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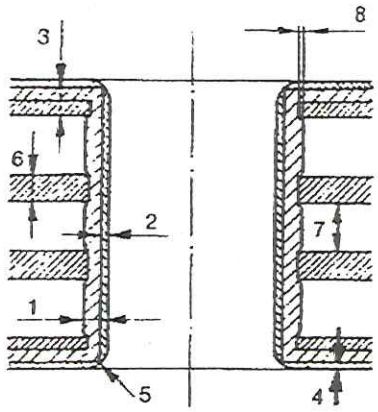
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-2A-2B-2C-2D

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	36	42	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	16	26	
3. Cu on surface pattern	78	80	
4. Sn/Pb on surface pattern	14	16	
5. Sn/Pb in angle area	6	8	
6. Cu on internal layers	66	-	
7. Insulation distance	180	-	
8. Chemical cleaning	∝	-	
9. Misregistration	-	∝	

Visual and dimensional inspection

Examination of base laminate	∝	External dimensions	∝
Examination of conductive pattern	∝	Dimension of holes	∝

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	∝
Bond strength ≥6,37 N/mm²	∝	Current Carrying Capacity 10A 4 sec	∝
Peel strength 17,64 N/cm	∝	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235°C, 5SEC.	∝
Intra layer > 10.000 Mohm / 500V DC	∝	Termal Stress 5× 288° C, 10SEC.	∝
Inter layer >100.000 Mohm / 500V DC	∝	Rework simulation test	∝
Bow and twist	∝	Flexible test	-
		Electrical test	∝

Remarks **Drying prior to processing is mandatory. See www.printca.dk for details**

See attachment

Certificate of conformance

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Inspected QC	**Approved PA**
Date 07-04-2014 Q2	Date 07-04-2014 Ulla Andisen

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BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

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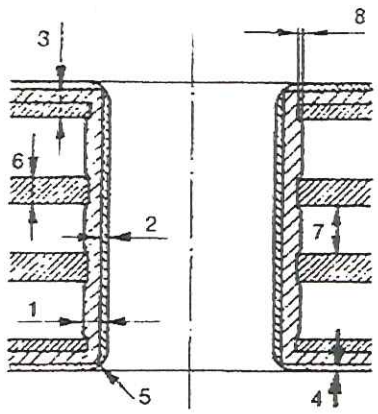
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-3A-3B-3C-3D

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	46	54	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	14	22	
3. Cu on surface pattern	76	78	
4. Sn/Pb on surface pattern	16	18	
5. Sn/Pb in angle area	6	8	
6. Cu on internal layers	66	-	
7. Insulation distance	174	-	
8. Chemical cleaning	∝	-	
9. Misregistration	-	∝	

Visual and dimensional inspection

Examination of base laminate	∝	External dimensions	∝
Examination of conductive pattern	∝	Dimension of holes	∝

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	∝
Bond strength ≥6,37 N/mm²	∝	Current Carrying Capacity 10A 4 sec	∝
Peel strength 16,39 N/cm	∝	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° C, 5 SEC.	∝
Intra layer > 10.000 Mohm / 500V DC	∝	Termal Stress 5 × 288° C, 10 SEC.	∝
Inter layer >100.000 Mohm / 500V DC	∝	Rework simulation test	∝
Bow and twist	∝	Flexible test	-
		Electrical test	∝

Remarks **Drying prior to processing is mandatory. See www.printca.dk for details**

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Inspected QC	**Approved PA**
Date 07-04-2014 Q2	Date 07-04-2014 Ulla Andersen

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BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

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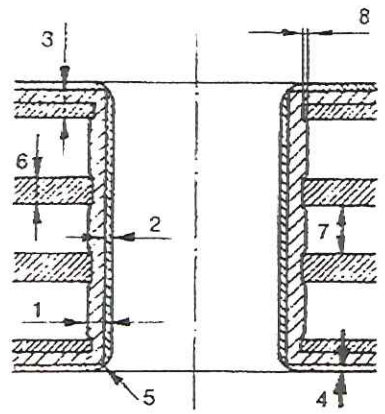
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-4A-4B-4C-4D-4E-4F-4G-4H

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	38	52	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	16	24	
3. Cu on surface pattern	82	86	
4. Sn/Pb on surface pattern	14	16	
5. Sn/Pb in angle area	8	10	
6. Cu on internal layers	66	-	
7. Insulation distance	188	-	
8. Chemical cleaning	ok	-	
9. Misregistration	-	ok	

Visual and dimensional inspection

Examination of base laminate	* see note	External dimensions	ok
Examination of conductive pattern	ok	Dimension of holes	ok

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	ok
Bond strength ≥ 6,37 N/mm²	ok	Current Carrying Capacity 10A 4 sec	ok
Peel strength 17,28 N/cm	ok	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° C, 5SEC.	ok
Intra layer > 10.000 Mohm / 500V DC	ok	Termal Stress 3x 288° C, 10SEC.	ok
Inter layer >100.000 Mohm / 500V DC	ok	Rework simulation test	ok
Bow and twist	ok	Flexible test	-
		Electrical test	ok

Remarks **Drying prior to processing is mandatory. See www.printca.dk for details**

* See attachments.

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Inspected QC	**Approved PA**
Date '07 -04- 2014 Q2	Date '07 -04- 2014 Ulla Andersen

Attachment to Test report and Certificate of Conformance

File No:

Remarks: 2220-40004 A1

*Impurity in the base laminate. Not visible to the naked eye. Accepted according to Ref: 6.2.2-7b
Applies to PCB No: 4A

BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

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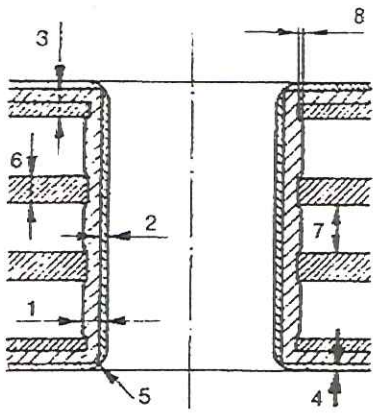
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-SA-SB-SC-SD-SE-SF-SG-SH

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	46	58	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	20	24	
3. Cu on surface pattern	90	96	
4. Sn/Pb on surface pattern	10	12	
5. Sn/Pb in angle area	6	10	
6. Cu on internal layers	66	-	
7. Insulation distance	194	-	
8. Chemical cleaning	ok	-	
9. Misregistration	-	ok	

Visual and dimensional inspection

Examination of base laminate	ok	External dimensions	ok
Examination of conductive pattern	ok	Dimension of holes	ok

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	ok
Bond strength ≥6,37 N/mm²	ok	Current Carrying Capacity 10A 4 sec	ok
Peel strength 16,21 N/cm	ok	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° C, 5SEC.	ok
Intra layer > 10.000 Mohm / 500V DC	ok	Termal Stress 5 x 288° C, 10SEC.	ok
Inter layer >100.000 Mohm / 500V DC	ok	Rework simulation test	ok
Bow and twist	ok	Flexible test	-
		Electrical test	ok

Remarks **Drying prior to processing is mandatory. See www.printca.dk for details**

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Inspected QC Date 07-04-2014 Q2	**Approved PA** Date 07-04-2014 Ulla Andersen

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BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

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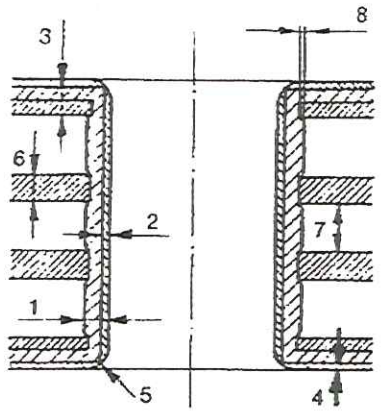
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-6A-6B-6C-6D-6E-6F-6G-6H

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	40	56	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	14	20	
3. Cu on surface pattern	80	88	
4. Sn/Pb on surface pattern	14	16	
5. Sn/Pb in angle area	6	8	
6. Cu on internal layers	66	-	
7. Insulation distance	186	-	
8. Chemical cleaning	∝	-	
9. Misregistration	-	∝	

Visual and dimensional inspection

Examination of base laminate	∝	External dimensions	∝
Examination of conductive pattern	∝	Dimension of holes	∝

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	∝
Bond strength ≥ 6,37 N/mm²	∝	Current Carrying Capacity 10A 4 sec	∝
Peel strength 16,39 N/cm	∝	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° C, 5SEC.	∝
Intra layer > 10.000 Mohm / 500V DC	∝	Termal Stress 5×288°C, 10SEC.	∝
Inter layer >100.000 Mohm / 500V DC	∝	Rework simulation test	∝
Bow and twist	∝	Flexible test	-
		Electrical test	∝

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Inspected QC	**Approved PA**
Date '87 -04- 2014 Q2	Date '87 -04- 2014 Ulla Andersen

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BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

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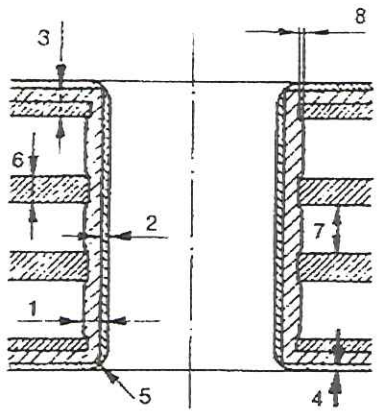
TESTREPORT and CERTIFICATE OF CONFORMANCE

Ref.spec.	ECSS-Q-ST-70-11C	**Order No.**	IN1-40506-1
Customer	NECAS	**Conf.No.**	44325
PCB No.	NANOPOWER-P31U-9	**File.No.**	40004A-1-1A-1B-1C-1D-1E-1F-1G-1H

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	40	50	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	8	24	
3. Cu on surface pattern	80	80	
4. Sn/Pb on surface pattern	6*	12	*Minor
5. Sn/Pb in angle area	4	8	
6. Cu on internal layers	66	-	
7. Insulation distance	184	-	
8. Chemical cleaning	ok	-	
9. Misregistration	-	ok	

Visual and dimensional inspection

Examination of base laminate	ok	External dimensions	ok
Examination of conductive pattern	ok	Dimension of holes	ok

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	ok
Bond strength ≥6,37 N/mm²	ok	Current Carrying Capacity 10A 4 sec	ok
Peel strength 16,39 N/cm	ok	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° C, 5SEC.	ok
Intra layer > 10.000 Mohm / 500V DC	ok	Termal Stress 5 × 288° C, 10SEC.	ok
Inter layer >100.000 Mohm / 500V DC	ok	Rework simulation test	ok
Bow and twist	ok	Flexible test	-
		Electrical test	ok

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Inspected QC	**Approved PA**
Date 07-04-2014 Q2	Date 07-04-2014 Jette Andersen

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BUILDUP-/MATERIAL REPORT

Customer	NECAS	**Order No.**	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	**Conf.No.**	44325
		File.No.	40004A-1

Laminate material

ThickA	ThickB	Type	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

Attachment to Test report and certificate of conformance

2220-40004 A1

The boards are compliant to requirements defined in ECSS-Q-ST-70-11-C and our PID 1.13 which was ESA approved from May 2013 to Feb. 2014.

Be aware that per *07-04-2014* we are not considered qualified by ESA to ECSS-Q-ST-70-10-C as maintenance qualification is pending.

Boards are further tested with increased stress criteria of 5xTS288 and RWS380 to screen for good PTH integrity.