Crystal Bridge to the Future

RoHS Compliant
Directive 2011/65/EU

REFERENCE SPECIFICATION

Customer:

Item:	Simple Packaged Crystal Oscillator (SPXO)
Type:	NZ2520SH
Nominal Frequency:	4 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	ERG5040A

For your reference we submit this specification.
Please study and keep in your related document file.

Revision Record

Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	29.Mar.2016	Issue	---	Y.Akasaka	T.Wada	C.Sakurai

1. Customer's Spec. No. : ---

2. NDK Spec. No. : ERG5040A

3. Type : NZ2520SH

4. Maximum Ratings

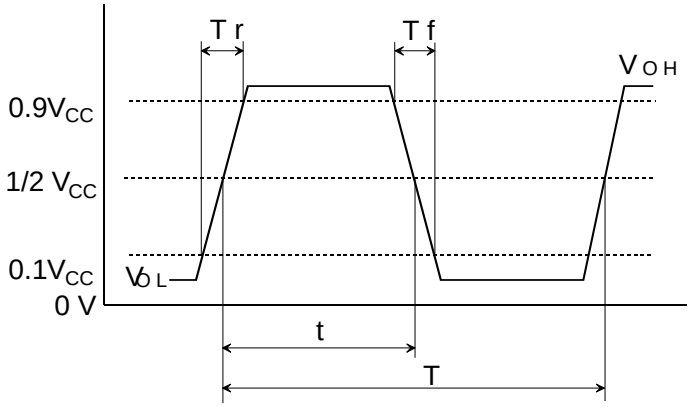
	Item	Ratings			Notes
		min	max	Units	
1	Supply Voltage	-0.3	4.0	V	
2	Storage Temperature Range	-55	+125	°C	

5. Electrical Specifications

(Unless otherwise noted, TA=-40 to +125 °C, V_{CC}=3.3 V, Load=15 pF)

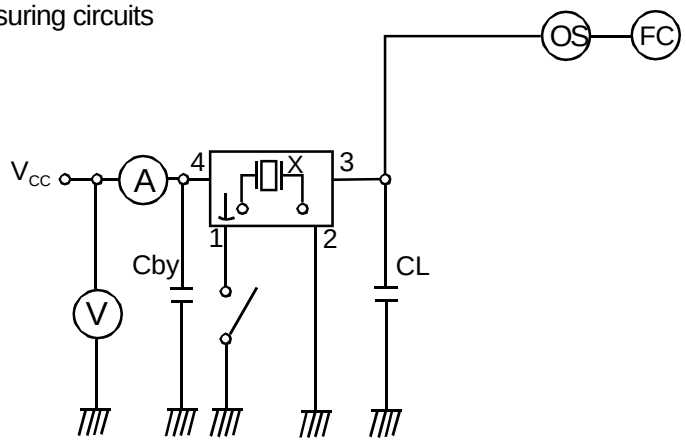
	Parameters	SYM	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal Frequency	f_{nom}		4		MHz	
2	Supply Voltage	V_{CC}	2.97	3.3	3.63	V	
3	Current Consumption (Operating)	I_{CC}			3.5	mA	at 25 °C
4	Current Consumption (Stand-by)	I_{ST}			20	μA	at 25 °C
5	Output Level	-	C-MOS				
6	Load Capacitance	C_L			15	pF	
7	Operating Temperature Range	T_{opr}	-40		+125	°C	
8	Overall Frequency Tolerance	$\Delta f/f_{nom}$	-60		+60	ppm	*1
9	Output Voltage	V_{OL}			0.1 V_{CC}	V	
		V_{OH}	0.9 V_{CC}			V	
10	Rise Time(t_r), Fall Time(t_f)	t_r/t_f			5	ns	0.1 V_{CC} to 0.9 V_{CC}
11	Symmetry	SYM	45		55	%	at 1/2 V_{CC}
12	Start-up Time	t_{su}			4	ms	
13	Output Wave Form	-	Rectangular				
14	Stand-by Function						
	#1 PAD input		# 3 PAD output				
	H level (0.7 V_{CC} to V_{CC}) or open		Operating				
	L level (0.3 V_{CC} max)		High impedance				

*1 Inclusive of Freq. tolerance (at 25 °C), frequency/temperature characteristics, frequency/voltage coefficient.



Symmetry =t / T ×100 (%)

6. Measuring circuits



CL ; 15pF MAX including input capacity of osilloscope
Cby ; Bypass capacitor (0.01uF)

7. Test data will not be submitted.

8. Application drawing

8.1 Dimension drawing

EKD14B-00027

8.2 Marking drawing

EKH11B-00052

8.3 Reliability assurance Item

EKS30B-00092

8.4 Taping & Reel drawing

EKK17B-00032

EEK17B-00015

9. Instruction Notice

9.1 Noise

When the NZ2520 series are used, the 0.01 μF capacitor should be connected between V_{CC} and GND line. (Closer to the product terminal is desirable.)

9.2 Resistance to dropping

The NZ2520 series is designed to be impactproof so that no damage occurs when dropped a height(75 cm) three times. However, if dropped from a desk etc., it is advisable to check their performance or contact us to check it.

9.3 Electrostatic protection

The NZ2520 series employ C-MOS ICs for the active element. Please use them in static-free environments.

9.4 High temperature

Normal operation cannot be guaranteed for the NZ2520 series at +125 °C (for 24 hours). Be sure that the units are kept within the specified temperature range.

9.5 Cleaning

Basically, the NZ2520 series are applicable for ultrasonic wave cleaning. However, in some case, during ultrasonic wave cleanings, internal design may get damage. Please check condition carefully beforehand.

9.6 Other

The NZ2520 series are C-MOS applied products. And careful handling(same as with C-MOS IC) are needed to avoid electrostatic problems.

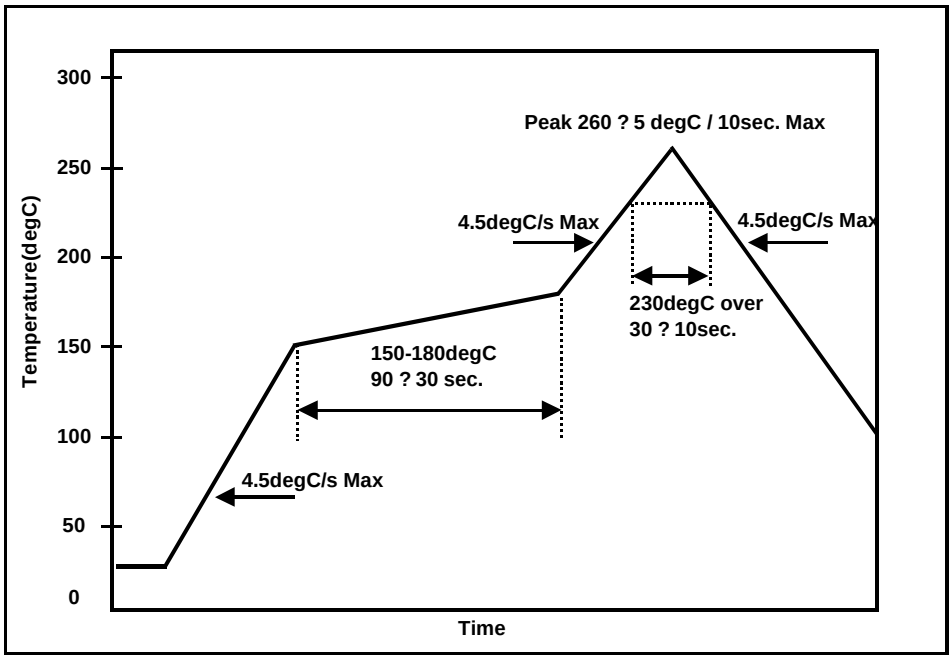
Incorrect PAD connection is cause of trouble. Please make sure to connect correctly as below.

#2 terminal → GND

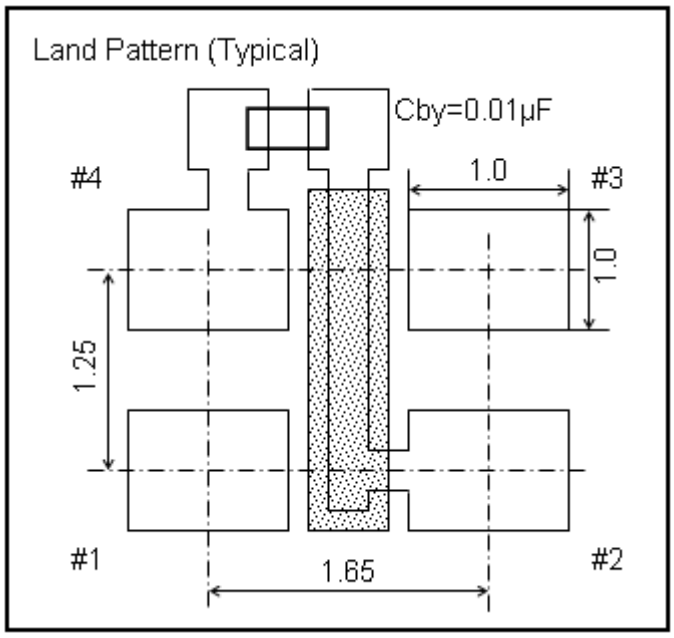
#4 terminal → V_{CC}

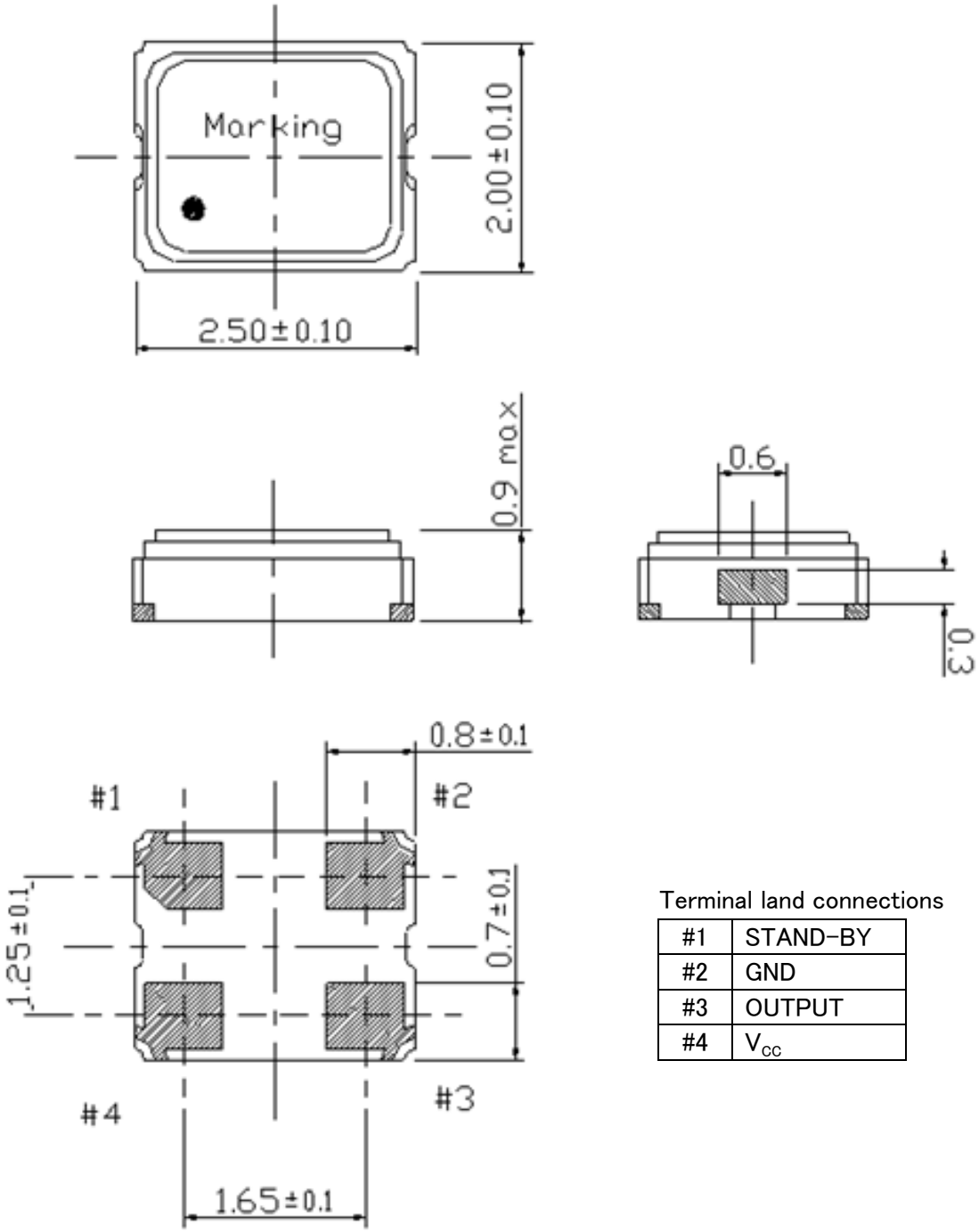
10. Order items are manufactured according to specification. As to conditions, which are not indicated in this specification and unpredictable such as applied condition and oscillation margin, please check them beforehand.

*Example For Soldering Conditions (The below graph corresponds to Pb free solder)



* Recommended footprint [mm]





Terminal land connections

#1	STAND-BY
#2	GND
#3	OUTPUT
#4	V_{CC}

	Date of Revise	Charge	Approved	Reason
C	2.Aug.2012	Y.Oishi	C.Ishimaru	Change V_{DD}→V_{CC}, PAD CONNECTIONS→Terminal land connections

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	23.Oct.2003	M.Yamaguchi	Dimension : mm	-------	--------
Designed	27.Jun.2003	M.Yamaguchi	Title	Drawing No.	Rev.
Checked	-----	-----	**NZ2520S Dimension of External**	**EKD14B-00027**	C
Approved	23.Oct.2003	H.Omata			

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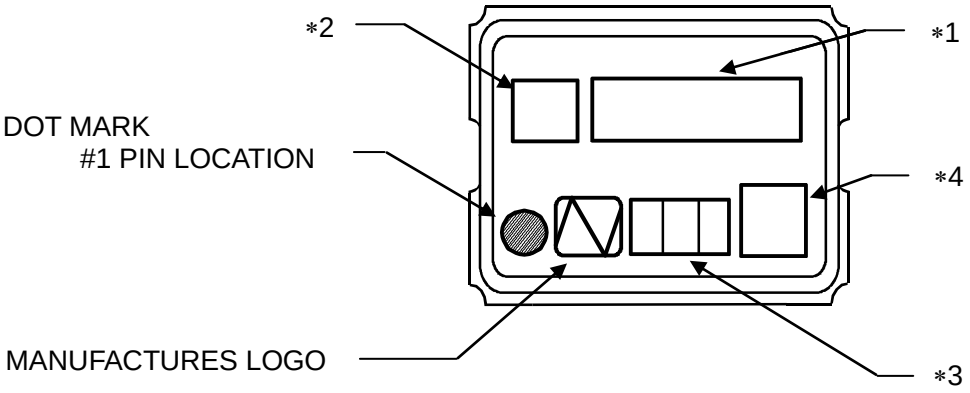
Form M-1



∗1 [FREQUENCY]

Digits are five and 6TH digit will be omitted.
MHz unit sign is not marked.
ex,) 28.63636MHz → 28.636 [Unit sign not marked]

∗2 [MODEL MARK]
A last digit of model is marked. →

[MODEL MARK]
NZ2520SA → Space
NZ2520SB → B
NZ2520SC → C
NZ2520SD → D
NZ2520SEA→ E
NZ2520SF → F
NZ2520SG → G
NZ2520SH → H
NZ2520SJ → J

∗3 [WEEK CODE (Digit are three)]

ex1,) In case of 7TH week of 2006

6 0 7

Week No. (Digit are two)
Lower one digit of year

ex2,) In case of 31TH week of 2006

6 3 1

∗4 [Trace code]
Trace code consists of four digits number or letter.
This code indicates production date and production line number.

	Date of Revise	Charge	Approved	Reason
H	12.Mar.2014	Y.Oishi	Y.Akasaka	Model mark addition.(NZ2520SJ)

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	27.Jan.2006	Y.Oishi	mm	-------	-------
Designed	27.Jan.2006	Y.Okajima	Title	Drawing No.	Rev.
Checked	27.Jan.2006	C.Ishimaru	NZ2520S Marking	**EKH11B-00052**	H
Approved	27.Jan.2006	H.Omata			

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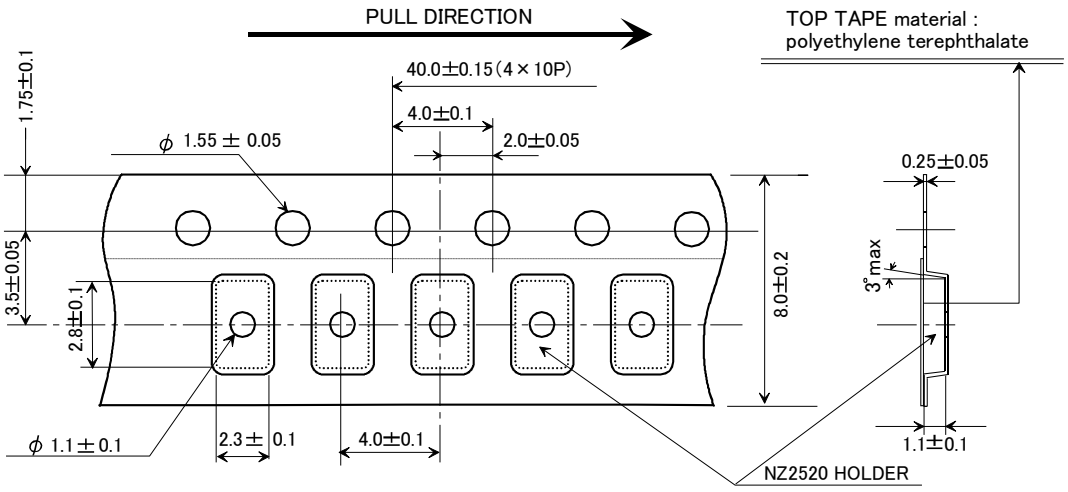
Environmental Test Conditions	Specification
1. Pre- and Post-Stress Electrical Test Refer to AEC-Q200-REV.D TABLE.11 NO.1	∗1
2. High Temperature Exposure (Storage) Refer to AEC-Q200-REV.D TABLE.11 NO.3	∗3
3. Temperature Cycling Refer to AEC-Q200-REV.D TABLE.11 NO.4	∗3
4. Moisture Resistance Refer to AEC-Q200-REV.D TABLE.11 NO.6	∗2
5. Biased Humidity Refer to AEC-Q200-REV.D TABLE.11 NO.7	∗2
6. Operational Life Refer to AEC-Q200-REV.D TABLE.11 NO.8	∗3
7. External Visual Refer to AEC-Q200-REV.D TABLE.11 NO.9	∗4
8. Physical Dimension Refer to AEC-Q200-REV.D TABLE.11 NO.10	∗5
9. Resistance to Solvents Refer to AEC-Q200-REV.D TABLE.11 NO.12	∗2, ∗4
10. Mechanical Shock Refer to AEC-Q200-REV.D TABLE.11 NO.13	∗2
11. Vibration Refer to AEC-Q200-REV.D TABLE.11 NO.14	∗2
12. Resistance to Soldering Heat Refer to AEC-Q200-REV.D TABLE.11 NO.15	∗2
13. Solderability Refer to AEC-Q200-REV.D TABLE.11 NO.18	∗6
14. Electrical Characterization Refer to AEC-Q200-REV.D TABLE.11 NO.19	∗2
15. Board Flex Refer to AEC-Q200-REV.D TABLE.11 NO.21	∗7
16. Terminal Strength Refer to AEC-Q200-REV.D TABLE.11 NO.22	∗7

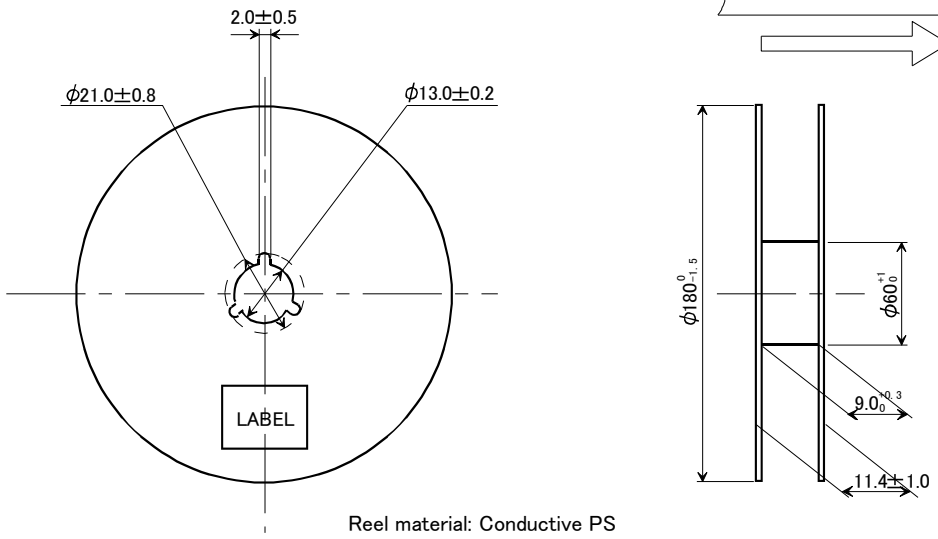
*1 After the test mentioned above, the electrical specifications are satisfied.
∗2 Frequency deviation before and after test should be $\Delta F/F \leq \pm 10\times10^{-6}$,
Current consumption deviation before and after test should be $\Delta F/F \leq \pm 10\%$.
∗3 Frequency deviation before and after test should be $\Delta F/F \leq \pm 20\times10^{-6}$,
Current consumption deviation before and after test should be $\Delta F/F \leq \pm 10\%$.
∗4 Inspect device construction, marking, and workmanship.
∗5 External is satisfied.
∗6 95% min. covered by new solder.
∗7 Visual inspection to confirm no cracking of materials and no break of sealing.

The electrical specifications are I_{CC}, Tr/Tf, V_{OL}/V_{OH}, duty cycle, stand-by current consumption.



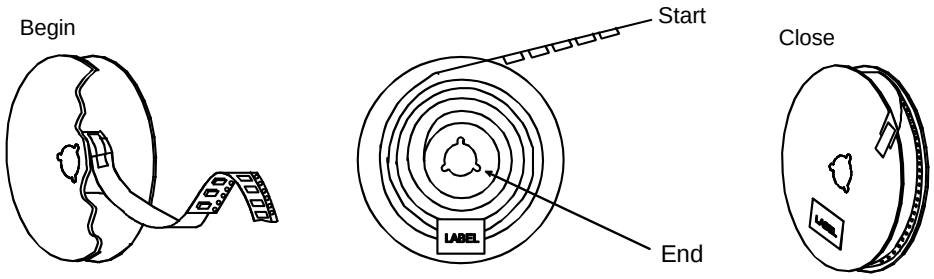
TAPING material: Conductive PS

DIRECTION OF UNIT



Reel material: Conductive PS

EIAJ standard reel



3000pcs MAX-Product Tape

	Date of Revise	Charge	Approved	Reason
C	5.Sep.2012	Y.Oishi	C.Ishimaru	3000pcs-Product Tape→3000pcs MAX-Product Tape.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	7.Oct.2003	Y.Okajima	Dimension:mm		/
Designed	7.Oct.2003	Y.Okajima	Title: **NZ2520 Taping and Reel Spec.**	Drawing No.: **EKK17B-00032**	Rev.: C
Checked					
Approved	7.Oct.2003	H.Omata			

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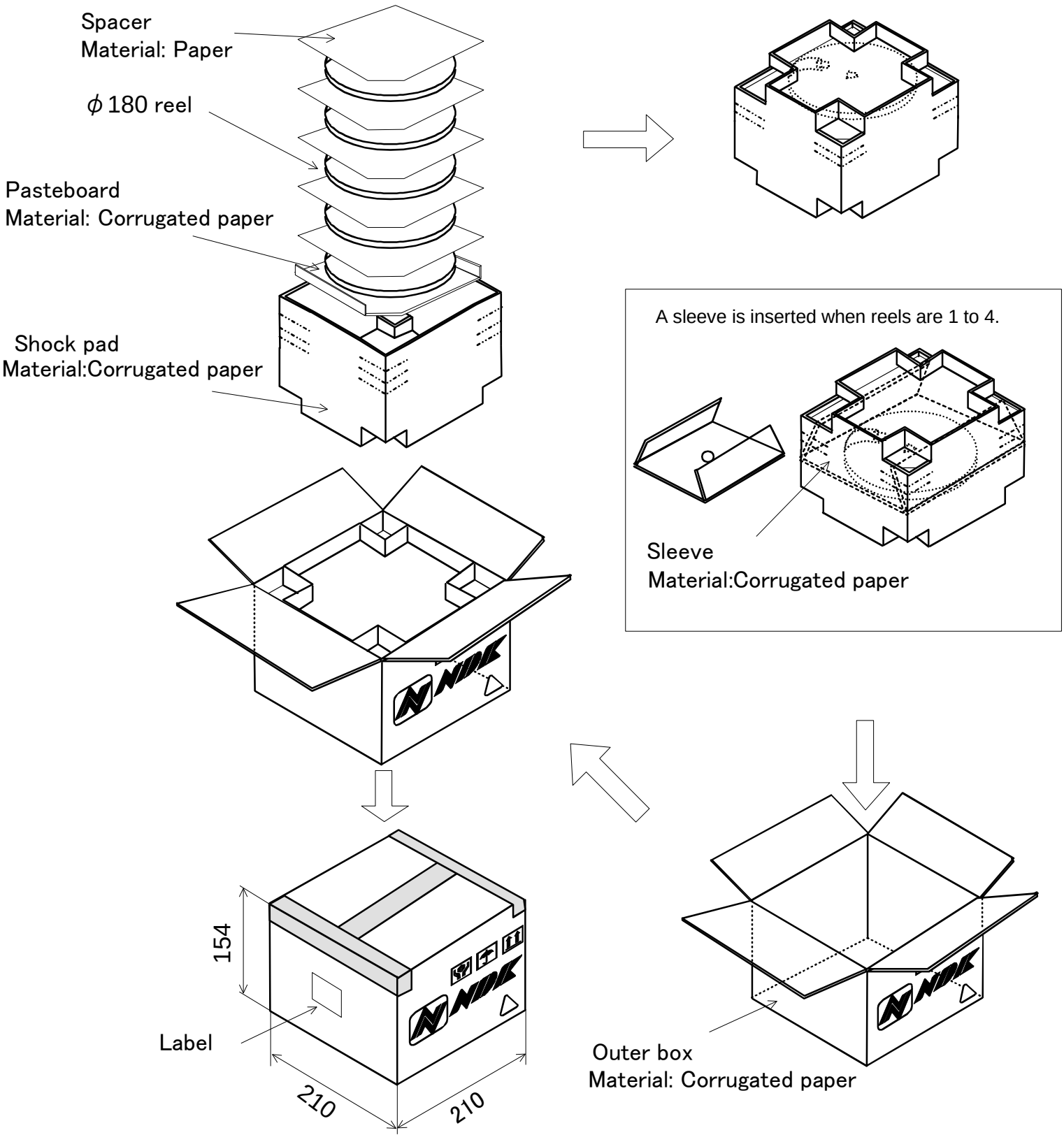
Form M-1



	Date of Revise	Charge	Approved	Reason
C	4 Jul. 2012	H.Ohkubo	K.Oguri	Addition of condition when reels are 1 to 4.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26 Feb. 2010	H. Ohkubo	Dimension:mm	---------	---------
Designed	26 Feb. 2010	K.Oguri	Title	Drawing No.	Rev.
Checked	26 Feb. 2010	K.Oguri	**180 dia. Reel package**	**EEK17B-00015**	C
Approved	26 Feb. 2010	J. Nakamura			

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