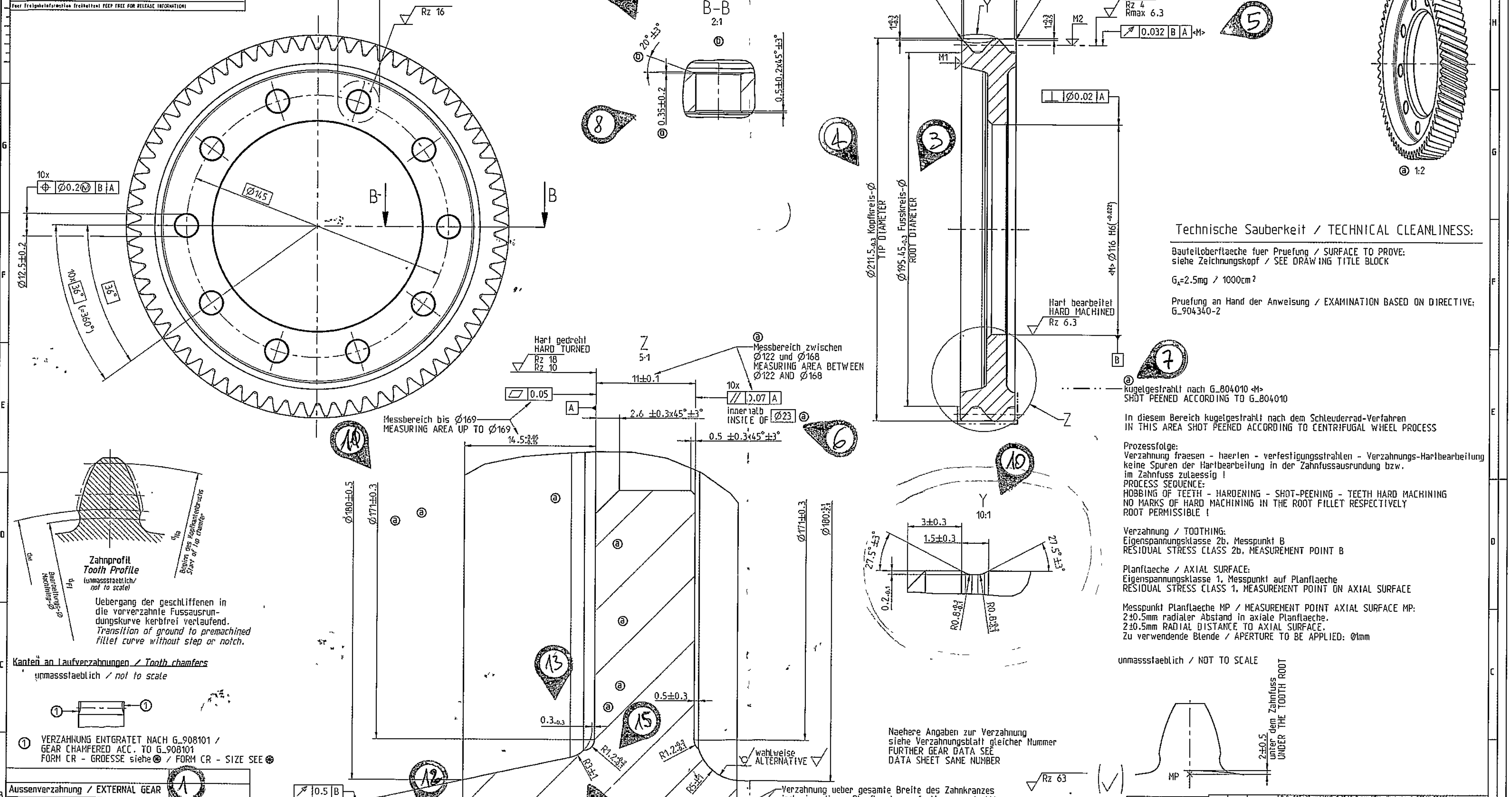
Print Name Getrag DEQ H. Stadler   Customer Tracking Number (optional)

March 2006 CFG-1001

MAGNA GETRAG

GETRAG B.V. & Co. KG
Hermann-Hagenmeyer-Straße
74199 Untergruppenbach

Design Release: 2018-01-25 Filippo.Russo
Function Release: 2018-01-25 Daniel.Sans
Geardata Release: 2018-01-25 Filippo.Russo
Material Release: 2018-01-25 Filippo.Russo
SAP Release: 2018-01-26 Hartmut.Kobald
Document Status: approved
Fuer Freigabeinformation freihalten! KEEP FREE FOR RELEASE INFORMATION!



Uebergang der geschliffenen in die vorverzahnte Fussausrundungskurve kerbfrei verlaufend.
Transition of ground to premachined fillet curve without step or notch.

Kanten an Laufverzahnungen / *Tooth chamfers*
unmassstaeblich / *not to scale*

① VERZAHNUNG ENTGRATET NACH G_908101 /
GEAR CHAMFERED ACC. TO G_908101
FORM CR - GROESSE siehe ⊛ / FORM CR - SIZE SEE ⊛

Aussenverzahnung / EXTERNAL GEAR		
Zahnwelle/ SPLINE DATA EXTERNAL		
Bezugsdurchmesser / REFERENCE DIAMETER d_B		
Modul / NORMAL MODULE m_n		2.650
Zaehnezahl / NUMBER OF TEETH z		70
Eingriffswinkel / NORMAL PRESSURE ANGLE α_n		20.0°
Schraegungswinkel / HELIX ANGLE β		24.0°
Richtung / HAND OF HELIX		RIGHT. rechts
Bezugsprofil / BASIC RACK		
Profilverschiebung/ADDENDUM MODIFICATION $x \cdot m_n$	Nennmass / NOMINAL	0.011
Qualitaet / GEAR TOOTH QUALITY (DIN3961)		7
Toleranzklasse / TOLERANCE CLASS		
Zahndicke / TOOTH THICKNESS s_n (Lehrenmass / GAGE DIMENSION)	effective max	
Zahndicke / TOOTH THICKNESS s_n (Einzelmessung / ACTUAL)	max.	4.093
	min.	4.068
Messkugel-Ø / BALL DIA D_M		4.00
Pruefmass / MEASUREMENT OVER BALLS M_{dK} (Einzelmessung / ACTUAL) <M>	max.	207.122
	min.	207.053

Zahnflankenkantenbereich und Zahngrundkantenbereich muss komplett durchgaengig entgratet sein
AREA OF TOOTH FLANK EDGE AND AREA OF TOOTH ROOT EDGE COMPLETELY AND CONTINOUSLY DEBURRED

Verzahnung ueber gesamte Breite des Zahnkranzes inclusive dieser Planflaeche verfestigungsgestrahlt. Planflaeche muss mindestens 3mm, in radialer Richtung, unterhalb des Fusskreises verfestigungsgestrahlt sein
Ⓜ MP TOOTHING SHOT PEENED OVER COMPLETE WIDTH OF GEAR INCLUDING THIS AXIAL SURFACE. AXIAL SURFACE MUST BE SHOT PEENED AT LEAST 3mm. IN RADIAL DIRECTION. BELOW THE TOOTH ROOT

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

einsatzgehaertet und angelassen nach G_804002
CASE HARDENED AND TEMPERED ACCORDING TO G_804002
M1 (Oberflaechenhaerte/CASE HARDNESS) : 80.5+2.5 HRA
M2 (Zahnflanke/TOOTH FLANK) : CHD (Eht) 550 HV1=0.5+0.4
M3 (Kernhaerte/CORE HARDNESS) : 300min HV10

Technische Sauberkeit / TECHNICAL CLEANLINESS:

Bauteiloberflaeche fuer Pruefung / SURFACE TO PROVE:
siehe Zeichnungskopf / SEE DRAWING TITLE BLOCK

G_A=2.5mg / 1000cm²

Pruefung an Hand der Anweisung / EXAMINATION BASED ON DIRECTIVE:
G_904340-2

Ⓜ kugelgestrahlt nach G_804010 <M>
SHOT PEENED ACCORDING TO G_804010

In diesem Bereich kugelgestrahlt nach dem Schleuderrad-Verfahren
IN THIS AREA SHOT PEENED ACCORDING TO CENTRIFUGAL WHEEL PROCESS

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

Verzahnung / TOOTHING:
Eigenspannungsklasse 2b, Messpunkt B
RESIDUAL STRESS CLASS 2b, MEASUREMENT POINT B

Planflaeche / AXIAL SURFACE:
Eigenspannungsklasse 1, Messpunkt auf Planflaeche
RESIDUAL STRESS CLASS 1, MEASUREMENT POINT ON AXIAL SURFACE

Messpunkt Planflaeche MP / MEASUREMENT POINT AXIAL SURFACE MP:
2±0.5mm radialer Abstand in axiale Planflaeche.
2±0.5mm RADIAL DISTANCE TO AXIAL SURFACE.
Zu verwendende Blende / APERTURE TO BE APPLIED: Ø1mm

unmassstaeblich / NOT TO SCALE

Buchst. CHANGE INDEX	Anzahl NUMBER	Aend.-Nr. CHANGE ORDER NO.	Aenderung --nur mittels CAD zulaessig; FMEA ueberpruefen-- MODIFICATION --ONLY ALLOWED BY CAD. CHECK FMEA--	Datum DATE
b	3x	C011951MIP2	B-B: 20°±3° und/AND 0.35±0.2 neu/NEW, Kantenbruch/BREAK EDGES -0.5/-0.1 entf./DEL ;	20180125
a	14x	C007030MIP1	Ansicht/VIEW: Ø23 war/WAS Ø25; Z: Ø23 war/WAS Ø25, Notiz/NOTE geaendert/CHANGED, Messpunkt/MEASUREMENT POINT MP neu/NEW, 45°±3°(2x), R1.2+0.2/-0.1(2x), 0.4±0.2, Ø130.5±0.3 und/AND Ø159.5±0.3, Kugelstrahlen/SHOT PEENING aktualisiert/UPDATED; Massstab/SCALE 1:1 war/WAS 1:2; GCG80500-02_20MnCrS5 war/WAS GCG80500-01_20MnCrS5;	20170928
--	--	C009048MIP1	Spezifikationsreifegrad 3 erreicht SPECIFICATION MATURITY LEVEL 3 APPROVED	20170502

GCG_803001 | 5 <M> | 0 <C> | 0 PTC
CAD Pro/Engineer
Massstab / SCALE M: 1:1 (--)

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

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

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

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

Werkstoff / MATERIAL: GCG805000-02_20MnCrS5 Ⓐ
MAGNA GETRAG
GETRAG B.V. & Co. KG
Halbzeug SEMI-FINISHED: -
beibenetzte Oberflaeche OIL WETTED SURFACE: 0 mm²
Gesamtoberflaeche SURFACE AREA: 100236 mm²
Masse MASS: 2.939 kg
Schutzvermerk nach ISO 16016 beachten PROTECTION PER ISO 16016

Benennung / ITEM NAME: **Zahnkranz** RING GEAR
Artikel-Nr./ ITEM NO.: **2511130050** Blatt/SHEET 1 von/OF 1
CAD-Modell: 2511130050
Reifegrad MATURITY: 3
Format SIZE: A1
Ersatz fuer SUBSTITUTE FOR: -

INTRALINK DATA	CHECKED IN BY	CHECKED IN ON: dd.mm.yyyy hh:mm:ss	VERSION
Zchng / DRW:	Petra.Kaufmann	25.01.2018 10:56:09	7
MODEL:	Petra.Kaufmann	25.01.2018 10:56:09	6