

Product change notification

PCN07-9-KSC

C&K components

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Document revision

Revision	Date	Description	Author
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1. Purpose

C&K components, as design and manufacturing company for micro-miniature tact switches, set up continuous product improvement to go toward zero defects.

This continuous improvement action leads to implement a major modification on the KSC tact switches series: anti particle central contact will be placed on the lead frame in order to increase product robustness to dust or particle contamination. In addition, new injection tooling & methods will allow better over-molding parameters to improve process stability.

Those modifications will make for our customers a significant reduction of any issue linked to the particle failure mode.

2. Change definition

2.1 Overview

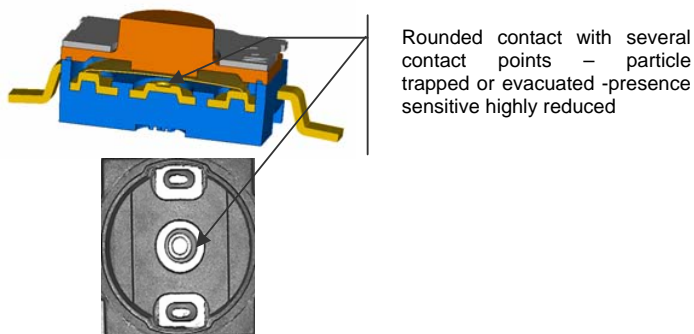
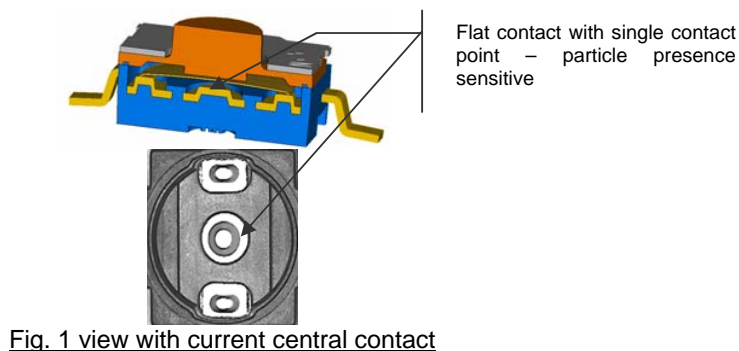
Leadframe

- Lead frame modification to include several points of contact between the central contact and the dome. Other modifications such as terminal position on the plastic housing, ejector location and
- Central contact round shape allow, in particle presence, to catch it inside the contact. The radius size has been calculated according the most common particle size.
- Other modifications such as terminal position on the plastic housing.

Plastic housing

- New mold with new injection parameters location such as ejector, injection pin and parting line.

2.2 Illustration



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2.3 *New molding parameters*

Main differences between the new and the old mold design are related to the ejector and hole location, the shape of over-molding elements.

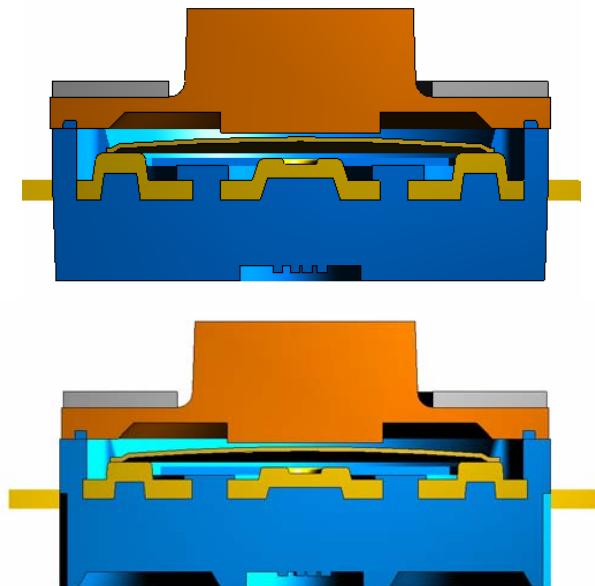


Fig. 3 Comparative view of old design (above) and new one (below)

2.4 *Anti-particle contact analysis*

The basic mechanism of the resistance of the particle is the following

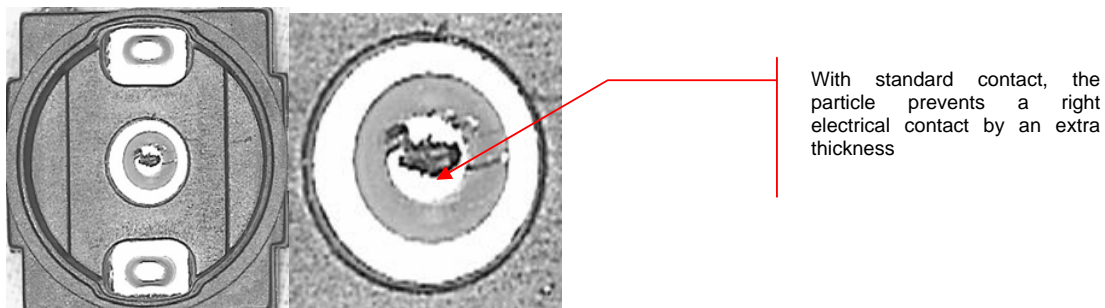


Fig. 4 standard contact with particle

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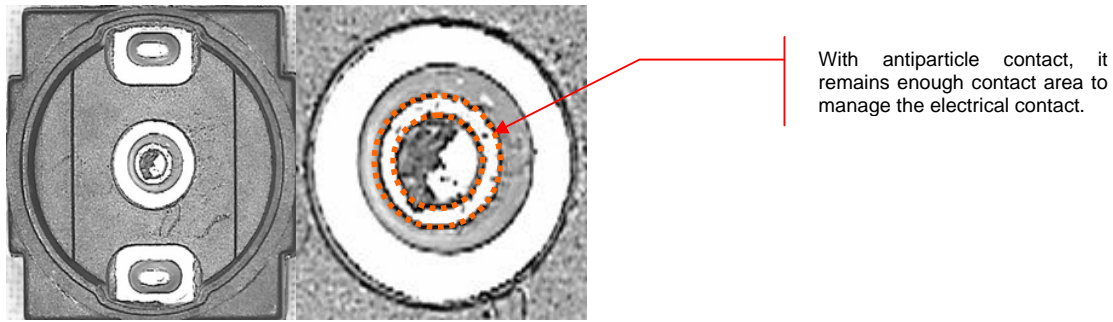


Fig. 5 anti-particle contact with particle

Of course, as far particles are from different origins, several test according several types of pollution were performed.

● **Dust proof test:**

- Test method:
 - Particle type = White powder of magnesium silicate.
 - Particle size < 0.05mm
 - Quantity > 200 particles / switch
 - 30 Switches tested by batch
- Results with standard contact:
 - 30% of the switches are out of specification versus contact resistance.
 - 90% of the switches present contact instability (bounces).
- Result with anti-particle contact:
 - All the switches are in the specification versus contact resistance.
 - 10% of the switches present contact instability (bounces).

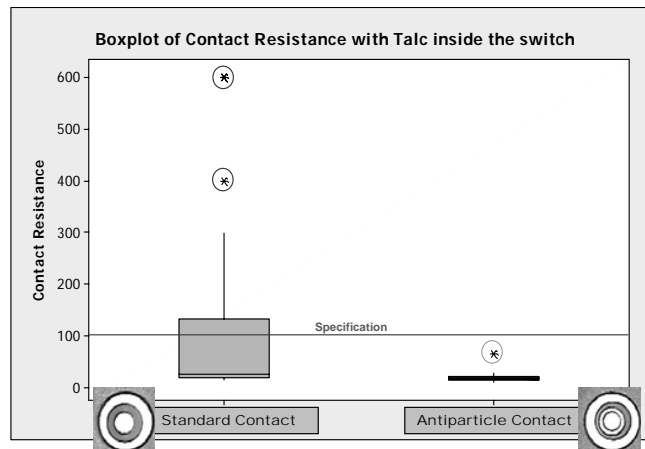


Fig. 6 Dust proof test results

● **Plastic burr test**

- Test method:
 - Particle type = plastic burs
 - 0.05mm > Particle size < 0.5mm
 - Quantity > 20 particles / switch

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- 30 Switches tested by batch
 - Results with standard contact:
 - Some switches are out of specification versus contact resistance
 - 60% of the switches present contact instability (bounces)
 - Result with anti-particle contact:
 - All the switches are in the specification versus contact resistance
 - 5% of the switches present contact instability (bounces)

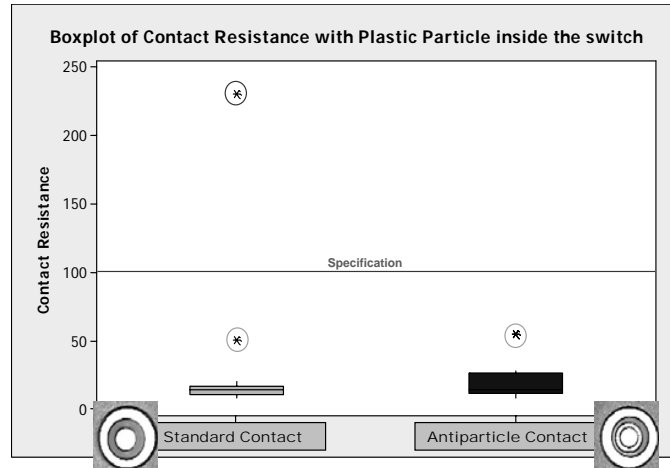


Fig. 7 Plastic burr test results

- Combined test: dust and plastic burrs:
 - Test method:
 - Particle type = White powder & Plastic burrs
 - Particle size < 0.5mm
 - Quantity = 20 to 200 particles / switch
 - 40 Switches tested by batch
 - Test results for standard contact.

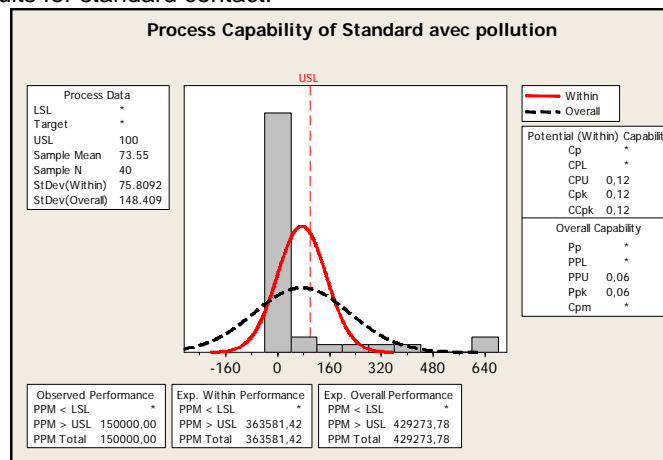


Fig. 8 Mix test results for standard contact

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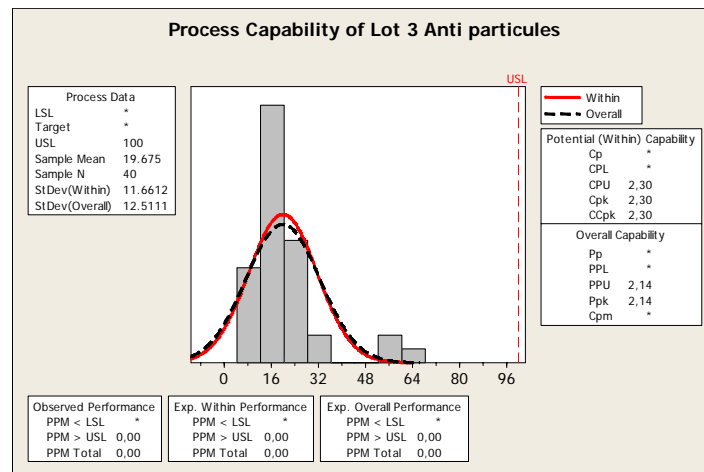


Fig. 9 Mix test results for standard contact

As a conclusion, the new antiparticle contact can reduce significantly any failure linked to particle inside the switch. This improvement is a major step to go toward zero defects on the KSC series.

3. Change impact and qualification method

The design constrain for this new central contact on the lead frame and the new housing was to get **no modification on any specification** to avoid any change on customer application. **All product features, mechanical, electrical, environmental remains unchanged.**

The manufacturing & quality processes, location and procedures remain also unchanged.

The qualification proceeds as follows as both modification are dissociated.

- Antiparticle contact qualification on the most common KSC P/N's. We have qualified the characteristics for which this new contact may have an impact which are:
 - Forces
 - Stroke
 - Contact resistance
 - Simultaneity
 - Life test
- New mold housing: A full qualification was done on one P/N. On the main KSC P/N's, the following test are the following:
 - Forces
 - Stroke
 - Contact resistance
 - Simultaneity
 - Life test

You will find in annex 2 the justification of the characteristics choice for the qualification.

You will find in annex 3 a synthesis with all the part numbers test for the antiparticle contact and the corresponding report for each of them. The full qualification report for the new housing is also included in annex 4.

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4. Application

4.1 Overview

The new lead frame including the anti-particle contact with the new molding parameters will be introduced on all products at the application date.

4.2 Product range affected

- KSC1
- KSC2
- KSC3
- KSC4
- KSC5
- KSC6

You will find in the annex 1 the complete P/N list.

4.3 Date of application & time frame

- Samples availability: From February 15th, 2008
- PPAP delivery: March 15th 2008.
- Application date for new version: deliveries from June 1st 2008 latest.

Note: C&K will apply the change on any P/N prior to the application date in the case of the entire necessary customer approval will be received. The corresponding information will be forwarded on time through our customer service network.

4.4 Ordering, pricing and stock handling policy

- Ordering: P/N codes remain unchanged.
- Pricing: any pricing and other sales conditions remain valid.
- Stock handling: no obsolescence and no specification modification is applied on any P/N. No return or scrap for obsolescence will be accepted.

4.5 Customer qualification

We recommend to our customers to carry on the necessary actions and qualifications they feel necessary to make sure that they will be ready at the date of application. We haven't modified the product features to minimize the customer impact and make easier the modification acceptance. **For any reason, if you evaluate that your acceptance will be released after the date of application, you have to notify C&K components at least 2 months before the application date, ie April 1st 2008.** Without this notification, the change will be applied on any purchased products affected by the modification.

For products already sold under PPAP, a new PPAP will be issued at the date given is item 4.3. PPAP to be provided will be PPAP level 3 with the following content:

- PSW
- Samples (30 pieces)
- Samples measurements
- Measurement report.
- Laboratory reports according the qualification plan (refer to annex 2)

As no material modification is done, the IMDS data remain unchanged.

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5. Acknowledgement

We recommend acknowledging this PCN with your requirements in terms of samples & qualification files no later than January 1st 2008 at the following email address: ksc.ap@coactive-tech.com.

6. Support

For any question, please contact your sales representative or email at ksc.apcontact@coactive-tech.com.

Annex 1: P/N affected by the change**KSC1**

Y31A41139FP	Ksc141g En Vrac
Y31B11131FP	Ksc121j
Y31B11131FP LFS	Ksc121j Lfs
Y31B11135FP	Ksc121g
Y31B11135FP LFS	Ksc121g Lfs
Y31B41131FP	Ksc141j
Y31B41131FP LFS	Ksc141j Lfs
Y31B41135FP	Ksc141g
Y31B41135FP LFS	Ksc141g Lfs
Y31B43131FP	Ksc143j
Y31B43131FP LFG	Ksc143j Lfg
Y31B43135FP	Ksc143g
Y31B43135FP LFG	Ksc143g Lfg
Y31B43195FP	Ksc143g Sureleve
Y31B43195FP LFG	Ksc143g Sureleve Lfg
Y31B51131FP	Ksc151j
Y31B51131FP LFS	Ksc151j Lfs
Y31B51135FP	Ksc151g
Y31B51135FP LFS	Ksc151g Lfs

KSC2

Y31A11136FP	Ksc221g En Vrac
Y31A41136FP	Ksc241g En Vrac
Y31BE3132FP	Ksc2e3j Special Delt a
Y31BE3132FP LFG	Ksc2e3j Special Delt a Lfg
Y31B01132FP	Ksc201j
Y31B01132FP LFS	Ksc201j Lfs
Y31B01136FP	Ksc201g
Y31B01136FP LFS	Ksc201g Lfs
Y31B11132FP	Ksc221j
Y31B11132FP LFS	Ksc221j Lfs
Y31B11132FP A	Ksc221j Btb
Y31B11132FP VLFS	Ksc221j Lfsv
Y31B11133FP	Ksc221g Oxy
Y31B11133FP LFS	Ksc221g Oxy Lfs
Y31B11136FP	Ksc221g
Y31B11136FP LFS	Ksc221g Lfs
Y31B12132FP LFS	Ksc222j Lfs
Y31B12136FP LFS	Ksc222g Lfs
Y31B13132FP	Ksc223j
Y31B13132FP LFG	Ksc223j Lfg
Y31B13132FP ALFG	Ksc223j Lfg Btb
Y31B13136FP	Ksc223g

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KSC2

Y31B13136FP LFG	Ksc223g Lfg
Y31B3112HFP LFS	Ksc241g h Lfs
Y31B3113HFP	Ksc241j h
Y31B3113HFP LFS	Ksc241j h Lfs
Y31B3113HFP LLFS	Ksc241j h Lfs Bt b
Y31B31132FP	Ksc231j Sp Delt a
Y31B31132FP LFS	Ksc231j Sp Delt a Lfs
Y31B33132FP	Ksc233j Special Delt a
Y31B33132FP LFG	Ksc233j Special Delt a Lfg
Y31B33132FP DLFG	Ksc233j Special Delt a Lfg Btb
Y31B41132FP	Ksc241j
Y31B41132FP LFS	Ksc241j Lfs
Y31B41132FP C	Ksc241j Btb
Y31B41132FP ILFS	Ksc241j Lfs lko r
Y31B41132FP L	Ksc241j Btb
Y31B41132FP LLFS	Ksc241j Lfs Btb
Y31B41132FP VLFS	Ksc241j Lfsv
Y31B41136FP	Ksc241g
Y31B41136FP LFS	Ksc241g Lfs
Y31B41136FP C	Ksc241g Btb
Y31B41136FP ELFS	Ksc241g Lfs Epi q
Y31B43132FP	Ksc243j
Y31B43132FP LFG	Ksc243j Lfg
Y31B43132FP V10	Ksc243j
Y31B43136FP	Ksc243g
Y31B43136FP LFG	Ksc243g Lfg
Y31B51132FP	Ksc251j
Y31B51132FP LFS	Ksc251j Lfs
Y31B51136FP	Ksc251g
Y31B51136FP LFS	Ksc251g Lfs
Y31B61132FP	Ksc261j
Y31B61132FP LFS	Ksc261j Lfs
Y31B61136FP	Ksc261g
Y31B61136FP LFS	Ksc261g Lfs
Y31B73132FP LFG	Ksc273j Sde Lfg
Y31B81132FP	Ksc281j
Y31B81132FP LFS	Ksc281j Lfs
Y31C21139FP	Ksc221g Surelev e
Y31C21139FP LFS	Ksc221g Surelev e Lfs

KSC3

Y31B11113FP	Ksc321j
Y31B11113FP LFS	Ksc321j Lfs
Y31B11117FP	Ksc321g
Y31B11117FP LFS	Ksc321g Lfs

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Y31B11117FP ELFS	Ksc321g Lfs Epiq
Y31B13113FP	Ksc323j
Y31B13113FP LFG	Ksc323j Lfg
Y31B13117FP	Ksc323g
Y31B13117FP LFG	Ksc323g Lfg
Y31B25117FP	Ksc321ge
Y31B25117FP LFS	Ksc321ge Lfs
Y31B31117FP	Ksc331g Special Delta

KSC3

Y31B31117FP LFS	Ksc331g Special Delta Lfs
Y31B41113FP	Ksc341j
Y31B41113FP LFS	Ksc341j Lfs
Y31B41117FP	Ksc341g
Y31B41117FP LFS	Ksc341g Lfs
Y31B41117FP LFT	Ksc341g Lft
Y31B41117FP E	Ksc341g Epiq
Y31B41117FP ELFS	Ksc341g Lfs Epiq
Y31B41117FP VLFS	Ksc341g Lfsv
Y31B43113FP	Ksc343j
Y31B43113FP LFG	Ksc343j Lfg
Y31B43117FP	Ksc343g
Y31B43117FP LFG	Ksc343g Lfg
Y31B51113FP	Ksc351j
Y31B51113FP LFS	Ksc351j Lfs
Y31B51113FP OLFS	Ksc351j Lfs Btb
Y31B51117FP	Ksc351g
Y31B51117FP LFS	Ksc351g Lfs
Y31B53113FP	Ksc353j
Y31B53113FP LFG	Ksc353j Lfg
Y31B53117FP	Ksc353g
Y31B53117FP LFG	Ksc353g Lfg

KSC4

Y31CA1441FP	Ksc451j 70sh Mti
Y31CA1441FP LFS	Ksc451j 70sh Mti Lfs
Y31CA1441FP V10	Ksc451j 70sh Mti
Y31CA1441FP SV10	Ksc451j 70sh Mti Lfs
Y31CA1441FP VLFS	Ksc451j 70sh Mti Lfs v
Y31CD1241FP LFS	Ksc4d1j 50sh Lfs
Y31CD1245FP LFS	Ksc4d1g 50sh Lfs
Y31CM1241FP	Ksc4m1j 50sh
Y31CM1241FP LFS	Ksc4m1j 50sh Lfs
Y31CM1241FP J	Ksc4m1j 50sh Btb
Y31CM1241FP JLFS	Ksc4m1j 50sh Lfs Btb

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KSC4

Y31CM1245FP	Ksc4m1g 50sh
Y31CM1245FP LFS	Ksc4m1g 50sh Lf s
Y31C01241FP	Ksc401j 50 Sh
Y31C01241FP LFS	Ksc401j 50 Sh Lfs
Y31C01241FP LFT	Ksc401j 50 Sh Lft
Y31C01241FP ELFS	Ksc401j 50 Sh Lfs Ep iq
Y31C01241FP VLFS	Ksc401j 50 Sh Lfsv
Y31C01245FP	Ksc401g 50 Sh
Y31C01245FP LFS	Ksc401g 50 Sh Lfs
Y31C01441FP	Ksc401j 70 Sh
Y31C01441FP LFS	Ksc401j 70 Sh Lfs
Y31C01445FP	Ksc401g 70 Sh
Y31C01445FP LFS	Ksc401g 70 Sh Lfs
Y31C03241FP	Ksc403j 50 Sh
Y31C03241FP LFG	Ksc403j 50 Sh Lfg
Y31C03245FP	Ksc403g 50 Sh
Y31C03245FP LFG	Ksc403g 50 Sh Lfg
Y31C11245FP	Ksc411g 50 Sh
Y31C11245FP LFS	Ksc411g 50 Sh Lfs
Y31C11441FP	Ksc411j 70 Sh
Y31C11441FP LFS	Ksc411j 70 Sh Lfs
Y31C11445FP	Ksc411g 70 Sh
Y31C11445FP LFS	Ksc411g 70 Sh Lfs
Y31C13441FP	Ksc413j 70 Sh
Y31C13441FP LFG	Ksc413j 70 Sh fg
Y31C13445FP	Ksc413g 70 Sh
Y31C13445FP LFG	Ksc413g 70 Sh Lfg
Y31C21441FP	Ksc421j 70 Sh
Y31C21441FP LFS	Ksc421j 70 Sh Lfs
Y31C21441FP NLFS	Ksc421j 70 Sh Lfs Bt b
Y31C21445FP	Ksc421g 70 Sh
Y31C21445FP LFS	Ksc421g 70 Sh Lfs
Y31C21445FP LFT	Ksc421g 70 Sh Lft
Y31C21445FP NLFS	Ksc421g 70 Sh Lfs Bt b
Y31C22441FP LFS	Ksc422j 70 Sh Lfs
Y31C22445FP LFS	Ksc422g 70 Sh Lfs
Y31C23441FP	Ksc423j 70 Sh
Y31C23441FP LFG	Ksc423j 70 Sh Lfg
Y31C23445FP	Ksc423g 70 Sh
Y31C23445FP LFG	Ksc423g 70 Sh Lfg
Y31C31441FP	Ksc441j 70 Sh S p Delta

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KSC4

Y31C31441FP V10	Ksc441j 70 Sh S p Delta
Y31C31441FP LFS	Ksc441j 70 Sh S p Delta Lfs
Y31C31441FP SV10	Ksc441j 70 Sh S p Delta Lfs
Y31C31441FP VLFS	Ksc441j 70 Sh S p Delta Lfsv
Y31C31841FP	Ksc441j 70 Sh Spdelta Sptravel
Y31C31841FP LFS	Ksc441j 70sh Sp D Sp Travel Lfs
Y31C4144EFP LFS	Ksc441j 70 Sh Se Lfs
Y31C41441FP	Ksc441j 70 Sh
Y31C41441FP LFS	Ksc441j 70 Sh Lfs
Y31C41441FP E	Ksc441j 70 Sh E piq
Y31C41441FP ELFS	Ksc441j 70 Sh fs Epiq
Y31C41441FP VLFS	Ksc441j 70 Sh Lfsv
Y31C41445FP	Ksc441g 70 Sh
Y31C41445FP LFS	Ksc441g 70 Sh Lfs
Y31C41445FP VLFS	Ksc441g 70 Sh Lfsv
Y31C41841FP LFS	Ksc441j St1 Lfs
Y31C41845FP LFS	Ksc441g St1 Lfs
Y31C41941FP LFS	Ksc441j St2 Lfs
Y31C41945FP LFS	Ksc441g St2 Lfs
Y31C42441FP LFS	Ksc442j 70 Sh Lfs
Y31C42445FP LFS	Ksc442g 70 Sh Lfs
Y31C43441FP	Ksc443j 70 Sh
Y31C43441FP LFG	Ksc443j 70 Sh fg
Y31C43441FP HLFG	Ksc443j 70 Sh Lfgh
Y31C43445FP	Ksc443g 70 Sh
Y31C43445FP LFG	Ksc443g 70 Sh Lfg
Y31C71441FP	Ksc471j 70 Sh
Y31C71441FP LFS	Ksc471j 70 Sh Lfs
Y31C71445FP	Ksc471g 70 Sh
Y31C71445FP LFS	Ksc471g 70 Sh Lfs

KSC5

Y31C11666FP	Ksc511g (+-30)
Y31C11666FP LFS	Ksc511g (+-30) Lfs Annule
Y31C11666FP ROHS	Ksc511g (+-30) Rohs
Y31C21664FP	Ksc521j
Y31C21664FP M	Ksc521j Btb
Y31C21664FP MRHS	Ksc521j Rohs Bt b
Y31C21664FP ROHS	Ksc521j Rohs
Y31C21666FP	Ksc521g
Y31C21666FP M	Ksc521g Btb
Y31C21666FP MRHS	Ksc521g Rohs Bt b
Y31C21666FP ROHS	Ksc521g Rohs

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KSC5

Y31C23664FP	Ksc523j
Y31C23664FP ROHS	Ksc523j Rohs
Y31C23666FP	Ksc523g
Y31C23666FP ROHS	Ksc523g Rohs
Y31C41664FP	Ksc541j
Y31C41664FP ROHS	Ksc541j Rohs
Y31C41666FP	Ksc541g
Y31C41666FP ROHS	Ksc541g Rohs
Y31C43666FP	Ksc543g
Y31C43666FP ROHS	Ksc543g Rohs
Y31C71666FP	Ksc571g (+-30)
Y31C71666FP LFS	Ksc571g (+-30) Lfs Annule
Y31C71666FP ROHS	Ksc571g (+-30) Rohs

KSC6

Y31A21051FP	Ksc621j
Y31A21051FP LFS	Ksc621j Lfs
Y31A21055FP	Ksc621g
Y31A21055FP LFS	Ksc621g Lfs
Y31A21058FP	Ksc621v 30
Y31A21058FP LFS	Ksc621v 30 Lfs
Y31A23051FP LFG	Ksc623j Lfg
Y31A41R55FP	Ksc641g Red
Y31A41R55FP LFS	Ksc641g Red Lfs
Y31A41051FP	Ksc641j
Y31A41051FP LFS	Ksc641j Lfs
Y31A41055FP	Ksc641g
Y31A41055FP LFS	Ksc641g Lfs
Y31A43051FP	Ksc643j
Y31A43051FP LFG	Ksc643j Lfg
Y31A43051FP HLF	Ksc643j Lfgh

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Annex 2: Qualification plan

Antiparticle contact

Performed measurements or tests	Applicable standards	Applicable for anti particle contact qualification	Reason
Visual Examination	NA	Yes	
Mechanical measurements			
Switching diagram type	Product specification	Yes	
Switching force (Fa)	Product specification	Yes	
Force at electrical travel (Fa)	Product specification	Yes	
Tactile feeling (D1)	Product specification	Per calculation	
Tactile feeling (D1%)	Product specification	Per calculation	
Sound feeling (D2)	Product specification	Per calculation, if applicable	
Sound feeling (D3)	Product specification	Per calculation, if applicable	
Return force (Frr)	Product specification	Yes	
Electrical travel (Te)	Product specification	Yes	
Mechanical travel (Tm)	Product specification	Yes	
Slope	Product specification	Per calculation	
Maximum travel	Product specification	Yes	
Simultaneity (Tm-Te)	Product specification	Yes	
Total height at the electrical contact	Product specification	Yes if applicable	
Electrical measurements			
Dielectric strength	Product specification	No	No influence of the central contact
Contact resistance	Product specification	Yes	
Insulation resistance between terminals :	Product specification	No	No influence of the central contact
Insulation resistance between terminals & ground	Product specification	No	No influence of the central contact
Bounce time	Product specification	Yes	
Capacity	Product specification	No	No influence of the central contact
IP Tests	Product specification	No	Central contact has no influence on the sealing level

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Performed measurements or tests		Applicable standards	Applicable for anti particle contact qualification	Reason
SOLDERING	Without solder paste	Product specification	No	
	With solder on PCB	Product specification	No	
MEASUREMENTS AFTER SOLDERING	Visual Examination			
	Mechanical measurements			
	Switching diagram type	Product specification	Yes	
	Switching force (Fa)	Product specification	Yes	
	Force at electrical travel (Fa)	Product specification	Yes	
	Tactile feeling (D1)	Product specification	Per calculation	
	Tactile feeling (D1%)	Product specification	Per calculation	
	Sound feeling (D2)	Product specification	Per calculation, if applicable	
	Return force (Frr)	Product specification	Yes	
	Electrical travel (Te)	Product specification	Yes	
	Mechanical travel (Tm)	Product specification	Yes	
	Maximum travel	Product specification	Yes	
	Simultaneity (Tm-Te)	Product specification	Yes	
	Total height at the electrical contact	Product specification	Yes if applicable	
	Electrical measurements			
	Dielectric strength	Product specification	No	
	Contact resistance	Product specification	Yes	
	Insulation resistance between terminals :	Product specification	No	
	Insulation resistance between terminals & ground	Product specification	No	
	Bounce time	Product specification	Yes	
	Capacity	Product specification	No	
IP Tests or Flux tightness	Product specification	No		

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Performed measurements or tests		Applicable standards	Applicable for anti particle contact qualification	Reason
LIFE MEASUREMENTS	Life test	Product specification	Yes	
	Life test (Weibull curve)	Product specification	Per calculation	
	Overload life test	Product specification	Yes	Done once to evaluate the influence of the AP contact - no influence
VIBRATION	Sinusoidal Vibrations	EN60068-2-6	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Mechanical shock	EN60068-2-27 & EN60068-2-27	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Random Vibrations		Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Mechanical shocks		Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
ENVIRONMENTAL TESTS	Thermal Shocks	EN60068-2-14	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Humidity storage (Continuous)	CEI60068-2-78	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Dry Heat storage	EN60068-2-2	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Cold storage	EN60068-2-1	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Humidity storage cyclic	EN60068-2-30	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Combinated environmental test	EN60068-2-61 & EN60068-2-38	Yes - contact validation	Done once to evaluate the influence of the AP contact - no influence
	Corrosion test	EN60068-2-60 (4 gaz) 1 EN60068-2-11 (BS)	No	
ROBUSTNESS	Solderability	EN60068-2-20 & EN60068-2-58 & EN60068-2-69	No	No influence of the central contact
	Solder heat resistance	EN60068-2-20	Yes	Mechanical test performed after reflow heat cycle
	Solder flux tightness	Norme ITT pâte à brasée colorée	No	No influence of the central contact
	Washing process	EN60068-45	No	No influence of the central contact
	Resistance to fluid	EN600-68-2-74	No	No influence of the central contact
	Robustness of terminals	Product specification	No	No influence of the central contact
	Overload on switches	Product specification	No	Done once to evaluate the influence of the AP contact - no influence
	Robustness of actuator	Product specification	No	No influence of the central contact
	Dust Test	Product specification	Yes	Done to qualify the central contact desing
MEASUREMENTS AFTER TESTS	Visual Examination	Product specification	Yes	
	Mechanical measurements	Product specification	Yes	
	Electrical measurements	Product specification	Yes	
	IP Tests or fluid tightness	Product specification	No	
DIMENSIONS			No	

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New housing

Performed measurements or tests		Applicable standards	Applicable for anti particle contact qualification	Reason
INITIAL MEASUREMENTS	Visual Examination	NA	Yes	
	Mechanical measurements			
	Switching diagram type	Product specification	Yes	
	Switching force (Fa)	Product specification	Yes	
	Force at electrical travel (Fa)	Product specification	Yes	
	Tactile feeling (D1)	Product specification	Per calculation	
	Tactile feeling (D1%)	Product specification	Per calculation	
	Return force (Frr)	Product specification	Yes	
	Electrical travel (Te)	Product specification	Yes	
	Mechanical travel (Tm)	Product specification	Yes	
	Simultaneity (Tm-Te)	Product specification	Yes	
	Electrical measurements	Product specification	Yes	
	Dielectric strength	Product specification	Yes	
	Contact resistance	Product specification	Yes	
	Insulation resistance between terminals : Bounce time	Product specification	Yes	
IP Tests 67				
SOLDERING	Without solder paste	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
MEASUREMENTS AFTER SOLDERING	Visual Examination			
	Mechanical measurements			
	Switching diagram type	Product specification	Yes	
	Switching force (Fa)	Product specification	Yes	
	Force at electrical travel (Fa)	Product specification	Yes	
	Tactile feeling (D1)	Product specification	Per calculation	
	Tactile feeling (D1%)	Product specification	Per calculation	
	Return force (Frr)	Product specification	Yes	
	Electrical travel (Te)	Product specification	Yes	
	Mechanical travel (Tm)	Product specification	Yes	
	Simultaneity (Tm-Te)	Product specification	Yes	
Electrical measurements	Product specification	Yes		

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Performed measurements or tests		Applicable standards	Applicable for anti particle contact qualification	Reason
MEASUREMENTS AFTER SOLDERING	Dielectric strength	Product specification	Yes	
	Contact resistance	Product specification	Yes	
	Insulation resistance between terminals :	Product specification	Yes	
	Bounce time	Product specification	No	
	IP Tests 67	Product specification	Yes	
LIFE MEASUREMENTS	Life test	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
VIBRATION	Sinusoidal Vibrations	EN60068-2-6	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	Mechanical shock	EN60068-2-27	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
ENVIRONMENTAL TESTS	Dry Heat storage	EN60068-2-2 (85 °OC 4 days)	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	Cold storage	EN60068-2-1 (-40°C; 4 days)	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	Humidity storage	EN60068-2-30 (55°C/93%, 6 cycles)	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
ROBUSTNESS	Shear test		Yes - modif validation	No influence of the housing
	Dust Test	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
MEASUREMENTS AFTER TESTS	Visual Examination	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	Mechanical measurements	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	Electrical measurements	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
	IP Tests or fluid tightness	Product specification	Yes - modif validation	Done once to evaluate the influence of the modification - no influence
DIMENSIONS			Yes - modif validation	Report M475-07

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Annex 3: Test report (abstract)



GENERIC LABORATORY REPORT		August, 16th 2007																																					
Product : <p style="text-align: center;">KSC SWITCH WITH ANTIPARTICLE CONTACT</p>																																							
Subject : <p style="text-align: center;">OPERATING LIFE VALIDATION OF ANTIPARTICLE CONTACT VERSUS KSC VERSIONS</p>																																							
Test performed <p style="text-align: center;">Activation force after operating life on antiparticle contact</p> <p>> Force displacement, electrical activation and contact resistance after operating life</p> <p>> Tested versions</p> <table border="1"><tbody><tr><td rowspan="3">KSC-2xx</td><td>KSC-22x</td><td>Page 2</td></tr><tr><td>KSC-24x</td><td>Page 3</td></tr><tr><td>KSC-26x</td><td>Page 4</td></tr><tr><td rowspan="2">KSC-3xx</td><td>KSC-32x</td><td>Page 5</td></tr><tr><td>KSC-34x</td><td>Page 6</td></tr><tr><td rowspan="4">KSC-4xx</td><td>KSC-40x</td><td>Page 7</td></tr><tr><td>KSC-42x</td><td>Page 8</td></tr><tr><td>KSC-44x</td><td>Page 9</td></tr><tr><td>KSC-45x</td><td>Page 10</td></tr><tr><td rowspan="2">KSC-4M1</td><td>KSC-4M1</td><td>Page 11</td></tr><tr><td colspan="2"></td></tr><tr><td rowspan="2">KSC-5xx</td><td>KSC-51x</td><td>Page 12</td></tr><tr><td>KSC-57x</td><td>Page 13</td></tr><tr><td colspan="2"></td><td></td></tr><tr><td>KSC-6xx</td><td>KSC-64x</td><td>Page 14</td></tr></tbody></table> <p style="text-align: center;">All other references are covered by these tests</p>			KSC-2xx	KSC-22x	Page 2	KSC-24x	Page 3	KSC-26x	Page 4	KSC-3xx	KSC-32x	Page 5	KSC-34x	Page 6	KSC-4xx	KSC-40x	Page 7	KSC-42x	Page 8	KSC-44x	Page 9	KSC-45x	Page 10	KSC-4M1	KSC-4M1	Page 11			KSC-5xx	KSC-51x	Page 12	KSC-57x	Page 13				KSC-6xx	KSC-64x	Page 14
KSC-2xx	KSC-22x	Page 2																																					
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KSC-5xx	KSC-51x	Page 12																																					
	KSC-57x	Page 13																																					
KSC-6xx	KSC-64x	Page 14																																					
Conclusion : <p style="text-align: center;">Satisfying results of antiparticle contact after operating life</p>																																							

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	Laboratory report	N° : 789-07 Page : 2																																																																																																																																																																																																																																																																																			
Measurements :																																																																																																																																																																																																																																																																																					
Life test : force travel measurements KSC 22x Antiparticle																																																																																																																																																																																																																																																																																					
Measurement unit: MTS 2	Life test machine reference: SW11 SW12																																																																																																																																																																																																																																																																																				
Number of cycles : 500 000	Pressure: 1,3																																																																																																																																																																																																																																																																																				
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #ADD8E6;"> <th>Sample #</th> <th>Fa N</th> <th>Fra N</th> <th>Fa-Fra N</th> <th>Fa-Fra/Fa %</th> <th>Frr N</th> <th>Cm mm</th> <th>Ce mm</th> <th>Simul (mm)</th> <th>F à Ce N</th> <th>RC (mW)</th> </tr> </thead> <tbody> <tr><td>1</td><td>2,07</td><td>1,18</td><td>0,88</td><td>43</td><td>0,93</td><td>0,44</td><td>0,43</td><td>-0,01</td><td>1,55</td><td>64</td></tr> <tr><td>2</td><td>2,20</td><td>1,24</td><td>0,96</td><td>44</td><td>0,92</td><td>0,45</td><td>0,45</td><td>-0,01</td><td>1,56</td><td>27</td></tr> <tr><td>3</td><td>2,18</td><td>1,29</td><td>0,89</td><td>41</td><td>0,94</td><td>0,44</td><td>0,43</td><td>-0,01</td><td>1,54</td><td>18</td></tr> <tr><td>4</td><td>2,08</td><td>1,24</td><td>0,84</td><td>40</td><td>0,96</td><td>0,43</td><td>0,43</td><td>-0,01</td><td>1,49</td><td>15</td></tr> <tr><td>5</td><td>2,10</td><td>1,27</td><td>0,83</td><td>39</td><td>1,03</td><td>0,44</td><td>0,43</td><td>0,00</td><td>1,36</td><td>24</td></tr> <tr><td>6</td><td>2,12</td><td>1,19</td><td>0,93</td><td>44</td><td>0,94</td><td>0,44</td><td>0,44</td><td>0,00</td><td>1,31</td><td>21</td></tr> <tr><td>7</td><td>2,28</td><td>1,36</td><td>0,92</td><td>40</td><td>0,99</td><td>0,42</td><td>0,41</td><td>-0,01</td><td>1,71</td><td>40</td></tr> <tr><td>8</td><td>2,12</td><td>1,26</td><td>0,86</td><td>41</td><td>1,05</td><td>0,43</td><td>0,43</td><td>-0,01</td><td>1,38</td><td>20</td></tr> <tr><td>9</td><td>2,26</td><td>1,34</td><td>0,91</td><td>40</td><td>1,16</td><td>0,44</td><td>0,43</td><td>0,00</td><td>1,39</td><td>26</td></tr> <tr><td>10</td><td>2,15</td><td>1,17</td><td>0,99</td><td>46</td><td>0,92</td><td>0,44</td><td>0,43</td><td>0,00</td><td>1,31</td><td>24</td></tr> <tr><td>11</td><td>2,15</td><td>1,34</td><td>0,81</td><td>38</td><td>1,17</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,41</td><td>22</td></tr> <tr><td>12</td><td>2,15</td><td>1,15</td><td>0,99</td><td>46</td><td>0,91</td><td>0,48</td><td>0,47</td><td>-0,01</td><td>1,43</td><td>24</td></tr> <tr><td>13</td><td>2,12</td><td>1,25</td><td>0,87</td><td>41</td><td>1,06</td><td>0,43</td><td>0,43</td><td>0,00</td><td>1,29</td><td>18</td></tr> <tr><td>14</td><td>2,15</td><td>1,17</td><td>0,98</td><td>46</td><td>0,89</td><td>0,43</td><td>0,42</td><td>0,00</td><td>1,43</td><td>66</td></tr> <tr><td>15</td><td>2,18</td><td>1,32</td><td>0,86</td><td>39</td><td>1,09</td><td>0,45</td><td>0,45</td><td>0,00</td><td>1,36</td><td>40</td></tr> <tr><td>16</td><td>2,20</td><td>1,26</td><td>0,93</td><td>43</td><td>1,05</td><td>0,41</td><td>0,40</td><td>0,00</td><td>1,40</td><td>28</td></tr> <tr><td>17</td><td>2,30</td><td>1,46</td><td>0,84</td><td>37</td><td>1,12</td><td>0,45</td><td>0,45</td><td>0,00</td><td>1,53</td><td>40</td></tr> <tr><td>18</td><td>2,22</td><td>1,21</td><td>1,01</td><td>46</td><td>0,97</td><td>0,43</td><td>0,42</td><td>0,00</td><td>1,35</td><td>25</td></tr> <tr><td>19</td><td>2,14</td><td>1,29</td><td>0,85</td><td>40</td><td>1,02</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,34</td><td>31</td></tr> <tr><td>20</td><td>2,13</td><td>1,36</td><td>0,77</td><td>36</td><td>1,18</td><td>0,43</td><td>0,43</td><td>0,00</td><td>1,38</td><td>28</td></tr> <tr><td>maxi</td><td>2,30</td><td>1,46</td><td>1,01</td><td>46</td><td>1,18</td><td>0,48</td><td>0,47</td><td>0,00</td><td>1,71</td><td>66</td></tr> <tr><td>mini</td><td>2,07</td><td>1,15</td><td>0,77</td><td>36</td><td>0,89</td><td>0,41</td><td>0,40</td><td>-0,01</td><td>1,29</td><td>15</td></tr> <tr><td>Average</td><td>2,17</td><td>1,27</td><td>0,90</td><td>41</td><td>1,02</td><td>0,44</td><td>0,43</td><td>0,00</td><td>1,43</td><td>30</td></tr> <tr><td>Std dev</td><td>0,06</td><td>0,08</td><td>0,07</td><td>3</td><td>0,09</td><td>0,02</td><td>0,02</td><td>0,0</td><td>0,1</td><td>14</td></tr> </tbody> </table>			Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul (mm)	F à Ce N	RC (mW)	1	2,07	1,18	0,88	43	0,93	0,44	0,43	-0,01	1,55	64	2	2,20	1,24	0,96	44	0,92	0,45	0,45	-0,01	1,56	27	3	2,18	1,29	0,89	41	0,94	0,44	0,43	-0,01	1,54	18	4	2,08	1,24	0,84	40	0,96	0,43	0,43	-0,01	1,49	15	5	2,10	1,27	0,83	39	1,03	0,44	0,43	0,00	1,36	24	6	2,12	1,19	0,93	44	0,94	0,44	0,44	0,00	1,31	21	7	2,28	1,36	0,92	40	0,99	0,42	0,41	-0,01	1,71	40	8	2,12	1,26	0,86	41	1,05	0,43	0,43	-0,01	1,38	20	9	2,26	1,34	0,91	40	1,16	0,44	0,43	0,00	1,39	26	10	2,15	1,17	0,99	46	0,92	0,44	0,43	0,00	1,31	24	11	2,15	1,34	0,81	38	1,17	0,41	0,41	0,00	1,41	22	12	2,15	1,15	0,99	46	0,91	0,48	0,47	-0,01	1,43	24	13	2,12	1,25	0,87	41	1,06	0,43	0,43	0,00	1,29	18	14	2,15	1,17	0,98	46	0,89	0,43	0,42	0,00	1,43	66	15	2,18	1,32	0,86	39	1,09	0,45	0,45	0,00	1,36	40	16	2,20	1,26	0,93	43	1,05	0,41	0,40	0,00	1,40	28	17	2,30	1,46	0,84	37	1,12	0,45	0,45	0,00	1,53	40	18	2,22	1,21	1,01	46	0,97	0,43	0,42	0,00	1,35	25	19	2,14	1,29	0,85	40	1,02	0,42	0,42	0,00	1,34	31	20	2,13	1,36	0,77	36	1,18	0,43	0,43	0,00	1,38	28	maxi	2,30	1,46	1,01	46	1,18	0,48	0,47	0,00	1,71	66	mini	2,07	1,15	0,77	36	0,89	0,41	0,40	-0,01	1,29	15	Average	2,17	1,27	0,90	41	1,02	0,44	0,43	0,00	1,43	30	Std dev	0,06	0,08	0,07	3	0,09	0,02	0,02	0,0	0,1	14
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul (mm)	F à Ce N	RC (mW)																																																																																																																																																																																																																																																																											
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3	2,18	1,29	0,89	41	0,94	0,44	0,43	-0,01	1,54	18																																																																																																																																																																																																																																																																											
4	2,08	1,24	0,84	40	0,96	0,43	0,43	-0,01	1,49	15																																																																																																																																																																																																																																																																											
5	2,10	1,27	0,83	39	1,03	0,44	0,43	0,00	1,36	24																																																																																																																																																																																																																																																																											
6	2,12	1,19	0,93	44	0,94	0,44	0,44	0,00	1,31	21																																																																																																																																																																																																																																																																											
7	2,28	1,36	0,92	40	0,99	0,42	0,41	-0,01	1,71	40																																																																																																																																																																																																																																																																											
8	2,12	1,26	0,86	41	1,05	0,43	0,43	-0,01	1,38	20																																																																																																																																																																																																																																																																											
9	2,26	1,34	0,91	40	1,16	0,44	0,43	0,00	1,39	26																																																																																																																																																																																																																																																																											
10	2,15	1,17	0,99	46	0,92	0,44	0,43	0,00	1,31	24																																																																																																																																																																																																																																																																											
11	2,15	1,34	0,81	38	1,17	0,41	0,41	0,00	1,41	22																																																																																																																																																																																																																																																																											
12	2,15	1,15	0,99	46	0,91	0,48	0,47	-0,01	1,43	24																																																																																																																																																																																																																																																																											
13	2,12	1,25	0,87	41	1,06	0,43	0,43	0,00	1,29	18																																																																																																																																																																																																																																																																											
14	2,15	1,17	0,98	46	0,89	0,43	0,42	0,00	1,43	66																																																																																																																																																																																																																																																																											
15	2,18	1,32	0,86	39	1,09	0,45	0,45	0,00	1,36	40																																																																																																																																																																																																																																																																											
16	2,20	1,26	0,93	43	1,05	0,41	0,40	0,00	1,40	28																																																																																																																																																																																																																																																																											
17	2,30	1,46	0,84	37	1,12	0,45	0,45	0,00	1,53	40																																																																																																																																																																																																																																																																											
18	2,22	1,21	1,01	46	0,97	0,43	0,42	0,00	1,35	25																																																																																																																																																																																																																																																																											
19	2,14	1,29	0,85	40	1,02	0,42	0,42	0,00	1,34	31																																																																																																																																																																																																																																																																											
20	2,13	1,36	0,77	36	1,18	0,43	0,43	0,00	1,38	28																																																																																																																																																																																																																																																																											
maxi	2,30	1,46	1,01	46	1,18	0,48	0,47	0,00	1,71	66																																																																																																																																																																																																																																																																											
mini	2,07	1,15	0,77	36	0,89	0,41	0,40	-0,01	1,29	15																																																																																																																																																																																																																																																																											
Average	2,17	1,27	0,90	41	1,02	0,44	0,43	0,00	1,43	30																																																																																																																																																																																																																																																																											
Std dev	0,06	0,08	0,07	3	0,09	0,02	0,02	0,0	0,1	14																																																																																																																																																																																																																																																																											
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 15%;">Cp</td> <td style="width: 15%;">2,64</td> <td style="width: 15%;"></td> <td style="width: 15%;">4,24</td> <td style="width: 15%;">4,15</td> <td style="width: 15%;"></td> </tr> <tr> <td>CpK</td> <td>1,77</td> <td></td> <td>3,93</td> <td>3,75</td> <td>3,64</td> </tr> </table>	Cp	2,64		4,24	4,15		CpK	1,77		3,93	3,75	3,64	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1,68</td> </tr> </table>													1,68																																																																																																																																																																																																																																																											
Cp	2,64		4,24	4,15																																																																																																																																																																																																																																																																																	
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<small>±/-: 0.5 % of the read value (load) ±/-: 0.01 mm (travel)</small>																																																																																																																																																																																																																																																																																					

	Laboratory report	N° : 827-07
		Page : 3

Measurements :

Life test : force travel measurements

KSC 24x Antiparticle

Measurement unit: **MTS 2** Life test machine reference: **SW4** **SW9** Max: **5,14**
 Number of cycles: **300 000** Pressure: **154** **186** Min: **5,2**

Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm aller mm	Ce aller mm	Simul (mm)	h élec/C.l. all mm	h elec/Cl retour mm	H. KSC mm	RC (mW)
1	4,22	2,74	1,47	35	2,35	0,43	0,42	-0,01	3,15	3,19	3,57	50
2	4,01	2,73	1,28	32	2,19	0,47	0,46	-0,01	3,11	3,16	3,57	48
3	4,22	2,90	1,32	31	2,37	0,42	0,41	-0,01	3,16	3,21	3,96	40
4	4,25	2,92	1,33	31	2,44	0,44	0,43	-0,01	3,16	3,20	3,59	61
5	4,27	2,85	1,42	33	2,34	0,45	0,44	-0,01	3,13	3,18	3,58	21
6	4,23	2,81	1,43	34	2,37	0,43	0,43	-0,01	3,10	3,14	3,53	20
7	4,17	2,72	1,45	35	2,21	0,43	0,42	-0,01	3,09	3,14	3,51	20
8	4,19	2,66	1,53	37	2,13	0,44	0,43	-0,01	3,10	3,14	3,54	50
9	3,97	2,50	1,47	37	2,11	0,44	0,43	-0,01	3,13	3,17	3,56	18
10	4,24	2,74	1,49	35	2,28	0,46	0,45	-0,01	3,10	3,14	3,67	52
11	4,17	2,81	1,37	33	2,10	0,44	0,43	-0,01	3,10	3,15	3,63	24
12	4,25	2,87	1,38	33	2,32	0,45	0,44	-0,01	3,15	3,20	3,69	40
13	4,19	2,88	1,32	31	2,37	0,46	0,45	-0,01	3,11	3,16	3,78	27
14	4,11	2,84	1,26	31	2,08	0,42	0,41	-0,01	3,10	3,16	3,52	26
15	4,30	2,87	1,44	33	2,49	0,44	0,44	0,00	3,13	3,17	3,57	17
16	4,22	2,66	1,56	37	2,17	0,42	0,41	-0,01	3,14	3,18	3,56	55
17	4,05	2,57	1,49	37	2,21	0,43	0,42	-0,01	3,16	3,20	3,77	25
18	3,75	2,51	1,23	33	2,16	0,46	0,48	0,02	3,09	3,13	3,65	50
19	4,13	2,82	1,31	32	2,40	0,45	0,44	-0,01	3,16	3,20	3,72	60
20	4,04	2,66	1,38	34	2,30	0,43	0,42	-0,01	3,16	3,21	3,59	27
maxi	4,30	2,92	1,56	37	2,49	0,47	0,48	0,02	3,16	3,21	3,96	61
mini	3,75	2,50	1,23	31	2,08	0,42	0,41	-0,01	3,09	3,13	3,51	17
Average	4,15	2,75	1,40	34	2,27	0,44	0,43	-0,01	3,13	3,17	3,63	37
Std dev	0,13	0,13	0,09	2	0,12	0,01	0,02	0,01	0,03	0,03	0,11	15

Cp	2,29												
CpK	0,64		2,14		3,46	3,19	2,49					1,37	
Req min	2,6		0,80		1,00	0,30	0,30						
Req max	4,4					0,70	0,70	0,05				100	

+/- 0.5% of the read value (load)
 +/- 0.01 mm (travel)

C&K components SAS - 1 rue Louis de la Verne B.P. 359 F-39105 Dole Cedex - FRANCE
 Telephone : +33 (0)3 84 72 94 03 - Facsimile: +33 (0)3 84 79 20 39 - www.ck-components.com

Document subject to change without prior notice
 Diffusion: no restriction

	Laboratory report	N° : 649-07 Page : 4																																																																																																																																																																																																																																																																																																																																																																																																	
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Life test : force travel measurements KSC 26x Antiparticle																																																																																																																																																																																																																																																																																																																																																																																																			
Measurement unit: MTS 5	Life test machine reference: SW4 SW9	Max: 5,14																																																																																																																																																																																																																																																																																																																																																																																																	
Number of cycles: 300 000	Pressure: 154 186	Min: 5,2																																																																																																																																																																																																																																																																																																																																																																																																	
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<tr><td>5</td><td>2,88</td><td>1,82</td><td>1,06</td><td>37</td><td>1,63</td><td>0,41</td><td>0,40</td><td>-0,01</td><td>1,83</td><td>31</td></tr> <tr><td>6</td><td>2,61</td><td>1,61</td><td>1,00</td><td>38</td><td>1,46</td><td>0,38</td><td>0,38</td><td>0,00</td><td>1,62</td><td>27</td></tr> <tr><td>7</td><td>2,77</td><td>1,68</td><td>1,09</td><td>39</td><td>1,54</td><td>0,39</td><td>0,39</td><td>0,00</td><td>1,73</td><td>43</td></tr> <tr><td>8</td><td>2,67</td><td>1,56</td><td>1,11</td><td>42</td><td>1,41</td><td>0,40</td><td>0,40</td><td>0,00</td><td>1,57</td><td>31</td></tr> <tr><td>9</td><td>2,81</td><td>1,59</td><td>1,22</td><td>43</td><td>1,48</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,62</td><td>34</td></tr> <tr><td>10</td><td>2,70</td><td>1,66</td><td>1,04</td><td>39</td><td>1,52</td><td>0,39</td><td>0,39</td><td>0,00</td><td>1,66</td><td>30</td></tr> <tr><td>11</td><td>2,72</td><td>1,66</td><td>1,06</td><td>39</td><td>1,54</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,67</td><td>26</td></tr> <tr><td>12</td><td>2,62</td><td>1,64</td><td>0,98</td><td>38</td><td>1,52</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,65</td><td>37</td></tr> <tr><td>13</td><td>2,71</td><td>1,61</td><td>1,10</td><td>41</td><td>1,50</td><td>0,40</td><td>0,40</td><td>0,00</td><td>1,62</td><td>35</td></tr> <tr><td>14</td><td>2,55</td><td>1,45</td><td>1,11</td><td>43</td><td>1,33</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,47</td><td>24</td></tr> <tr><td>15</td><td>2,79</td><td>1,68</td><td>1,11</td><td>40</td><td>1,56</td><td>0,43</td><td>0,43</td><td>0,00</td><td>1,71</td><td>29</td></tr> <tr><td>16</td><td>2,65</td><td>1,63</td><td>1,01</td><td>38</td><td>1,51</td><td>0,44</td><td>0,44</td><td>0,00</td><td>1,71</td><td>31</td></tr> 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<tr><td>23</td><td>2,88</td><td>1,86</td><td>1,02</td><td>35</td><td>1,73</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,87</td><td>36</td></tr> <tr><td>24</td><td>2,85</td><td>1,77</td><td>1,08</td><td>38</td><td>1,64</td><td>0,43</td><td>0,43</td><td>0,00</td><td>1,85</td><td>40</td></tr> <tr><td>25</td><td>2,70</td><td>1,60</td><td>1,09</td><td>41</td><td>1,48</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,63</td><td>24</td></tr> <tr><td>26</td><td>2,64</td><td>1,66</td><td>0,98</td><td>37</td><td>1,54</td><td>0,43</td><td>0,43</td><td>0,00</td><td>1,66</td><td>30</td></tr> <tr><td>27</td><td>2,69</td><td>1,65</td><td>1,04</td><td>39</td><td>1,52</td><td>0,44</td><td>0,44</td><td>0,00</td><td>1,65</td><td>32</td></tr> <tr><td>28</td><td>2,74</td><td>1,74</td><td>0,99</td><td>36</td><td>1,62</td><td>0,42</td><td>0,41</td><td>-0,01</td><td>1,77</td><td>24</td></tr> <tr><td>29</td><td>2,89</td><td>1,85</td><td>1,04</td><td>36</td><td>1,67</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,89</td><td>23</td></tr> <tr><td>30</td><td>2,71</td><td>1,59</td><td>1,12</td><td>41</td><td>1,47</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,64</td><td>47</td></tr> <tr><td>maxi</td><td>2,89</td><td>1,86</td><td>1,22</td><td>43</td><td>1,73</td><td>0,44</td><td>0,44</td><td>0,01</td><td>1,89</td><td>50</td></tr> <tr><td>mini</td><td>2,55</td><td>1,45</td><td>0,97</td><td>35</td><td>1,33</td><td>0,38</td><td>0,38</td><td>-0,01</td><td>1,47</td><td>23</td></tr> <tr><td>Average</td><td>2,72</td><td>1,66</td><td>1,06</td><td>39</td><td>1,53</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,68</td><td>33</td></tr> <tr><td>Std dev</td><td>0,09</td><td>0,09</td><td>0,05</td><td>2</td><td>0,08</td><td>0,02</td><td>0,02</td><td>0,00</td><td>0,10</td><td>8</td></tr> </tbody> </table>			Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC (mW)	1	2,65	1,63	1,02	38	1,48	0,40	0,41	0,01	1,63	32	2	2,86	1,81	1,05	37	1,66	0,43	0,42	-0,01	1,82	25	3	2,73	1,65	1,09	40	1,52	0,42	0,41	-0,01	1,70	50	4	2,64	1,66	0,97	37	1,53	0,41	0,41	0,00	1,67	34	5	2,88	1,82	1,06	37	1,63	0,41	0,40	-0,01	1,83	31	6	2,61	1,61	1,00	38	1,46	0,38	0,38	0,00	1,62	27	7	2,77	1,68	1,09	39	1,54	0,39	0,39	0,00	1,73	43	8	2,67	1,56	1,11	42	1,41	0,40	0,40	0,00	1,57	31	9	2,81	1,59	1,22	43	1,48	0,42	0,42	0,00	1,62	34	10	2,70	1,66	1,04	39	1,52	0,39	0,39	0,00	1,66	30	11	2,72	1,66	1,06	39	1,54	0,42	0,42	0,00	1,67	26	12	2,62	1,64	0,98	38	1,52	0,42	0,42	0,00	1,65	37	13	2,71	1,61	1,10	41	1,50	0,40	0,40	0,00	1,62	35	14	2,55	1,45	1,11	43	1,33	0,41	0,41	0,00	1,47	24	15	2,79	1,68	1,11	40	1,56	0,43	0,43	0,00	1,71	29	16	2,65	1,63	1,01	38	1,51	0,44	0,44	0,00	1,71	31	17	2,57	1,56	1,01	39	1,45	0,38	0,38	0,00	1,57	42	18	2,78	1,70	1,09	39	1,58	0,43	0,42	-0,01	1,71	23	19	2,64	1,58	1,06	40	1,43	0,40	0,40	0,00	1,58	38	20	2,75	1,63	1,12	41	1,50	0,39	0,39	0,00	1,68	44	21	2,73	1,65	1,07	39	1,53	0,41	0,41	0,00	1,66	24	22	2,66	1,64	1,02	38	1,48	0,40	0,40	0,00	1,66	40	23	2,88	1,86	1,02	35	1,73	0,42	0,42	0,00	1,87	36	24	2,85	1,77	1,08	38	1,64	0,43	0,43	0,00	1,85	40	25	2,70	1,60	1,09	41	1,48	0,42	0,42	0,00	1,63	24	26	2,64	1,66	0,98	37	1,54	0,43	0,43	0,00	1,66	30	27	2,69	1,65	1,04	39	1,52	0,44	0,44	0,00	1,65	32	28	2,74	1,74	0,99	36	1,62	0,42	0,41	-0,01	1,77	24	29	2,89	1,85	1,04	36	1,67	0,42	0,42	0,00	1,89	23	30	2,71	1,59	1,12	41	1,47	0,41	0,41	0,00	1,64	47	maxi	2,89	1,86	1,22	43	1,73	0,44	0,44	0,01	1,89	50	mini	2,55	1,45	0,97	35	1,33	0,38	0,38	-0,01	1,47	23	Average	2,72	1,66	1,06	39	1,53	0,41	0,41	0,00	1,68	33	Std dev	0,09	0,09	0,05	2	0,08	0,02	0,02	0,00	0,10	8
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC (mW)																																																																																																																																																																																																																																																																																																																																																																																									
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<table border="1" style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 20%;">Cp</td> <td style="width: 20%;">2,71</td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> </tr> <tr> <td>CpK</td> <td>1,69</td> <td>1,58</td> <td>2,11</td> <td>4,03</td> <td>4,21</td> </tr> <tr> <td></td> <td></td> <td></td> <td>2,26</td> <td>2,34</td> <td>2,96</td> </tr> </table>	Cp	2,71					CpK	1,69	1,58	2,11	4,03	4,21				2,26	2,34	2,96																																																																																																																																																																																																																																																																																																																																																																																	
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<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.9em;"> <thead> <tr style="background-color: #e1ecf4;"> <th>Sample #</th> <th>Fa N</th> <th>Fra N</th> <th>Fa-Fra N</th> <th>Fa-Fra/Fa %</th> <th>Frr N</th> <th>Cm mm</th> <th>Ce mm</th> <th>Simul (mm)</th> <th>F à Ce N</th> <th>RC (mW)</th> </tr> </thead> <tbody> <tr><td>1</td><td>2,13</td><td>1,58</td><td>0,55</td><td>26</td><td>1,43</td><td>0,40</td><td>0,40</td><td>-0,01</td><td>1,61</td><td>22</td></tr> <tr><td>2</td><td>2,33</td><td>1,86</td><td>0,47</td><td>20</td><td>1,65</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,88</td><td>18</td></tr> <tr><td>3</td><td>2,20</td><td>1,80</td><td>0,40</td><td>18</td><td>1,65</td><td>0,35</td><td>0,35</td><td>0,00</td><td>1,81</td><td>21</td></tr> <tr><td>4</td><td>2,28</td><td>1,95</td><td>0,33</td><td>14</td><td>1,77</td><td>0,38</td><td>0,38</td><td>0,00</td><td>1,96</td><td>17</td></tr> <tr><td>5</td><td>2,37</td><td>2,05</td><td>0,33</td><td>14</td><td>1,88</td><td>0,40</td><td>0,40</td><td>0,00</td><td>2,05</td><td>35</td></tr> <tr><td>6</td><td>2,33</td><td>1,95</td><td>0,39</td><td>17</td><td>1,82</td><td>0,36</td><td>0,36</td><td>0,00</td><td>1,95</td><td>25</td></tr> <tr><td>7</td><td>2,36</td><td>2,03</td><td>0,32</td><td>14</td><td>1,90</td><td>0,36</td><td>0,36</td><td>0,00</td><td>2,04</td><td>26</td></tr> <tr><td>8</td><td>2,25</td><td>1,84</td><td>0,41</td><td>18</td><td>1,62</td><td>0,42</td><td>0,41</td><td>0,00</td><td>1,85</td><td>26</td></tr> <tr><td>9</td><td>2,33</td><td>2,02</td><td>0,31</td><td>13</td><td>1,85</td><td>0,37</td><td>0,37</td><td>0,00</td><td>2,02</td><td>23</td></tr> <tr><td>10</td><td>2,41</td><td>2,09</td><td>0,32</td><td>13</td><td>1,95</td><td>0,36</td><td>0,35</td><td>0,00</td><td>2,09</td><td>21</td></tr> <tr><td>11</td><td>2,35</td><td>2,00</td><td>0,36</td><td>15</td><td>1,81</td><td>0,41</td><td>0,41</td><td>0,00</td><td>2,01</td><td>22</td></tr> <tr><td>12</td><td>2,19</td><td>1,68</td><td>0,50</td><td>23</td><td>1,45</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,68</td><td>26</td></tr> <tr><td>13</td><td>2,39</td><td>2,05</td><td>0,34</td><td>14</td><td>1,91</td><td>0,35</td><td>0,35</td><td>0,00</td><td>2,05</td><td>36</td></tr> <tr><td>14</td><td>2,23</td><td>1,87</td><td>0,36</td><td>16</td><td>1,77</td><td>0,35</td><td>0,35</td><td>0,00</td><td>1,87</td><td>21</td></tr> <tr><td>15</td><td>2,54</td><td>2,23</td><td>0,31</td><td>12</td><td>2,06</td><td>0,40</td><td>0,40</td><td>0,00</td><td>2,23</td><td>22</td></tr> <tr><td>16</td><td>2,28</td><td>2,04</td><td>0,24</td><td>10</td><td>1,90</td><td>0,36</td><td>0,37</td><td>0,00</td><td>2,04</td><td>47</td></tr> <tr><td>17</td><td>2,49</td><td>2,18</td><td>0,31</td><td>12</td><td>2,00</td><td>0,36</td><td>0,36</td><td>0,00</td><td>2,19</td><td>18</td></tr> <tr><td>18</td><td>2,15</td><td>1,69</td><td>0,47</td><td>22</td><td>1,46</td><td>0,42</td><td>0,42</td><td>0,00</td><td>1,69</td><td>14</td></tr> <tr><td>19</td><td>2,53</td><td>2,21</td><td>0,31</td><td>12</td><td>2,08</td><td>0,37</td><td>0,37</td><td>0,00</td><td>2,22</td><td>24</td></tr> <tr><td>20</td><td>2,02</td><td>1,49</td><td>0,53</td><td>26</td><td>1,28</td><td>0,41</td><td>0,41</td><td>0,00</td><td>1,49</td><td>30</td></tr> <tr><td>maxi</td><td>2,54</td><td>2,23</td><td>0,55</td><td>26</td><td>2,08</td><td>0,42</td><td>0,42</td><td>0,00</td><td>2,23</td><td>47</td></tr> <tr><td>mini</td><td>2,02</td><td>1,49</td><td>0,24</td><td>10</td><td>1,28</td><td>0,35</td><td>0,35</td><td>-0,01</td><td>1,49</td><td>14</td></tr> <tr style="font-weight: bold;"><td>Average</td><td>2,31</td><td>1,93</td><td>0,38</td><td>17</td><td>1,76</td><td>0,38</td><td>0,38</td><td>0,00</td><td>1,94</td><td>25</td></tr> <tr><td>Std dev</td><td>0,13</td><td>0,20</td><td>0,08</td><td>5</td><td>0,22</td><td>0,03</td><td>0,03</td><td>0,0</td><td>0,2</td><td>8</td></tr> </tbody> </table>			Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul (mm)	F à Ce N	RC (mW)	1	2,13	1,58	0,55	26	1,43	0,40	0,40	-0,01	1,61	22	2	2,33	1,86	0,47	20	1,65	0,41	0,41	0,00	1,88	18	3	2,20	1,80	0,40	18	1,65	0,35	0,35	0,00	1,81	21	4	2,28	1,95	0,33	14	1,77	0,38	0,38	0,00	1,96	17	5	2,37	2,05	0,33	14	1,88	0,40	0,40	0,00	2,05	35	6	2,33	1,95	0,39	17	1,82	0,36	0,36	0,00	1,95	25	7	2,36	2,03	0,32	14	1,90	0,36	0,36	0,00	2,04	26	8	2,25	1,84	0,41	18	1,62	0,42	0,41	0,00	1,85	26	9	2,33	2,02	0,31	13	1,85	0,37	0,37	0,00	2,02	23	10	2,41	2,09	0,32	13	1,95	0,36	0,35	0,00	2,09	21	11	2,35	2,00	0,36	15	1,81	0,41	0,41	0,00	2,01	22	12	2,19	1,68	0,50	23	1,45	0,41	0,41	0,00	1,68	26	13	2,39	2,05	0,34	14	1,91	0,35	0,35	0,00	2,05	36	14	2,23	1,87	0,36	16	1,77	0,35	0,35	0,00	1,87	21	15	2,54	2,23	0,31	12	2,06	0,40	0,40	0,00	2,23	22	16	2,28	2,04	0,24	10	1,90	0,36	0,37	0,00	2,04	47	17	2,49	2,18	0,31	12	2,00	0,36	0,36	0,00	2,19	18	18	2,15	1,69	0,47	22	1,46	0,42	0,42	0,00	1,69	14	19	2,53	2,21	0,31	12	2,08	0,37	0,37	0,00	2,22	24	20	2,02	1,49	0,53	26	1,28	0,41	0,41	0,00	1,49	30	maxi	2,54	2,23	0,55	26	2,08	0,42	0,42	0,00	2,23	47	mini	2,02	1,49	0,24	10	1,28	0,35	0,35	-0,01	1,49	14	Average	2,31	1,93	0,38	17	1,76	0,38	0,38	0,00	1,94	25	Std dev	0,13	0,20	0,08	5	0,22	0,03	0,03	0,0	0,2	8
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul (mm)	F à Ce N	RC (mW)																																																																																																																																																																																																																																																																											
1	2,13	1,58	0,55	26	1,43	0,40	0,40	-0,01	1,61	22																																																																																																																																																																																																																																																																											
2	2,33	1,86	0,47	20	1,65	0,41	0,41	0,00	1,88	18																																																																																																																																																																																																																																																																											
3	2,20	1,80	0,40	18	1,65	0,35	0,35	0,00	1,81	21																																																																																																																																																																																																																																																																											
4	2,28	1,95	0,33	14	1,77	0,38	0,38	0,00	1,96	17																																																																																																																																																																																																																																																																											
5	2,37	2,05	0,33	14	1,88	0,40	0,40	0,00	2,05	35																																																																																																																																																																																																																																																																											
6	2,33	1,95	0,39	17	1,82	0,36	0,36	0,00	1,95	25																																																																																																																																																																																																																																																																											
7	2,36	2,03	0,32	14	1,90	0,36	0,36	0,00	2,04	26																																																																																																																																																																																																																																																																											
8	2,25	1,84	0,41	18	1,62	0,42	0,41	0,00	1,85	26																																																																																																																																																																																																																																																																											
9	2,33	2,02	0,31	13	1,85	0,37	0,37	0,00	2,02	23																																																																																																																																																																																																																																																																											
10	2,41	2,09	0,32	13	1,95	0,36	0,35	0,00	2,09	21																																																																																																																																																																																																																																																																											
11	2,35	2,00	0,36	15	1,81	0,41	0,41	0,00	2,01	22																																																																																																																																																																																																																																																																											
12	2,19	1,68	0,50	23	1,45	0,41	0,41	0,00	1,68	26																																																																																																																																																																																																																																																																											
13	2,39	2,05	0,34	14	1,91	0,35	0,35	0,00	2,05	36																																																																																																																																																																																																																																																																											
14	2,23	1,87	0,36	16	1,77	0,35	0,35	0,00	1,87	21																																																																																																																																																																																																																																																																											
15	2,54	2,23	0,31	12	2,06	0,40	0,40	0,00	2,23	22																																																																																																																																																																																																																																																																											
16	2,28	2,04	0,24	10	1,90	0,36	0,37	0,00	2,04	47																																																																																																																																																																																																																																																																											
17	2,49	2,18	0,31	12	2,00	0,36	0,36	0,00	2,19	18																																																																																																																																																																																																																																																																											
18	2,15	1,69	0,47	22	1,46	0,42	0,42	0,00	1,69	14																																																																																																																																																																																																																																																																											
19	2,53	2,21	0,31	12	2,08	0,37	0,37	0,00	2,22	24																																																																																																																																																																																																																																																																											
20	2,02	1,49	0,53	26	1,28	0,41	0,41	0,00	1,49	30																																																																																																																																																																																																																																																																											
maxi	2,54	2,23	0,55	26	2,08	0,42	0,42	0,00	2,23	47																																																																																																																																																																																																																																																																											
mini	2,02	1,49	0,24	10	1,28	0,35	0,35	-0,01	1,49	14																																																																																																																																																																																																																																																																											
Average	2,31	1,93	0,38	17	1,76	0,38	0,38	0,00	1,94	25																																																																																																																																																																																																																																																																											
Std dev	0,13	0,20	0,08	5	0,22	0,03	0,03	0,0	0,2	8																																																																																																																																																																																																																																																																											
<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 20%;">Cp</td><td>1,00</td><td style="width: 20%;"></td><td style="width: 20%;"></td><td style="width: 20%;"></td><td style="width: 20%;"></td></tr> <tr><td>CpK</td><td>0,23</td><td></td><td></td><td></td><td></td></tr> </table>	Cp	1,00					CpK	0,23					<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 20%;"></td><td style="width: 20%;">1,93</td><td style="width: 20%;">1,96</td><td style="width: 20%;"></td><td style="width: 20%;"></td></tr> <tr><td></td><td>1,51</td><td>1,54</td><td></td><td></td></tr> </table>		1,93	1,96				1,51	1,54			<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 100%; text-align: center;">3,31</td></tr> </table>	3,31																																																																																																																																																																																																																																																												
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<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 20%;">Mini</td><td>1,6</td><td style="width: 20%;"></td><td style="width: 20%;"></td><td style="width: 20%;"></td><td style="width: 20%;"></td></tr> <tr><td>Max</td><td>2,4</td><td></td><td></td><td></td><td></td></tr> </table>	Mini	1,6					Max	2,4					<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 100%; text-align: center;">0,4</td></tr> </table>	0,4	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 20%;"></td><td style="width: 20%;">0,6</td><td style="width: 20%;">0,20</td><td style="width: 20%;">0,20</td><td style="width: 20%;"></td></tr> <tr><td></td><td></td><td>0,50</td><td>0,50</td><td></td></tr> </table>		0,6	0,20	0,20				0,50	0,50		<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <tr><td style="width: 100%; text-align: center;">100</td></tr> </table>	100																																																																																																																																																																																																																																																										
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	Laboratory report	N° : 989-07 Page : 6
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Measurements :

Life test : force travel measurements

KSC 34x Antiparticle

MTS 4 nombre de cycles : 300 000

Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	Rc mW
1	3,36	2,28	1,08	32	2,12	0,36	0,36	0,00	2,34	25,00
2	3,45	2,52	0,93	27	2,20	0,37	0,41	0,04	4,82	31,00
3	3,64	2,65	0,98	27	2,20	0,37	0,37	0,00	2,67	35,00
4	3,62	2,72	0,89	25	2,48	0,40	0,40	0,00	2,74	21,00
5	3,25	2,23	1,02	31	1,81	0,39	0,39	0,00	2,36	19,00
6	3,49	2,08	1,41	40	1,64	0,43	0,43	0,00	2,12	22,00
7	2,98	1,60	1,38	46	1,46	0,38	0,37	-0,01	1,66	37,00
8	3,49	2,37	1,12	32	2,09	0,38	0,38	0,00	2,39	30,00
9	3,52	2,63	0,89	25	2,40	0,34	0,34	0,00	2,66	32,00
10	3,54	2,59	0,95	27	2,19	0,38	0,38	0,00	2,72	28,00
11	3,49	2,47	1,02	29	2,15	0,38	0,37	-0,01	2,52	30,00
12	3,31	2,21	1,10	33	1,96	0,37	0,37	0,00	2,33	40,00
13	3,54	2,55	1,00	28	2,32	0,39	0,38	-0,01	2,58	21,00
14	3,32	2,11	1,21	36	1,78	0,39	0,39	0,00	2,15	30,00
15	3,09	1,80	1,28	42	1,46	0,39	0,38	-0,01	1,92	30,00
16	3,44	2,31	1,13	33	2,03	0,36	0,36	0,00	2,43	30,00
17	3,07	1,74	1,33	43	1,57	0,40	0,40	0,00	1,81	51,00
18	3,38	2,37	1,01	30	2,19	0,38	0,38	0,00	2,45	26,00
19	3,62	2,56	1,06	29	2,27	0,36	0,35	-0,01	2,61	28,00
20	3,23	2,03	1,20	37	1,75	0,39	0,39	0,00	2,08	76,00
maxi	3,64	2,72	1,41	46	2,48	0,43	0,43	0,04	4,82	76,00
mini	2,98	1,60	0,89	25	1,46	0,34	0,34	-0,01	1,66	19,00
Average	3,39	2,29	1,10	33	2,00	0,38	0,38	0,00	2,47	32,10
Std dev	0,19	0,32	0,16	6	0,31	0,02	0,02	0,01	0,63	12,66

Cp	1,32				2,62	2,41	
CpK	0,63	0,63		1,08	2,09	1,93	1,79
Mini	2,25	0,80		1,00	0,20	0,20	
Max	3,75				0,50	0,50	0,05
							100

	Laboratory report	N° : 983-07
		Page : 7

Measurements :

Life test : force travel measurements

KSC 40x Antiparticle

Measurement unit: **MTS 2** Life test machine reference: **S 09**
 Number of cycles: **300 000** Pressure: **0,94**

Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm aller mm	Ce aller mm	Simul (mm)	h élec/C.I. all mm	h elec/Cl retour mm	H. KSC mm	RC (mW)
1	1,16	0,96	0,20	17	0,56	0,39	0,38	-0,01	4,66	4,78	5,04	28
2	1,19	0,97	0,22	18	0,69	0,37	0,36	-0,01	4,74	4,83	5,10	23
3	1,18	0,98	0,20	17	0,74	0,39	0,38	-0,01	4,74	4,83	5,13	20
4	1,26	1,06	0,20	16	0,81	0,40	0,39	-0,01	4,72	4,81	5,12	22
5	1,22	1,00	0,22	18	0,66	0,41	0,41	-0,01	4,67	4,78	5,08	18
6	1,17	0,94	0,23	20	0,60	0,40	0,40	-0,01	4,67	4,77	5,07	20
7	1,21	0,97	0,24	20	0,67	0,38	0,38	-0,01	4,69	4,77	5,07	22
8	1,11	0,86	0,25	23	0,60	0,38	0,37	-0,01	4,69	4,79	5,07	20
9	1,13	0,92	0,21	18	0,59	0,36	0,36	-0,01	4,77	4,87	5,13	29
10	1,19	0,98	0,21	18	0,68	0,38	0,37	-0,01	4,69	4,78	5,06	24
maxi	1,26	1,06	0,25	23	0,81	0,41	0,41	-0,01	4,77	4,87	5,13	29
mini	1,11	0,86	0,20	16	0,56	0,36	0,36	-0,01	4,66	4,77	5,04	18
Average	1,18	0,96	0,22	18	0,66	0,39	0,38	-0,01	4,70	4,80	5,09	23
Std dev	0,04	0,05	0,02	2	0,08	0,02	0,02	0,00	0,04	0,03	0,03	4

Cp	4,22					7,24
CpK	2,17	0,59	1,79	3,01	2,65	
Req min	0,9	15	0,25	0,25	0,25	
Req max	2			0,75	0,75	0,05

+/- 0.5 % of the read value (load)
 +/- 0.01 mm (travel)

+/- 0.5 % of the read value (load)
 +/- 0.01 mm (travel)

	Laboratory report	N° : 856-07 Page : 8																																																																																																																																																																																													
<p>Measurements :</p> <p style="text-align: center;"><u>Life test : force travel measurements</u></p> <p style="text-align: center;"><u>KSC 42x Antiparticle</u></p> <p>Measurement unit: MTS 2 Life test machine reference: S 09 Number of cycles : 300000 Pressure: 0,98</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #ADD8E6;"> <th>Sample #</th> <th>Fa N</th> <th>Fra N</th> <th>Fa-Fra N</th> <th>Fa-Fra/Fa %</th> <th>Frr N</th> <th>Cm mm</th> <th>Ce mm</th> <th>Simul mm</th> <th>F à Ce mm</th> <th>RC mW</th> </tr> </thead> <tbody> <tr><td>1</td><td>1,50</td><td>1,03</td><td>0,46</td><td>31</td><td>0,74</td><td>0,33</td><td>0,32</td><td>-0,01</td><td>1,42</td><td>33</td></tr> <tr><td>2</td><td>1,48</td><td>0,93</td><td>0,55</td><td>37</td><td>0,57</td><td>0,34</td><td>0,33</td><td>-0,01</td><td>1,38</td><td>20</td></tr> <tr><td>3</td><td>1,42</td><td>0,91</td><td>0,51</td><td>36</td><td>0,59</td><td>0,33</td><td>0,32</td><td>-0,01</td><td>1,33</td><td>18</td></tr> <tr><td>4</td><td>1,48</td><td>0,96</td><td>0,52</td><td>35</td><td>0,54</td><td>0,35</td><td>0,34</td><td>-0,01</td><td>1,39</td><td>25</td></tr> <tr><td>5</td><td>1,53</td><td>1,09</td><td>0,44</td><td>29</td><td>0,72</td><td>0,34</td><td>0,33</td><td>-0,01</td><td>1,39</td><td>20</td></tr> <tr><td>6</td><td>1,46</td><td>0,95</td><td>0,50</td><td>35</td><td>0,59</td><td>0,35</td><td>0,34</td><td>-0,01</td><td>1,38</td><td>24</td></tr> <tr><td>7</td><td>1,54</td><td>1,11</td><td>0,42</td><td>28</td><td>0,77</td><td>0,32</td><td>0,32</td><td>-0,01</td><td>1,36</td><td>19</td></tr> <tr><td>8</td><td>1,50</td><td>1,04</td><td>0,46</td><td>31</td><td>0,55</td><td>0,35</td><td>0,34</td><td>-0,01</td><td>1,47</td><td>18</td></tr> <tr><td>9</td><td>1,53</td><td>1,09</td><td>0,44</td><td>29</td><td>0,76</td><td>0,36</td><td>0,35</td><td>-0,01</td><td>1,28</td><td>19</td></tr> <tr><td>10</td><td>1,51</td><td>1,01</td><td>0,50</td><td>33</td><td>0,53</td><td>0,34</td><td>0,33</td><td>-0,01</td><td>1,35</td><td>19</td></tr> <tr><td>maxi</td><td>1,54</td><td>1,11</td><td>0,55</td><td>37</td><td>0,77</td><td>0,36</td><td>0,35</td><td>-0,01</td><td>1,47</td><td>33</td></tr> <tr><td>mini</td><td>1,42</td><td>0,91</td><td>0,42</td><td>28</td><td>0,53</td><td>0,32</td><td>0,32</td><td>-0,01</td><td>1,28</td><td>18</td></tr> <tr><td>Average</td><td>1,50</td><td>1,01</td><td>0,48</td><td>32</td><td>0,64</td><td>0,34</td><td>0,33</td><td>-0,01</td><td>1,38</td><td>22</td></tr> <tr><td>Std dev</td><td>0,04</td><td>0,07</td><td>0,04</td><td>3</td><td>0,10</td><td>0,01</td><td>0,01</td><td>0,00</td><td>0,05</td><td>5</td></tr> </tbody> </table> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">Cp</td> <td style="border: 1px solid black; padding: 2px;">3,96</td> <td></td> <td style="border: 1px solid black; padding: 2px;">6,96</td> <td style="border: 1px solid black; padding: 2px;">8,07</td> <td style="border: 1px solid black; padding: 2px;">1,27</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">CpK</td> <td style="border: 1px solid black; padding: 2px;">2,23</td> <td style="border: 1px solid black; padding: 2px;">1,03</td> <td style="border: 1px solid black; padding: 2px;">2,53</td> <td style="border: 1px solid black; padding: 2px;">2,65</td> <td></td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">Mini</td> <td style="border: 1px solid black; padding: 2px;">1,25</td> <td style="border: 1px solid black; padding: 2px;">0,35</td> <td style="border: 1px solid black; padding: 2px;">0,40</td> <td style="border: 1px solid black; padding: 2px;">0,25</td> <td style="border: 1px solid black; padding: 2px;">0,25</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">Max</td> <td style="border: 1px solid black; padding: 2px;">2,12</td> <td></td> <td style="border: 1px solid black; padding: 2px;">0,75</td> <td style="border: 1px solid black; padding: 2px;">0,75</td> <td style="border: 1px solid black; padding: 2px;">0,05</td> </tr> </table>			Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC mW	1	1,50	1,03	0,46	31	0,74	0,33	0,32	-0,01	1,42	33	2	1,48	0,93	0,55	37	0,57	0,34	0,33	-0,01	1,38	20	3	1,42	0,91	0,51	36	0,59	0,33	0,32	-0,01	1,33	18	4	1,48	0,96	0,52	35	0,54	0,35	0,34	-0,01	1,39	25	5	1,53	1,09	0,44	29	0,72	0,34	0,33	-0,01	1,39	20	6	1,46	0,95	0,50	35	0,59	0,35	0,34	-0,01	1,38	24	7	1,54	1,11	0,42	28	0,77	0,32	0,32	-0,01	1,36	19	8	1,50	1,04	0,46	31	0,55	0,35	0,34	-0,01	1,47	18	9	1,53	1,09	0,44	29	0,76	0,36	0,35	-0,01	1,28	19	10	1,51	1,01	0,50	33	0,53	0,34	0,33	-0,01	1,35	19	maxi	1,54	1,11	0,55	37	0,77	0,36	0,35	-0,01	1,47	33	mini	1,42	0,91	0,42	28	0,53	0,32	0,32	-0,01	1,28	18	Average	1,50	1,01	0,48	32	0,64	0,34	0,33	-0,01	1,38	22	Std dev	0,04	0,07	0,04	3	0,10	0,01	0,01	0,00	0,05	5	Cp	3,96		6,96	8,07	1,27	CpK	2,23	1,03	2,53	2,65		Mini	1,25	0,35	0,40	0,25	0,25	Max	2,12		0,75	0,75	0,05
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC mW																																																																																																																																																																																					
1	1,50	1,03	0,46	31	0,74	0,33	0,32	-0,01	1,42	33																																																																																																																																																																																					
2	1,48	0,93	0,55	37	0,57	0,34	0,33	-0,01	1,38	20																																																																																																																																																																																					
3	1,42	0,91	0,51	36	0,59	0,33	0,32	-0,01	1,33	18																																																																																																																																																																																					
4	1,48	0,96	0,52	35	0,54	0,35	0,34	-0,01	1,39	25																																																																																																																																																																																					
5	1,53	1,09	0,44	29	0,72	0,34	0,33	-0,01	1,39	20																																																																																																																																																																																					
6	1,46	0,95	0,50	35	0,59	0,35	0,34	-0,01	1,38	24																																																																																																																																																																																					
7	1,54	1,11	0,42	28	0,77	0,32	0,32	-0,01	1,36	19																																																																																																																																																																																					
8	1,50	1,04	0,46	31	0,55	0,35	0,34	-0,01	1,47	18																																																																																																																																																																																					
9	1,53	1,09	0,44	29	0,76	0,36	0,35	-0,01	1,28	19																																																																																																																																																																																					
10	1,51	1,01	0,50	33	0,53	0,34	0,33	-0,01	1,35	19																																																																																																																																																																																					
maxi	1,54	1,11	0,55	37	0,77	0,36	0,35	-0,01	1,47	33																																																																																																																																																																																					
mini	1,42	0,91	0,42	28	0,53	0,32	0,32	-0,01	1,28	18																																																																																																																																																																																					
Average	1,50	1,01	0,48	32	0,64	0,34	0,33	-0,01	1,38	22																																																																																																																																																																																					
Std dev	0,04	0,07	0,04	3	0,10	0,01	0,01	0,00	0,05	5																																																																																																																																																																																					
Cp	3,96		6,96	8,07	1,27																																																																																																																																																																																										
CpK	2,23	1,03	2,53	2,65																																																																																																																																																																																											
Mini	1,25	0,35	0,40	0,25	0,25																																																																																																																																																																																										
Max	2,12		0,75	0,75	0,05																																																																																																																																																																																										

		Laboratory report				N° : 770-07				
						Page : 8				
Measurements :										
Life test : force travel measurements										
KSC 44x Antiparticle										
Life test machine reference		SW 13		Number of cycles :		2 000 000				
						MTS 5				
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC (mW)
1	3,07	2,16	0,91	30	1,13	0,53	0,53	0,00	3,02	40
2	3,07	2,17	0,90	29	1,23	0,53	0,53	0,00	2,79	39
3	3,04	2,12	0,92	30	1,17	0,53	0,52	-0,01	2,94	30
4	3,03	2,10	0,93	31	1,17	0,53	0,53	0,00	2,73	26
5	3,04	2,15	0,89	29	1,18	0,52	0,51	-0,01	2,81	24
6	3,05	2,19	0,85	28	1,17	0,55	0,55	0,00	3,02	30
7	3,10	2,21	0,89	29	1,25	0,59	0,59	0,00	3,02	38
8	3,05	2,14	0,91	30	1,24	0,56	0,56	0,00	3,03	20
9	3,01	2,12	0,89	30	1,17	0,61	0,60	-0,01	2,92	32
10	3,01	2,13	0,88	29	1,21	0,51	0,51	0,00	2,99	28
11	3,10	2,24	0,86	28	1,19	0,60	0,59	-0,01	3,08	22
12	3,02	2,15	0,86	29	1,16	0,56	0,56	0,00	2,74	20
13	3,04	2,14	0,90	30	1,25	0,57	0,56	-0,01	2,97	36
14	3,05	2,09	0,96	32	1,10	0,55	0,55	0,00	3,01	38
15	3,06	2,17	0,89	29	1,21	0,53	0,53	0,00	2,78	32
16	3,11	2,18	0,93	30	1,20	0,52	0,52	0,00	3,02	28
17	3,08	2,17	0,90	29	1,24	0,51	0,50	-0,01	3,04	26
18	3,01	2,10	0,91	30	1,18	0,51	0,51	0,00	2,78	30
19	3,06	2,09	0,96	32	1,20	0,51	0,50	-0,01	2,92	22
20	3,14	2,20	0,94	30	1,22	0,50	0,50	0,00	2,99	28
21	3,00	2,07	0,94	31	1,21	0,51	0,50	-0,01	2,94	40
22	3,09	2,22	0,86	28	1,19	0,58	0,58	0,00	3,04	30
23	3,04	2,17	0,87	29	1,14	0,53	0,52	-0,01	3,01	40
24	3,07	2,13	0,95	31	1,16	0,50	0,50	0,00	2,91	25
25	3,01	2,09	0,92	31	1,19	0,50	0,50	0,00	2,96	24
26	3,00	2,13	0,87	29	1,16	0,54	0,54	0,00	2,98	20
27	3,04	2,15	0,89	29	1,18	0,51	0,51	0,00	3,01	22
28	3,08	2,14	0,94	31	1,13	0,52	0,51	-0,01	2,99	30
29	3,00	2,13	0,87	29	1,15	0,52	0,52	0,00	2,90	24
30	3,03	2,10	0,92	31	1,19	0,50	0,49	-0,01	2,97	22
maxi	3,14	2,24	0,96	32	1,25	0,61	0,60	0,00	3,08	40
mini	3,00	2,07	0,85	28	1,10	0,50	0,49	-0,01	2,73	20
Average	3,05	2,15	0,90	30	1,19	0,53	0,53	0,00	2,94	29
Std dev	0,04	0,04	0,03	1	0,04	0,03	0,03	0,00	0,10	7

Cp	9,26				0,27
CpK	0,46	3,24	1,68	-5,19	3,62
Mini	3	0,60	1,00	0,50	
Max	5			1,00	0,05

* /: 0,5 % of the read value (load)
* /: 0,01 mm (travel)

		Laboratory report				N° : 445-07					
						Page : 9					
Measurements : <div style="text-align: center;"> Life test : force travel measurements KSC 45x Antiparticle </div>											
Measurement unit: MTS 2		F min : 9,05 7,79		F max : 9,5 9,45							
Number of cycles : 300 000		MTS 5		F moy : 9,32 8,84							
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC (mW)	
JIG SW05	1	4,15	3,14	1,00	24	1,41	0,97	0,97	0,00	4,06	40
	2	4,13	3,11	1,02	25	1,56	0,95	0,94	-0,01	4,05	43
	3	4,32	3,27	1,05	24	1,80	0,99	0,98	-0,01	4,24	28
	4	3,97	2,98	0,99	25	1,31	0,97	0,96	-0,01	3,93	34
	5	4,11	3,07	1,04	25	1,60	0,96	0,96	0,00	4,05	28
JIG SW09	6	4,45	3,35	1,10	25	1,69	0,99	0,98	-0,01	4,38	37
	7	4,10	3,10	1,00	24	1,71	0,95	0,94	-0,01	4,05	45
	8	3,98	2,98	1,01	25	1,47	0,92	0,91	-0,01	3,93	53
	9	4,30	3,23	1,07	25	1,69	0,95	0,94	-0,01	4,27	54
	10	3,91	2,89	1,03	26	1,51	0,93	0,92	-0,01	3,88	22
JIG SW05	11	4,02	3,04	0,97	24	1,55	0,96	0,95	-0,01	3,90	23
	12	4,32	3,32	1,00	23	1,77	0,99	0,99	0,00	4,22	33
	13	4,27	3,13	1,14	27	1,63	1,02	1,02	0,00	4,17	44
	14	4,45	3,41	1,04	23	1,82	1,07	1,06	-0,01	4,30	18
	15	4,04	3,09	0,95	24	1,61	0,95	0,94	-0,01	3,98	29
JIG SW09	16	4,35	3,32	1,03	24	1,71	1,05	1,04	-0,01	4,27	41
	17	4,01	3,09	0,92	23	1,62	0,92	0,92	0,00	3,96	30
	18	4,19	3,13	1,06	25	1,59	0,99	0,98	-0,01	4,11	57
	19	4,16	3,10	1,06	25	1,53	1,00	1,00	0,00	4,09	41
	20	4,08	3,06	1,02	25	1,55	0,89	0,88	-0,01	3,98	28
maxi	4,45	3,41	1,14	27	1,82	1,07	1,06	0,00	4,38	57	
mini	3,91	2,89	0,92	23	1,31	0,89	0,88	-0,01	3,88	18	
Average	4,17	3,14	1,03	25	1,61	0,97	0,96	-0,01	4,09	36	
Std dev	0,16	0,14	0,05	1	0,13	0,04	0,04	0,00	0,15	11	
Cp 1,56		1,50		2,61		1,53 1,51		0,22 0,27		1,93	
CpK 1,38											
Mini 3,5		0,80		0,60 0,60 0,60						100	
Max 5				1,80 1,00 1,00 0,05							
- / - 0.5 % of the read value (load) - / - 0.01 mm (travel)											

		Laboratory report			N° : 795-07		
					Page : 10		
<i>Measurements :</i>							
Life test : force travel measurements							
KSC 4M1 Antiparticle							
Measurement unit:		MTS 2		Life test machine reference		SW9	SW4
Number of cycles :		1000000		Pressure:		133	103
Sample #	Ce aller mm	Ce retour mm	Fa/Ce N	Fr/Ce N	F. pour 1,8mm N	Slope N/mm	RC (mW)
1	0,60	0,70	1,20	1,15	8,29	1,90	49
2	0,60	0,63	1,28	0,98	8,27	2,10	32
3	0,62	0,72	1,34	1,29	8,32	2,10	27
4	0,66	0,75	1,24	1,19	7,62	1,80	32
5	0,65	0,74	1,25	1,20	7,97	1,80	30
6	0,64	0,75	1,31	1,27	7,73	2,00	31
7	0,67	0,77	1,28	1,23	7,91	1,90	40
8	0,65	0,75	1,21	1,16	8,10	1,80	36
9	0,66	0,73	1,31	1,20	8,42	1,80	30
10	0,59	0,68	1,19	1,14	8,65	1,90	41
11	0,60	0,68	1,25	1,19	8,77	2,00	49
12	0,61	0,70	1,22	1,18	8,60	1,90	34
13	0,58	0,66	1,18	1,14	8,36	1,90	39
14	0,60	0,69	1,21	1,16	8,37	2,00	38
15	0,67	0,77	1,19	1,14	7,50	1,70	33
16	0,63	0,69	1,25	1,15	7,91	1,90	44
17	0,58	0,66	1,24	1,18	8,93	2,00	50
18	0,60	0,68	1,20	1,15	8,46	1,90	33
19	0,60	0,69	1,31	1,26	8,87	2,00	41
20	0,59	0,68	1,19	1,15	8,59	1,90	41
maxi	0,67	0,77	1,34	1,29	8,93	2,10	50
mini	0,58	0,63	1,18	0,98	7,50	1,70	27
Average	0,62	0,71	1,24	1,17	8,28	1,92	38
Std dev	0,03	0,04	0,05	0,06	0,41	0,10	7
Cp	2,63		6,99	-1,30	3,68		
CpK	1,38		1,68	-6,10	3,09		3,05
Mini	0,25		1	0,5	4,5		
Max	0,75		3		13,5		100

+/- 0.5 % of the read value (load)
+/- 0.01 mm (travel)

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Diffusion: no restriction

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Measurements :

Life test : force travel measurements

KSC 52x Antiparticle

Measurement unit: **MTS 5** Number of cycles: **100 000**

Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm	RC (mW)
1	2,16	1,08	1,08	50	0,95	0,35	0,35	0,00	1,08	20
2	2,10	1,06	1,04	49	1,02	0,35	0,35	0,00	1,08	16
3	2,07	1,21	0,86	42	1,15	0,38	0,38	0,00	1,25	17
4	2,14	1,27	0,88	41	1,17	0,39	0,39	0,00	1,27	29
5	2,11	1,15	0,96	46	1,07	0,35	0,35	0,00	1,15	20
6	2,20	1,22	0,98	45	1,13	0,37	0,37	0,00	1,23	18
7	2,14	1,38	0,75	35	1,27	0,32	0,32	0,00	1,39	18
8	2,15	1,13	1,01	47	0,99	0,33	0,33	0,00	1,14	23
9	2,10	1,16	0,95	45	1,03	0,33	0,33	0,00	1,19	23
10	2,26	1,33	0,94	41	1,20	0,33	0,32	-0,01	1,37	16
11	2,24	1,38	0,86	38	1,27	0,33	0,33	0,00	1,41	28
12	2,20	1,48	0,72	33	1,33	0,32	0,32	0,00	1,50	20
13	2,16	1,24	0,91	42	1,09	0,32	0,32	0,00	1,28	19
14	2,18	1,48	0,70	32	1,36	0,34	0,34	0,00	1,48	18
15	2,18	1,39	0,78	36	1,28	0,35	0,35	0,00	1,40	22
16	2,30	1,40	0,90	39	1,28	0,30	0,30	0,00	1,42	19
17	2,19	1,25	0,94	43	1,12	0,38	0,37	-0,01	1,29	24
18	2,19	1,40	0,79	36	1,30	0,37	0,36	-0,01	1,48	30
19	2,10	1,32	0,79	37	1,16	0,32	0,32	0,00	1,32	17
20	2,28	1,42	0,86	38	1,22	0,35	0,35	0,00	1,42	30
21	2,24	1,22	1,02	46	1,14	0,34	0,34	0,00	1,27	18
22	2,21	1,37	0,84	38	1,26	0,32	0,31	-0,01	1,40	15
23	2,17	1,11	1,06	49	0,95	0,34	0,33	-0,01	1,18	18
24	2,19	1,24	0,95	44	1,09	0,34	0,34	0,00	1,25	12
25	2,11	1,11	0,99	47	1,02	0,37	0,37	0,00	1,13	13
26	2,35	1,56	0,79	34	1,41	0,33	0,33	0,00	1,57	19
27	2,23	1,41	0,82	37	1,25	0,34	0,34	0,00	1,42	15
28	2,26	1,50	0,76	34	1,36	0,35	0,35	0,00	1,51	18
29	2,12	1,42	0,71	33	1,30	0,27	0,27	0,00	1,42	21
30	2,30	1,29	1,00	44	1,17	0,35	0,35	0,00	1,30	19
maxi	2,35	1,56	1,08	50	1,41	0,39	0,39	0,00	1,57	30
mini	2,07	1,06	0,70	32	0,95	0,27	0,27	-0,01	1,08	12
Average	2,19	1,30	0,89	41	1,18	0,34	0,34	0,00	1,32	20
Std dev	0,07	0,14	0,11	5	0,13	0,02	0,02	0,00	0,13	5

Cp	2,40					2,34	2,02
CpK	1,50	2,68	3,08	1,46	1,49		5,76
Mini	1,5	25,00	0,10	0,15			
Max	2,5		0,45	0,45			100

1/ -0,5 % of the real value (goal)
 2/ -0,03 mm (max)

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Measurements :									
Life test : force travel measurements									
<u>KSC 64x Antiparticle</u>									
		MTS 5		nombre de cycles :		300 000			
Sample #	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
1	2,96	1,58	1,38	47	1,51	0,55	0,54	-0,01	1,81
2	3,10	1,59	1,51	49	1,46	0,55	0,54	-0,01	1,60
3	3,09	1,61	1,49	48	1,43	0,61	0,61	0,00	1,62
4	3,16	1,95	1,21	38	1,81	0,58	0,57	-0,01	2,23
5	3,28	1,84	1,44	44	1,70	0,60	0,60	0,00	1,86
6	3,21	1,85	1,36	42	1,73	0,58	0,57	-0,01	1,93
7	3,29	1,82	1,47	45	1,69	0,62	0,62	0,00	1,86
8	3,14	1,77	1,37	44	1,61	0,64	0,62	-0,02	2,06
9	3,23	1,94	1,29	40	1,75	0,69	0,68	-0,01	1,98
10	3,34	1,96	1,38	41	1,82	0,70	0,70	0,00	1,96
11	3,32	2,16	1,16	35	1,87	0,66	0,66	0,00	2,20
12	3,21	1,87	1,34	42	1,77	0,61	0,61	0,00	1,87
13	3,21	1,97	1,24	39	1,83	0,53	0,53	0,00	1,97
14	3,17	1,79	1,38	44	1,68	0,66	0,66	0,00	1,79
15	3,33	1,82	1,51	45	1,61	0,67	0,67	0,00	1,88
16	3,10	1,75	1,34	43	1,66	0,43	0,43	0,00	1,80
17	3,21	1,88	1,33	42	1,73	0,62	0,62	0,00	1,89
18	3,46	2,12	1,33	39	1,92	0,64	0,66	0,02	4,21
19	3,42	2,14	1,28	37	1,97	0,69	0,71	0,02	4,06
20	3,30	2,06	1,23	37	1,94	0,60	0,59	-0,01	2,19
maxi	3,46	2,16	1,51	48,80	1,97	0,70	0,71	0,02	4,21
mini	2,96	1,58	1,16	35,00	1,43	0,43	0,43	-0,02	1,60
Average	3,23	1,87	1,35	42,02	1,72	0,61	0,61	0,00	2,14
Std dev	0,12	0,17	0,10	3,74	0,15	0,06	0,07	0,01	0,70
Cp		2,08				1,03		0,99	
CpK		1,45		3,36		1,60		0,46	
						0,46		0,45	
Mini		2,25		0,35		1,00		0,30	
Max		3,75				0,70		0,70	
								0,05	

Annex 4: KSC qualification report (abstract)

Please refer to the 23 following pages.

**C&K Components SAS**

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LABORATORY**QUALIFICATION REPORT**

Report N° : **1256-07C** Date : **31-oct.-07** Page : **1/23**

Product & Traceability

Family	Sub-Family	Designation	Date code	Quantity
KSC	KSC2	KSC241 J LFS		

Test Subject

Qualification of KSC241 J - Modified version according PCN KSC07-09

Contents

§	Designation	Comments	page
1	Product specification		2
2	Qualification file		3
3	Test results		4-23
4			
5			
6			
7			

General Conclusion

Satsyng results

Laboratory Technician	Laboratory Manager	Quality Director
Marion DULLIER	Daniel PEQUEGNOT	Jérôme BROCHOT



LABORATORY

QUALIFICATION REPORT

Report N° : 1256-07C

Date : 31/10/07

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Product Specification

Refer to C&K specification PS-KSC-102-rev C



LABORATORY

Report N° : 1256-07C

Date : 31/10/2007

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QUALIFICATION REPORT - QUALIFICATION FILE for SWITCHES

This qualification file is established according to PROC-16 Ed 03

Group #	Performed measurements or tests	Applicable measurements or tests	Applicable standards	Quantity of tested parts by Sub-Group																					
				Total	Tests Sub-Groups																				
					3.1	3.2	4.1	4.2	5.1	5.2	5.3	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10	8			
0	INITIAL MEASUREMENTS	Visual Examination	X	150	50	10															20				
		Mechanical measurements	X																						
		Switching force (Fa)	X																						
		Tactile feeling (D1)	X																						
		Return force (Fr)	X																						
		Electrical travel (Te)	X																						
		Mechanical travel (Tm)	X			10																			
		Electrical measurements	X	130	50						50													20	
		Dielectric strength	X																						
		Contact resistance	X																						
Insulation resistance between terminals :	X																								
Bounce time	X																								
IP Tests	X	IP E7 (Immersion + Dust voir 1,6,10)	20	10						10															
1	1.1	SOLDERING	Without solder paste	X	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
			2 Reflow lead free C&K components	X	80	40																	20		
			Visual Examination	X																					
2	MEASUREMENTS AFTER SOLDERING	Mechanical measurements	X																						
		Switching force (Fa)	X																						
		Tactile feeling (D1)	X																						
		Return force (Fr)	X																						
		Electrical travel (Te)	X																						
		Mechanical travel (Tm)	X			10					40														
		Electrical measurements	X																						
		Dielectric strength	X																						
		Contact resistance	X																						
		Insulation resistance between terminals :	X																						
Bounce time	X																								
IP Tests	X	IP E7 (Immersion + Dust voir 1,6,10)	20	10						10															
3	3.1	LIFE MEASUREMENTS	Life test	X																					
				X	30																				
4	4.1	VIBRATION	Sinusoidal Vibrations	X																					
			Mechanical shock	X				10																	
				X																					
			Dry Heat storage	X																					
			Cold storage	X																					
			Humidity storage	X																					
				X																					
				X																					
6.4	6.10	Robustness	Shower test	X																					
			Dust Test	X																			20		
7	MEASUREMENTS AFTER TESTS	Visual Examination	X																						
		Mechanical measurements	X																						
		Electrical measurements	X	30		10					20													20	
		IP Tests or fluid tightness	X	10							10														
Cumulative Measurements or tests by sub-group					Cumulative and chronological measurements or tests in the same column; Test in gray color : not applicable																				
X : Applicable measurement or test					Destructive tests																				
Made by :					Page																				
					Date : 24/04/2007																				



LABORATORY QUALIFICATION REPORT

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Table with 4 columns: TEST GROUP, S, TEST NAME, Initial measurements. Includes sub-headers for MEASUREMENT and Mechanical Characteristics.

Main data table with 15 columns: Sample N°, Fx, Fy, Fz, Fx/Fz, Fy/Fz, Fz/Fx, Fz/Fy, Fr, Cr, Cx, Cx/Fz, Cx/Fy, Cx/Fx, Cx/Fy, Cx/Fx, Cx/Fy. Rows 1-150.

Summary statistics table: Mean, Std dev, Min (PP5C), Max (PP95C), Cpk, Cpk. Includes a table for MOK and % MOK.

Comments



TEST GROUP: 0	TEST NAME: Initial measurements
MEASUREMENT: Mechanical characteristics	After: N/A

Sample N°	Lot	Voltage (V)	W (mW)	Power (W)	Eff. (%)
1	1400	Pass	1E-411	0.00	
2	1100	Pass	1E-411	0.00	
3	1200	Pass	1E-411	0.00	
4	1200	Pass	1E-411	0.00	
5	1200	Pass	1E-411	0.00	
6	1400	Pass	1E-411	0.00	
7	1200	Pass	1E-411	0.00	
8	1200	Pass	1E-411	0.00	
9	1200	Pass	1E-411	0.00	
10	1100	Pass	1E-411	0.00	
11	1300	Pass	1E-411	0.00	
12	1300	Pass	1E-411	0.00	
13	1100	Pass	1E-411	0.00	
14	1100	Pass	1E-411	0.00	
15	1200	Pass	1E-411	0.00	
16	1100	Pass	1E-411	0.00	
17	1200	Pass	1E-411	0.00	
18	1300	Pass	1E-411	0.00	
19	1200	Pass	1E-411	0.00	
20	1400	Pass	1E-411	0.00	
21	1200	Pass	1E-411	0.00	
22	1300	Pass	1E-411	0.00	
23	1200	Pass	1E-411	0.00	
24	1200	Pass	1E-411	0.00	
25	1200	Pass	1E-411	0.00	
26	1100	Pass	1E-411	0.00	
27	1100	Pass	1E-411	0.00	
28	1300	Pass	1E-411	0.00	
29	1300	Pass	1E-411	0.00	
30	1200	Pass	1E-411	0.00	
31	1200	Pass	1E-411	0.00	
32	1200	Pass	1E-411	0.00	
33	1100	Pass	1E-411	0.00	
34	1400	Pass	1E-411	0.00	
35	1400	Pass	1E-411	0.00	
36	1100	Pass	1E-411	0.00	
37	1300	Pass	1E-411	0.00	
38	1400	Pass	1E-411	0.00	
39	1300	Pass	1E-411	0.00	
40	1200	Pass	1E-411	0.00	
41	1400	Pass	1E-411	0.00	
42	1300	Pass	1E-411	0.00	
43	1300	Pass	1E-411	0.00	
44	1100	Pass	1E-411	0.00	
45	1200	Pass	1E-411	0.00	
46	1200	Pass	1E-411	0.00	
47	1500	Pass	1E-411	0.00	
48	1400	Pass	1E-411	0.00	
49	1100	Pass	1E-411	0.00	
50	1200	Pass	1E-411	0.00	
51	1200	Pass	1E-411	0.00	
52	1200	Pass	1E-411	0.00	
53	1500	Pass	1E-411	0.00	
54	1200	Pass	1E-411	0.00	
55	1400	Pass	1E-411	0.00	
56	1200	Pass	1E-411	0.00	
57	1100	Pass	1E-411	0.00	
58	1100	Pass	1E-411	0.00	
59	1200	Pass	1E-411	0.00	
60	1300	Pass	1E-411	0.00	
61	1200	Pass	1E-411	0.00	
62	1200	Pass	1E-411	0.00	
63	1500	Pass	1E-411	0.00	
64	1200	Pass	1E-411	0.00	
65	1300	Pass	1E-411	0.00	
66	1200	Pass	1E-411	0.00	
67	1200	Pass	1E-411	0.00	
68	1200	Pass	1E-411	0.00	
69	1100	Pass	1E-411	0.00	
70	1100	Pass	1E-411	0.00	
71	1300	Pass	1E-411	0.00	
72	1400	Pass	1E-411	0.00	
73	1100	Pass	1E-411	0.00	
74	1200	Pass	1E-411	0.00	
75	1200	Pass	1E-411	0.00	
76	1100	Pass	1E-411	0.00	
77	1200	Pass	1E-411	0.00	
78	1300	Pass	1E-411	0.00	
79	1100	Pass	1E-411	0.00	
80	1200	Pass	1E-411	0.00	
81	1300	Pass	1E-411	0.00	
82	1100	Pass	1E-411	0.00	
83	1200	Pass	1E-411	0.00	
84	1400	Pass	1E-411	0.00	
85	1100	Pass	1E-411	0.00	
86	1200	Pass	1E-411	0.00	
87	1400	Pass	1E-411	0.00	
88	1200	Pass	1E-411	0.00	
89	1100	Pass	1E-411	0.00	
90	1300	Pass	1E-411	0.00	
91	1200	Pass	1E-411	0.00	
92	1400	Pass	1E-411	0.00	
93	1300	Pass	1E-411	0.00	
94	1300	Pass	1E-411	0.00	
95	1200	Pass	1E-411	0.00	
96	1500	Pass	1E-411	0.00	
97	1100	Pass	1E-411	0.00	
98	1300	Pass	1E-411	0.00	
99	1200	Pass	1E-411	0.00	
100	1100	Pass	1E-411	0.00	
101	1200	Pass	1E-411	0.00	
102	1100	Pass	1E-411	0.00	
103	1100	Pass	1E-411	0.00	
104	1200	Pass	1E-411	0.00	
105	1300	Pass	1E-411	0.00	
106	1300	Pass	1E-411	0.00	
107	1200	Pass	1E-411	0.00	
108	1400	Pass	1E-411	0.00	
109	1400	Pass	1E-411	0.00	
110	1300	Pass	1E-411	0.00	
111	1200	Pass	1E-411	0.00	
112	1100	Pass	1E-411	0.00	
113	1100	Pass	1E-411	0.00	
114	1200	Pass	1E-411	0.00	
115	1200	Pass	1E-411	0.00	
116	1300	Pass	1E-411	0.00	
117	1500	Pass	1E-411	0.00	
118	1300	Pass	1E-411	0.00	
119	1200	Pass	1E-411	0.00	
120	1200	Pass	1E-411	0.00	
121	1500	Pass	1E-411	0.00	
122	1100	Pass	1E-411	0.00	
123	1200	Pass	1E-411	0.00	
124	1200	Pass	1E-411	0.00	
125	1200	Pass	1E-411	0.00	
126	1200	Pass	1E-411	0.00	
127	1400	Pass	1E-411	0.00	
128	1300	Pass	1E-411	0.00	
129	1200	Pass	1E-411	0.00	
130	1300	Pass	1E-411	0.00	
Mean	1500	0.00	1E-411	0.00	
Min	1100	0.00	1E-411	0.00	
Max	1500	0.00	1E-411	0.00	
Range	123.25	ADVIS	1E-411	0.00	
Std dev	1.26	ADVIS	0	0.00	

Min (SPEC)	1.0	1.0	0.00
Max (SPEC)	1.0	1.0	1.00
Cp	15.79		
Cpk	3.39	ADVIS	ADVIS
WOK			
% WOK			
WOK			
% WOK			
Process	1.00	100%	0
Yield	100%	% of non-conform parts	0
Yield	100%	% of non-conform parts	0.0%

Comments:



LABORATORY
QUALIFICATION REPORT

Report N° : **1256-07**
Date : **31-oct-07**
Page : **6/23**

TEST GROUP :	2	TEST NAME :	Soldering
MEASUREMENT	Mechanical characteristics	After	2 soldering process

Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F A Ce mm
11	4.02	2.42	1.60	40	2.19	0.52	0.52	0.00	2.44
12	3.87	2.39	1.48	38	2.12	0.47	0.47	0.00	2.55
13	3.93	2.54	1.39	35	2.27	0.52	0.52	0.00	2.54
14	4.05	2.53	1.52	38	2.26	0.51	0.51	0.00	2.60
15	3.94	2.37	1.56	40	2.09	0.49	0.49	0.00	2.60
16	3.88	2.36	1.52	39	2.15	0.44	0.43	-0.01	2.53
17	4.10	2.58	1.53	37	2.27	0.53	0.53	0.00	2.66
18	4.04	2.44	1.60	40	2.19	0.53	0.53	0.00	2.50
19	4.06	2.51	1.55	38	2.19	0.51	0.50	-0.01	3.17
20	4.02	2.55	1.47	37	2.24	0.52	0.52	0.00	2.78
21	4.08	2.47	1.61	39	2.19	0.56	0.55	-0.01	2.67
22	4.01	2.39	1.62	40	2.12	0.62	0.62	0.00	2.73
23	4.14	2.59	1.55	38	2.29	0.54	0.54	0.00	3.02
24	3.91	2.34	1.57	40	2.12	0.47	0.47	0.00	2.43
25	3.86	2.18	1.68	44	1.91	0.40	0.40	0.00	2.25
26	4.13	2.55	1.58	38	2.29	0.50	0.50	0.00	2.89
27	4.25	2.56	1.69	40	2.31	0.52	0.52	0.00	2.59
28	3.94	2.38	1.56	40	1.98	0.54	0.54	0.00	2.39
29	4.11	2.62	1.49	36	2.33	0.54	0.54	0.00	3.12
30	4.13	2.53	1.60	39	2.24	0.53	0.53	0.00	2.83
31	3.79	2.22	1.57	41	1.95	0.45	0.45	0.00	2.67
32	3.94	2.44	1.49	38	2.12	0.53	0.52	-0.01	2.73
33	4.04	2.49	1.55	38	2.21	0.54	0.53	-0.01	2.65
34	3.98	2.46	1.51	38	2.21	0.53	0.52	-0.01	2.76
35	4.04	2.40	1.64	41	2.13	0.53	0.53	0.00	2.44
36	3.96	2.66	1.30	33	2.35	0.57	0.57	0.00	2.82
37	4.13	2.62	1.51	37	2.36	0.52	0.52	0.00	2.74
38	3.97	2.41	1.57	40	2.14	0.52	0.52	0.00	2.50
39	3.95	2.44	1.51	38	2.16	0.49	0.49	0.00	2.81
40	4.03	2.41	1.62	40	2.17	0.52	0.52	0.00	2.46
41	4.19	2.64	1.55	37	2.32	0.57	0.57	0.00	2.73
42	4.31	2.64	1.68	39	2.37	0.56	0.56	0.00	2.77
43	3.96	2.52	1.44	37	2.24	0.54	0.54	0.00	2.71
44	4.07	2.46	1.61	40	2.26	0.52	0.51	-0.01	2.60
45	4.15	2.54	1.61	39	2.25	0.54	0.54	0.00	2.74
46	3.95	2.38	1.58	40	2.12	0.51	0.51	0.00	2.43
47	4.00	2.39	1.61	40	2.14	0.51	0.51	0.00	2.50
48	3.82	2.26	1.56	41	1.96	0.47	0.47	0.00	2.79
49	3.91	2.47	1.44	37	2.18	0.49	0.49	0.00	3.17
50	4.07	2.50	1.58	39	2.16	0.52	0.51	-0.01	2.94
51	3.60	2.02	1.58	44	1.77	0.51	0.51	0.00	2.07
52	3.75	2.18	1.56	42	1.82	0.56	0.56	0.00	2.27
53	3.63	2.22	1.41	39	1.82	0.63	0.63	0.00	3.11
54	3.84	2.14	1.71	44	1.88	0.62	0.62	0.00	2.23
55	3.63	1.99	1.64	45	1.83	0.53	0.53	0.00	2.02
56	3.92	2.20	1.72	44	1.88	0.59	0.58	-0.01	2.29
57	3.75	2.20	1.55	41	1.97	0.56	0.55	-0.01	2.39
58	3.59	1.96	1.63	45	1.75	0.52	0.52	0.00	2.34
59	3.83	2.08	1.75	46	1.87	0.57	0.56	-0.01	2.50
60	3.64	2.00	1.64	45	1.79	0.51	0.51	0.00	2.01
71	4.03	2.44	1.59	39	2.21	0.50	0.50	0.00	2.54
72	4.08	2.47	1.61	40	2.18	0.50	0.50	0.00	2.91
73	3.97	2.41	1.55	39	2.15	0.50	0.50	0.00	2.60
74	3.92	2.42	1.51	38	2.15	0.50	0.50	0.00	2.52
75	3.96	2.34	1.63	41	2.10	0.49	0.49	0.00	2.40
76	4.05	2.41	1.64	41	2.14	0.53	0.53	0.00	2.67
77	4.20	2.56	1.64	39	2.28	0.53	0.53	0.00	2.83
78	4.09	2.56	1.53	37	2.29	0.50	0.50	0.00	2.57
79	4.07	2.47	1.60	39	2.22	0.53	0.53	0.00	2.53
80	3.95	2.45	1.50	38	2.19	0.49	0.49	0.00	2.52
81	4.07	2.61	1.46	36	2.34	0.52	0.51	-0.01	2.71
82	4.24	2.64	1.60	38	2.39	0.55	0.54	-0.01	2.76
83	3.90	2.46	1.44	37	2.18	0.54	0.53	-0.01	2.61
84	4.06	2.52	1.54	38	2.24	0.51	0.51	0.00	2.77
85	4.01	2.42	1.59	40	2.13	0.51	0.50	-0.01	2.90
86	3.94	2.36	1.58	40	2.14	0.52	0.52	0.00	2.45
87	4.08	2.54	1.55	38	2.28	0.52	0.51	-0.01	2.64
88	4.02	2.47	1.55	39	2.23	0.51	0.51	0.00	2.61
89	4.10	2.51	1.58	39	2.24	0.54	0.54	0.00	2.68
90	4.05	2.45	1.61	40	2.21	0.57	0.57	0.00	2.55
91	4.03	2.48	1.55	39	2.21	0.55	0.54	-0.01	2.65
92	4.02	2.43	1.58	39	2.22	0.49	0.49	0.00	2.77
93	4.05	2.55	1.50	37	2.32	0.52	0.52	0.00	2.68
94	4.15	2.56	1.59	38	2.32	0.53	0.53	0.00	2.71
95	4.06	2.47	1.58	39	2.22	0.52	0.52	0.00	2.74
96	4.09	2.42	1.67	41	2.17	0.53	0.53	0.00	2.74
97	3.95	2.52	1.44	36	2.25	0.52	0.52	0.00	2.63
98	3.96	2.50	1.46	37	2.18	0.59	0.59	0.00	3.09
99	4.10	2.55	1.54	38	2.25	0.53	0.53	0.00	2.94
100	4.11	2.52	1.59	39	2.24	0.53	0.53	0.00	2.82
101	4.08	2.55	1.54	38	2.27	0.55	0.55	0.00	2.86
102	4.07	2.45	1.62	40	2.21	0.56	0.56	0.00	2.63
103	3.94	2.32	1.62	41	2.08	0.51	0.51	0.00	2.43
104	3.99	2.42	1.57	39	2.12	0.51	0.51	0.00	2.62
105	4.19	2.53	1.66	40	2.28	0.54	0.53	-0.01	2.60
106	3.96	2.44	1.52	38	2.13	0.53	0.52	-0.01	2.94
107	4.03	2.39	1.64	41	2.17	0.52	0.52	0.00	2.42
108	3.90	2.26	1.64	42	2.04	0.47	0.47	0.00	2.32
109	4.09	2.38	1.71	42	2.13	0.53	0.53	0.00	2.45
110	4.13	2.54	1.58	38	2.29	0.52	0.51	-0.01	2.64
Maxi	4.31	2.66	1.75	46	2.39	0.63	0.63	0.00	3.17
Mini	3.59	1.96	1.30	33	1.75	0.40	0.40	-0.01	2.01
Average	4.00	2.43	1.57	39	2.16	0.52	0.52	0.00	2.63
Std dev	0.14	0.15	0.08	2	0.15	0.04	0.03	0.00	0.23
Mini (SPEC)	2.6		0.80		1.00	0.30	0.30	-0.05	
Max (SPEC)	4.4					0.70	0.70	0.05	
Cp	2.14					1.89	1.91		
CpK	0.96		3.37		2.65	1.66	1.69		
M.O.K	90					90	90	90	
% M.O.K	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	
Tested parts	90								
Number of non-conform parts	0								
% of non-conform parts	0,0%								

Comments



LABORATORY
QUALIFICATION REPORT

Report N° : 1256-07C
Date : 31-oct-07
Page : 7/23

TEST GROUP :	2	TEST NAME :	Soldering
MEASUREMENT	Mechanical characteristics	After	2 soldering process

[Browse](#)

Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) W	Bounces ms
11	11,00	Pass	1,E+11	0,00
12	12,00	Pass	1,E+11	0,00
13	13,00	Pass	1,E+11	0,00
14	12,00	Pass	1,E+11	0,00
15	12,00	Pass	1,E+11	0,00
16	12,00	Pass	1,E+11	0,00
17	12,00	Pass	1,E+11	0,00
18	11,00	Pass	1,E+11	0,00
19	12,00	Pass	1,E+11	0,00
20	11,00	Pass	1,E+11	0,00
21	12,00	Pass	1,E+11	0,00
22	13,00	Pass	1,E+11	0,00
23	13,00	Pass	1,E+11	0,00
24	12,00	Pass	1,E+11	0,00
25	14,00	Pass	1,E+11	0,00
26	12,00	Pass	1,E+11	0,00
27	12,00	Pass	1,E+11	0,00
28	12,00	Pass	1,E+11	0,00
29	12,00	Pass	1,E+11	0,00
30	13,00	Pass	1,E+11	0,00
31	12,00	Pass	1,E+11	0,00
32	12,00	Pass	1,E+11	0,00
33	12,00	Pass	1,E+11	0,00
34	12,00	Pass	1,E+11	0,00
35	13,00	Pass	1,E+11	0,00
36	12,00	Pass	1,E+11	0,00
37	11,00	Pass	1,E+11	0,00
38	12,00	Pass	1,E+11	0,00
39	11,00	Pass	1,E+11	0,00
40	13,00	Pass	1,E+11	0,00
41	13,00	Pass	1,E+11	0,00
42	12,00	Pass	1,E+11	0,00
43	13,00	Pass	1,E+11	0,00
44	13,00	Pass	1,E+11	0,00
45	14,00	Pass	1,E+11	0,00
46	13,00	Pass	1,E+11	0,00
47	14,00	Pass	1,E+11	0,00
48	14,00	Pass	1,E+11	0,00
49	13,00	Pass	1,E+11	0,00
50	11,00	Pass	1,E+11	0,00
51	18,00	Pass	1,E+11	0,00
52	19,00	Pass	1,E+11	0,00
53	18,00	Pass	1,E+11	0,00
54	19,00	Pass	1,E+11	0,00
55	19,00	Pass	1,E+11	0,00
56	19,00	Pass	1,E+11	0,00
57	18,00	Pass	1,E+11	0,00
58	19,00	Pass	1,E+11	0,00
59	19,00	Pass	1,E+11	0,00
60	19,00	Pass	1,E+11	0,00
71	13,00	Pass	1,E+11	0,00
72	13,00	Pass	1,E+11	0,00
73	12,00	Pass	1,E+11	0,00
74	11,00	Pass	1,E+11	0,00
75	12,00	Pass	1,E+11	0,00
76	12,00	Pass	1,E+11	0,00
77	13,00	Pass	1,E+11	0,00
78	13,00	Pass	1,E+11	0,00
79	13,00	Pass	1,E+11	0,00
80	13,00	Pass	1,E+11	0,00
81	14,00	Pass	1,E+11	0,00
82	11,00	Pass	1,E+11	0,00
83	13,00	Pass	1,E+11	0,00
84	12,00	Pass	1,E+11	0,00
85	11,00	Pass	1,E+11	0,00
86	12,00	Pass	1,E+11	0,00
87	12,00	Pass	1,E+11	0,00
88	12,00	Pass	1,E+11	0,00
89	12,00	Pass	1,E+11	0,00
90	12,00	Pass	1,E+11	0,00
91	12,00	Pass	1,E+11	0,00
92	12,00	Pass	1,E+11	0,00
93	11,00	Pass	1,E+11	0,00
94	12,00	Pass	1,E+11	0,00
95	12,00	Pass	1,E+11	0,00
96	12,00	Pass	1,E+11	0,00
97	14,00	Pass	1,E+11	0,00
98	12,00	Pass	1,E+11	0,00
99	12,00	Pass	1,E+11	0,00
100	12,00	Pass	1,E+11	0,00
101	12,00	Pass	1,E+11	0,00
102	13,00	Pass	1,E+11	0,00
103	12,00	Pass	1,E+11	0,00
104	13,00	Pass	1,E+11	0,00
105	12,00	Pass	1,E+11	0,00
106	12,00	Pass	1,E+11	0,00
107	12,00	Pass	1,E+11	0,00
108	12,00	Pass	1,E+11	0,00
109	13,00	Pass	1,E+11	0,00
110	13,00	Pass	1,E+11	0,00
Maxi	19,00	0,00	1,E+11	0,00
Mini	11,00	0,00	1,E+11	0,00
Average	13,01	#DIV/0!	1,E+11	0,00
Std dev	2,16	#DIV/0!	0	0,00
Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00
Cp	7,72			
Cpk	2,01	#DIV/0!		#DIV/0!
M OK				
% M OK				
M N OK				
% M N OK				

Tested parts	90	Number of non-conform parts	0
		% of non-conform parts	0,0%

Comments



LABORATORY

QUALIFICATION REPORT

Report N° : **1256-07C**

Date : **31-oct.-07**

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TEST GROUP :	3	TEST NAME :	Life test
MEASUREMENT	Mechanical characteristics	After	Life test 300 000 cycles

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Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
21	3,82	2,35	1,47	39	2,05	0,49	0,49	0,00	2,56
22	3,76	2,32	1,44	38	2,02	0,54	0,54	0,00	2,85
23	3,93	2,46	1,47	37	2,12	0,52	0,52	0,00	2,89
24	3,89	2,47	1,41	36	2,15	0,49	0,49	0,00	2,65
25	3,98	2,54	1,44	36	2,27	0,53	0,53	0,00	2,60
26	3,94	2,48	1,46	37	2,14	0,51	0,50	-0,01	2,94
27	4,05	2,38	1,67	41	2,13	0,52	0,52	0,00	2,71
28	3,68	2,06	1,62	44	1,66	0,48	0,48	0,00	2,13
29	3,98	2,41	1,57	40	2,06	0,51	0,51	0,00	3,10
30	3,93	2,48	1,45	37	2,05	0,51	0,51	0,00	3,10
31	3,80	2,31	1,48	39	2,07	0,51	0,51	0,00	2,50
32	3,91	2,39	1,52	39	2,07	0,51	0,50	-0,01	2,39
33	3,78	2,25	1,53	40	1,95	0,48	0,48	0,00	2,59
34	3,83	2,29	1,54	40	1,99	0,48	0,48	0,00	2,75
35	3,83	2,20	1,62	42	1,95	0,49	0,48	-0,01	2,33
36	3,94	2,37	1,58	40	2,14	0,49	0,48	-0,01	2,49
37	4,04	2,46	1,57	39	2,22	0,50	0,49	-0,01	2,68
38	3,80	2,29	1,51	40	2,02	0,49	0,49	0,00	2,45
39	3,77	2,17	1,61	43	1,86	0,46	0,46	0,00	2,51
40	3,86	2,21	1,65	43	1,95	0,50	0,50	0,00	2,23
41	3,89	2,43	1,46	38	2,11	0,52	0,52	0,00	2,56
42	4,08	2,49	1,60	39	2,23	0,52	0,52	0,00	2,54
43	3,71	2,28	1,43	39	1,91	0,47	0,46	-0,01	2,85
44	3,99	2,43	1,56	39	2,19	0,51	0,50	-0,01	2,74
45	3,93	2,37	1,57	40	2,12	0,51	0,50	-0,01	2,42
46	3,85	2,31	1,53	40	2,04	0,49	0,49	0,00	2,42
47	3,89	2,31	1,58	41	2,02	0,49	0,48	-0,01	2,65
48	3,85	2,26	1,59	41	1,98	0,49	0,49	0,00	2,41
49	3,83	2,14	1,69	44	1,88	0,46	0,46	0,00	2,38
50	4,00	2,38	1,62	41	1,98	0,49	0,49	0,00	2,98
Maxi	4,08	2,54	1,69	44	2,27	0,54	0,54	0,00	3,10
Mini	3,68	2,06	1,41	36	1,66	0,46	0,46	-0,01	2,13
Average	3,88	2,34	1,54	40	2,04	0,50	0,50	0,00	2,61
Std dev	0,10	0,12	0,08	2	0,13	0,02	0,02	0,00	0,24

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05	
Max (SPEC)	4,4					0,70	0,70	0,05	

Cp	3,01					3,43	3,31		
CpK	1,72		3,20		2,77	3,41	3,24		

M.OK	30					30	30	30	
% M.OK	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	

Tested parts	30	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

**LABORATORY****QUALIFICATION REPORT**Report N° : **1256-07C**Date : **31-oct-07**Page : **9/23**

TEST GROUP :	3	TEST NAME :	Life test
MEASUREMENT	Mechanical characteristics	After	Life test 300 000 cycles

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
21	14,00	Pass	1,E+11	0,00
22	12,00	Pass	1,E+11	0,00
23	13,00	Pass	1,E+11	0,00
24	13,00	Pass	1,E+11	0,00
25	13,00	Pass	1,E+11	0,00
26	11,00	Pass	1,E+11	0,00
27	12,00	Pass	1,E+11	0,00
28	12,00	Pass	1,E+11	0,00
29	13,00	Pass	1,E+11	0,00
30	13,00	Pass	1,E+11	0,00
31	14,00	Pass	1,E+11	0,00
32	13,00	Pass	1,E+11	0,00
33	11,00	Pass	1,E+11	0,00
34	12,00	Pass	1,E+11	0,00
35	13,00	Pass	1,E+11	0,00
36	13,00	Pass	1,E+11	0,00
37	14,00	Pass	1,E+11	0,00
38	12,00	Pass	1,E+11	0,00
39	12,00	Pass	1,E+11	0,00
40	13,00	Pass	1,E+11	0,00
41	12,00	Pass	1,E+11	0,00
42	13,00	Pass	1,E+11	0,00
43	13,00	Pass	1,E+11	0,00
44	13,00	Pass	1,E+11	0,00
45	14,00	Pass	1,E+11	0,00
46	14,00	Pass	1,E+11	0,00
47	12,00	Pass	1,E+11	0,00
48	14,00	Pass	1,E+11	0,00
49	12,00	Pass	1,E+11	0,00
50	12,00	Pass	1,E+11	0,00
Maxi	14,00	0,00	1,E+11	0,00
Mini	11,00	0,00	1,E+11	0,00
Average	12,73	#DIV/0!	1,E+11	0,00
Std dev	0,87	#DIV/0!	0	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	19,19			
CpK	4,89	#DIV/0!		#DIV/0!

M.OK				
% M.OK				
M.N-OK				
% M.N-OK				

Tested parts	30	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments



LABORATORY

QUALIFICATION REPORT

Report N° : 1256-07C

Date : 31-oct-07

Page : 10/23

TEST GROUP :	4	TEST NAME :	Vibration
MEASUREMENT	Mechanical characteristics	After	sinusoïdal vibrations and mechanical shocks

Browse

Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
51	3,55	1,99	1,56	44	1,68	0,50	0,50	0,00	2,03
52	3,62	2,08	1,54	43	1,68	0,54	0,55	0,01	2,09
53	3,61	1,89	1,71	48	1,71	0,52	0,51	-0,01	2,02
54	3,71	1,98	1,73	47	1,75	0,56	0,56	0,00	2,07
55	3,62	1,90	1,72	48	1,69	0,53	0,53	0,00	1,93
56	3,67	2,01	1,66	45	1,72	0,53	0,53	0,00	2,09
57	3,64	2,05	1,59	44	1,75	0,50	0,49	-0,01	2,43
58	3,59	1,94	1,66	46	1,72	0,52	0,52	0,00	2,05
59	3,69	2,08	1,60	44	1,76	0,56	0,56	0,00	2,73
60	3,62	1,92	1,71	47	1,70	0,50	0,49	-0,01	2,16
Maxi	3,71	2,08	1,73	48	1,76	0,56	0,56	0,01	2,73
Mini	3,55	1,89	1,54	43	1,68	0,50	0,49	-0,01	1,93
Average	3,63	1,98	1,65	45	1,72	0,53	0,52	0,00	2,16
Std dev	0,05	0,07	0,07	2	0,03	0,02	0,03	0,01	0,24
Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05	
Max (SPEC)	4,4					0,70	0,70	0,05	
Cp	6,31					2,94	2,49		
CpK	5,38		4,00		8,09	2,55	2,19		
M.OK	10					10	10	10	
% M.OK	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	
Tested parts	10	Number of non-conform parts		0	% of non-conform parts		0,0%		

Comments

**LABORATORY****QUALIFICATION REPORT**Report N° : **1256-07C**Date : **31-oct.-07**Page : **11/23**

TEST GROUP :	4	TEST NAME :	Vibration
MEASUREMENT	Mechanical characteristics	After	sinusoidal vibrations and mechanical shocks

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
51	15,00	Pass	1,E+11	0,00
52	16,00	Pass	1,E+11	0,00
53	15,00	Pass	1,E+11	0,00
54	15,00	Pass	1,E+11	0,00
55	14,00	Pass	1,E+11	0,00
56	16,00	Pass	1,E+11	0,00
57	14,00	Pass	1,E+11	0,00
58	15,00	Pass	1,E+11	0,00
59	14,00	Pass	1,E+11	0,00
60	15,00	Pass	1,E+11	0,00
Maxi	16,00	0,00	1,E+11	0,00
Mini	14,00	0,00	1,E+11	0,00
Average	14,90		1,E+11	0,00
Std dev	0,74		0	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	22,59			
CpK	6,73			

M.OK				
% M.OK				
M.N-OK				
% M.N-OK				

Tested parts	10	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments

**LABORATORY****QUALIFICATION REPORT**Report N° : **1256-07C**Date : **31-oct.-07**Page : **12/23**

TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	dry heat 4 days at 85°C

[Browse](#)

Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm
81	3,91	2,52	1,39	36	2,30	0,50	0,50	0,00
82	4,15	2,65	1,50	36	2,40	0,53	0,52	-0,01
83	3,92	2,39	1,53	39	2,15	0,49	0,49	0,00
84	4,05	2,51	1,54	38	2,26	0,49	0,49	-0,01
85	3,96	2,42	1,54	39	2,08	0,49	0,48	-0,01
86	4,05	2,53	1,53	38	2,26	0,48	0,48	0,00
87	4,08	2,61	1,48	36	2,37	0,53	0,53	-0,01
88	3,96	2,44	1,52	38	2,14	0,50	0,49	-0,01
89	3,99	2,51	1,49	37	2,27	0,54	0,54	0,00
90	4,03	2,51	1,52	38	2,26	0,50	0,50	-0,01
Maxi	4,15	2,65	1,54	39	2,40	0,54	0,54	0,00
Mini	3,91	2,39	1,39	36	2,08	0,48	0,48	-0,01
Average	4,01	2,51	1,50	37	2,25	0,51	0,50	-0,01
Std dev	0,08	0,08	0,05	1	0,10	0,02	0,02	0,00

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05
Max (SPEC)	4,4					0,70	0,70	0,05

Cp	3,96					3,37	3,37	
CpK	1,72		5,21		4,14	3,27	3,36	

M.OK	10					10	10	10
% M.OK	100%					100%	100%	100%
M.N-OK	0					0	0	0
% M.N-OK	0%					0%	0%	0%

Tested parts	10	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

**LABORATORY****QUALIFICATION REPORT**Report N° : **1256-07C**Date : **31-oct-07**Page : **13/23**

TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	dry heat 4 days at 85°C

[Browse](#)

Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
81	12,00	Pass	1,E+11	0,00
82	12,00	Pass	1,E+11	0,00
83	11,00	Pass	1,E+11	0,00
84	12,00	Pass	1,E+11	0,00
85	12,00	Pass	1,E+11	0,00
86	12,00	Pass	1,E+11	0,00
87	11,00	Pass	1,E+11	0,00
88	11,00	Pass	1,E+11	0,00
89	11,00	Pass	1,E+11	0,00
90	12,00	Pass	1,E+11	0,00
Maxi	12,00	0,00	1,E+11	0,00
Mini	11,00	0,00	1,E+11	0,00
Average	11,60		1,E+11	0,00
Std dev	0,52		0,00	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	32,27			
CpK	7,49			

M.OK				
% M.OK				
M.N-OK				
% M.N-OK				

Tested parts	10	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments

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TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	cold 4 days at -40°C

[Browse](#)

Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm
91	3,96	2,45	1,51	38	2,15	0,52	0,51	-0,01
92	3,99	2,48	1,51	38	2,18	0,50	0,49	-0,01
93	4,00	2,58	1,41	35	2,29	0,52	0,51	-0,01
94	3,83	2,35	1,48	39	2,06	0,42	0,41	-0,01
95	3,92	2,49	1,44	37	2,22	0,51	0,51	-0,01
96	3,95	2,42	1,53	39	2,12	0,51	0,50	-0,01
97	3,92	2,36	1,56	40	2,08	0,48	0,48	0,00
98	3,99	2,39	1,59	40	2,08	0,51	0,50	-0,01
99	4,07	2,59	1,48	36	2,29	0,52	0,52	-0,01
100	4,07	2,56	1,51	37	2,16	0,53	0,52	-0,01
Maxi	4,07	2,59	1,59	40	2,29	0,53	0,52	0,00
Mini	3,83	2,35	1,41	35	2,06	0,42	0,41	-0,01
Average	3,97	2,47	1,50	38	2,16	0,50	0,50	-0,01
Std dev	0,07	0,09	0,05	2	0,08	0,03	0,03	0,00

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05
Max (SPEC)	4,4					0,70	0,70	0,05

Cp	4,16					2,00	2,04	
CpK	1,99		4,41		4,66	1,97	2,00	

M.OK	10					10	10	10
% M.OK	100%					100%	100%	100%
M.N-OK	0					0	0	0
% M.N-OK	0%					0%	0%	0%

Tested parts	10	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

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TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	cold 4 days at -40°C

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
91	11,00	Pass	1,E+11	0,00
92	13,00	Pass	1,E+11	0,00
93	11,00	Pass	1,E+11	0,00
94	12,00	Pass	1,E+11	0,00
95	13,00	Pass	1,E+11	0,00
96	12,00	Pass	1,E+11	0,00
97	13,00	Pass	1,E+11	0,00
98	11,00	Pass	1,E+11	0,00
99	11,00	Pass	1,E+11	0,00
100	13,00	Pass	1,E+11	0,00
Maxi	13,00	0,00	1,E+11	0,00
Mini	11,00	0,00	1,E+11	0,00
Average	12,00		1,E+11	0,00
Std dev	0,94		0	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	17,68			
CpK	4,24			

M.OK	10	0	0	10
% M.OK	100%			100%
M.N-OK	0	10	10	0
% M.N-OK	0%		100%	0%

Tested parts	30	Number of non-conform parts	10
		% of non-conform parts	100,0%

Comments

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TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	humidity storage 6 days at 55°C/93%

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Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
101	4,12	2,53	1,59	39	2,26	0,53	0,53	0,00	2,67
102	3,99	2,45	1,54	39	2,19	0,51	0,51	0,00	2,68
103	3,91	2,34	1,57	40	2,10	0,50	0,50	0,00	2,43
104	3,92	2,41	1,51	39	2,18	0,49	0,49	0,00	2,47
105	4,19	2,63	1,56	37	2,29	0,54	0,53	-0,01	2,78
106	3,95	2,37	1,58	40	2,10	0,52	0,52	0,00	2,43
107	3,86	2,45	1,41	37	2,18	0,54	0,54	0,00	2,53
108	3,85	2,30	1,54	40	2,07	0,49	0,49	0,00	2,30
109	3,98	2,28	1,70	43	2,00	0,49	0,49	0,00	2,36
110	3,97	2,41	1,56	39	2,18	0,51	0,51	0,00	2,48
Maxi	4,19	2,63	1,70	43	2,29	0,54	0,54	0,00	2,78
Mini	3,85	2,28	1,41	37	2,00	0,49	0,49	-0,01	2,30
Average	3,97	2,42	1,56	39	2,16	0,51	0,51	0,00	2,51
Std dev	0,11	0,11	0,07	2	0,09	0,02	0,02	0,00	0,15

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05	
Max (SPEC)	4,4					0,70	0,70	0,05	

Cp	2,79					3,35	3,60		
CpK	1,32		3,50		4,38	3,15	3,40		

M.OK	10					10	10	10	
% M.OK	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	

Tested parts	10	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

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TEST GROUP :	5	TEST NAME :	5,2 Environmental test
MEASUREMENT	Mechanical characteristics	After	humidity storage 6 days at 55°C/93%

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
101	11,00	Pass	1,E+11	0,00
102	12,00	Pass	1,E+11	0,00
103	12,00	Pass	1,E+11	0,00
104	12,00	Pass	1,E+11	0,00
105	12,00	Pass	1,E+11	0,00
106	11,00	Pass	1,E+11	0,00
107	13,00	Pass	1,E+11	0,00
108	11,00	Pass	1,E+11	0,00
109	14,00	Pass	1,E+11	0,00
110	12,00	Pass	1,E+11	0,00
Maxi	14,00	0,00	1,E+11	0,00
Mini	11,00	0,00	1,E+11	0,00
Average	12,00		1,E+11	0,00
Std dev	0,94		0,00	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	17,68			
CpK	4,24			

M.OK				
% M.OK				
M.N-OK				
% M.N-OK				

Tested parts	10	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments

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TEST GROUP :	6,4	TEST NAME :	6,4 Robustness
MEASUREMENT	Mechanical characteristics	After	Shear test

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Sample N°	F N
1	159
2	151
3	129
4	128
5	165
6	143
7	130
8	134
9	137
10	148
11	110
12	122
13	111
14	90
15	96
16	90
17	90
18	111
19	88
20	115
Maxi	165,10
Mini	88,10
Average	122,32
Std dev	23,97

Mini (SPEC) 50

Max (SPEC)

Cp

CpK

M.OK

% M.OK

M.N-OK

% M.N-OK

Tested parts	30	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments



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TEST GROUP :	6,10	TEST NAME :	6,10 Robustness
MEASUREMENT	Mechanical characteristics	After	Dust test

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Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
111	3,61	1,86	1,75	49	1,47	0,41	0,41	0,00	3,18
112	3,61	1,95	1,66	46	1,44	0,39	0,38	-0,01	3,22
113	3,58	1,91	1,67	47	1,40	0,38	0,37	-0,01	2,80
114	3,60	1,98	1,62	45	1,47	0,43	0,42	-0,01	2,89
115	3,52	1,97	1,55	44	1,43	0,40	0,39	-0,01	3,06
116	3,51	1,81	1,69	48	1,43	0,34	0,34	0,00	2,67
117	3,61	2,05	1,57	43	1,58	0,43	0,43	0,00	2,86
118	3,63	1,88	1,76	48	1,48	0,42	0,42	0,00	3,04
119	3,52	1,91	1,61	46	1,35	0,37	0,36	-0,01	2,84
120	3,69	2,11	1,58	43	1,62	0,41	0,40	-0,01	3,03
121	3,63	1,96	1,67	46	1,49	0,41	0,41	0,00	2,95
122	3,41	1,77	1,64	48	1,28	0,39	0,38	-0,01	3,07
123	3,52	1,66	1,86	53	1,37	0,36	0,36	0,00	2,45
124	3,64	1,99	1,65	45	1,55	0,43	0,42	-0,01	3,05
125	3,59	1,94	1,64	46	1,26	0,37	0,37	0,00	2,94
126	3,66	1,99	1,66	46	1,40	0,42	0,41	-0,01	3,24
127	3,71	1,97	1,74	47	1,55	0,42	0,42	0,00	2,74
128	3,66	2,10	1,56	43	1,45	0,42	0,41	-0,01	3,32
129	3,63	1,96	1,67	46	1,52	0,46	0,46	0,00	2,74
130	3,62	1,82	1,80	50	1,44	0,41	0,41	0,00	3,08
Maxi	3,71	2,11	1,86	53	1,62	0,46	0,46	0,00	3,32
Mini	3,41	1,66	1,55	43	1,26	0,34	0,34	-0,01	2,45
Average	3,60	1,93	1,67	46	1,45	0,40	0,40	-0,01	2,96
Std dev	0,07	0,11	0,08	2	0,09	0,03	0,03	0,01	0,21

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05	
Max (SPEC)	4,4					0,70	0,70	0,05	

Cp	4,22					2,32	2,29		
CpK	3,76		3,55		1,62	1,20	1,13		

M.OK	20					20	20	20	
% M.OK	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	

Tested parts	20	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

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TEST GROUP :	6,10	TEST NAME :	6,10 Robustness
MEASUREMENT	Mechanical characteristics	After	Dust test

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
111	12,00	Pass	1,E+11	0,00
112	13,00	Pass	1,E+11	0,00
113	14,00	Pass	1,E+11	0,00
114	13,00	Pass	1,E+11	0,00
115	15,00	Pass	1,E+11	0,00
116	13,00	Pass	1,E+11	0,00
117	13,00	Pass	1,E+11	0,00
118	14,00	Pass	1,E+11	0,00
119	15,00	Pass	1,E+11	0,00
120	14,00	Pass	1,E+11	0,00
121	14,00	Pass	1,E+11	0,00
122	12,00	Pass	1,E+11	0,00
123	13,00	Pass	1,E+11	0,00
124	15,00	Pass	1,E+11	0,00
125	13,00	Pass	1,E+11	0,00
126	14,00	Pass	1,E+11	0,00
127	14,00	Pass	1,E+11	0,00
128	14,00	Pass	1,E+11	0,00
129	16,00	Pass	1,E+11	0,00
130	15,00	Pass	1,E+11	0,00
Maxi	16,00	0,00	1,E+11	0,00
Mini	12,00	0,00	1,E+11	0,00
Average	13,80		1,E+11	0,00
Std dev	1,06		0	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

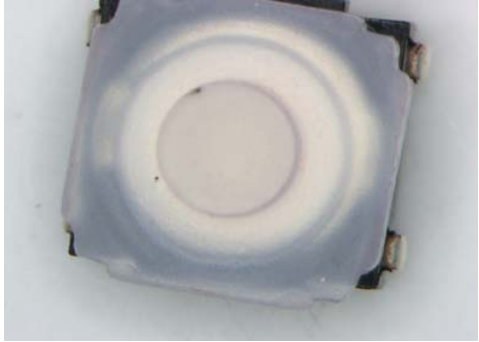
Cp	15,78			
CpK	4,35			


M.OK				
% M.OK				
M.N-OK				
% M.N-OK				


Tested parts	20	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments

TEST GROUP :	0 and 2	TEST NAME :	IP 67
MEASUREMENT	Mechanical characteristics	After	immersion

Picture N°	Magnification	Sample N°
		
Title : Immersion test		
Comment :		
No penetration of colored water		

Picture N°	Magnification	Sample N°
		
Title : Immersion test		
Comment :		
No penetration of colored water		

Picture N°	Magnification	Sample N°
		
Title : Immersion test		
Comment :		
No penetration of colored water		

Conclusion :



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TEST GROUP :	6,10	TEST NAME :	6,10 Robustness
MEASUREMENT	Mechanical characteristics	After	Dust test

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Sample N°	Fa N	Fra N	Fa-Fra N	Fa-Fra/Fa %	Frr N	Cm mm	Ce mm	Simul mm	F à Ce mm
6	3,54	1,94	1,60	45	1,36	0,35	0,34	-0,01	3,10
7	3,63	1,96	1,67	46	1,43	0,44	0,43	-0,01	3,26
8	3,54	1,83	1,71	48	1,45	0,38	0,38	0,00	2,97
9	3,63	1,97	1,66	46	1,46	0,42	0,41	-0,01	3,22
10	3,57	1,93	1,64	46	1,41	0,41	0,41	0,00	2,74
16	3,96	2,39	1,57	40	2,10	0,51	0,51	0,00	2,53
17	3,98	2,41	1,57	40	2,18	0,51	0,51	0,00	2,83
18	3,95	2,35	1,60	41	2,09	0,51	0,51	0,00	2,48
19	3,95	2,37	1,58	40	2,13	0,52	0,52	0,00	3,17
20	3,86	2,43	1,42	37	2,05	0,51	0,50	-0,01	2,95
66	3,60	2,16	1,44	40	1,52	0,45	0,44	-0,01	3,06
67	3,60	1,95	1,65	46	1,50	0,40	0,39	-0,01	3,12
68	3,56	2,00	1,56	44	1,61	0,39	0,38	-0,01	3,00
69	3,66	2,07	1,59	43	1,59	0,39	0,39	0,00	2,89
70	3,43	1,70	1,73	51	1,42	0,37	0,37	0,00	2,33
76	3,88	2,31	1,57	41	2,07	0,50	0,49	-0,01	2,65
77	3,88	2,32	1,56	40	1,95	0,51	0,51	0,00	2,90
78	3,83	2,30	1,53	40	2,11	0,49	0,49	0,00	2,43
79	3,93	2,46	1,47	38	2,20	0,52	0,52	0,00	2,47
80	3,79	2,34	1,46	38	2,10	0,54	0,54	0,00	2,49
Maxi	3,98	2,46	1,73	51	2,20	0,54	0,54	0,00	3,26
Mini	3,43	1,70	1,42	37	1,36	0,35	0,34	-0,01	2,33
Average	3,74	2,16	1,58	42	1,79	0,46	0,45	0,00	2,83
Std dev	0,18	0,23	0,09	4	0,33	0,06	0,06	0,01	0,29

Mini (SPEC)	2,6		0,80		1,00	0,30	0,30	-0,05	
Max (SPEC)	4,4					0,70	0,70	0,05	

Cp	1,69					1,08	1,05		
CpK	1,24		3,04		0,80	0,84	0,80		

M.OK	20					20	20	20	
% M.OK	100%					100%	100%	100%	
M.N-OK	0					0	0	0	
% M.N-OK	0%					0%	0%	0%	

Tested parts	40	Number of non-conform parts	0	% of non-conform parts	0,0%
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Comments

**LABORATORY****QUALIFICATION REPORT**Report N° : **1256-07C**Date : **31-oct.-07**Page : **23/23**

TEST GROUP :	6,10	TEST NAME :	6,10 Robustness
MEASUREMENT	Mechanical characteristics	After	Dust test

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Sample N°	Rc mW	Voltage Proof at 250V	Ri (100V) MW	Bounces ms
6	13,00	Pass	1,E+11	0,00
7	13,00	Pass	1,E+11	0,00
8	14,00	Pass	1,E+11	0,00
9	13,00	Pass	1,E+11	0,00
10	14,00	Pass	1,E+11	0,00
16	14,00	Pass	1,E+11	0,00
17	14,00	Pass	1,E+11	0,00
18	13,00	Pass	1,E+11	0,00
19	15,00	Pass	1,E+11	0,00
20	16,00	Pass	1,E+11	0,00
66	13,00	Pass	1,E+11	0,00
67	14,00	Pass	1,E+11	0,00
68	16,00	Pass	1,E+11	0,00
69	14,00	Pass	1,E+11	0,00
70	14,00	Pass	1,E+11	0,00
76	13,00	Pass	1,E+11	0,00
77	14,00	Pass	1,E+11	0,00
78	15,00	Pass	1,E+11	0,00
79	13,00	Pass	1,E+11	0,00
80	14,00	Pass	1,E+11	0,00
Maxi	16,00	0,00	1,E+11	0,00
Mini	13,00	0,00	1,E+11	0,00
Average	13,95		1,E+11	0,00
Std dev	0,94		0	0,00

Mini (SPEC)			1,E+06	
Max (SPEC)	100			1,00

Cp	17,65			
CpK	4,92			

M.OK				
% M.OK				
M.N-OK				
% M.N-OK				

Tested parts	30	Number of non-conform parts	0
		% of non-conform parts	100,0%

Comments