

## Specification for Approval

- DEVICE NUMBER: BL-3014B460-20-ML

SAMPLES  
ATTACHED AREA

| DATE \ PAGE | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |  |  | CONTENTS         |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|--|--|------------------|
| 2019/6/13   | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  |  | Initial Released |
|             |     |     |     |     |     |     |     |     |  |  |                  |
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### FOR CUSTOMER'S APPROVAL STAMP OR SIGNATURE

| APPROVED | PURCHASE | MANUFACTURE | QUALITY | ENGINEERING |
|----------|----------|-------------|---------|-------------|
|          |          |             |         |             |

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| ISSUED | APPROVED | PREPARED |
|--------|----------|----------|
| 張孝嚴    | 謝皓翔      | 熊燦芬      |

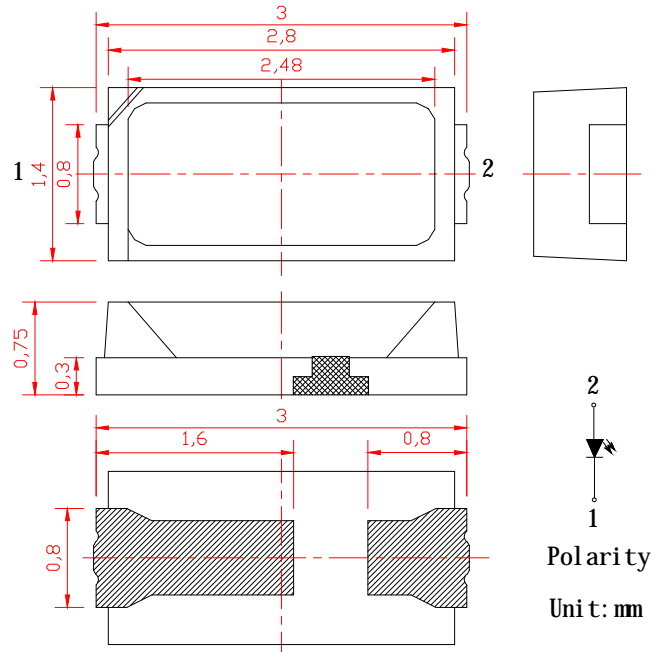
## ● Features:

1. Emitted Color : Super Blue.
2. Lens Appearance: white diffused.
3. 3.0x1.4x0.75mm standard package
4. Suitable for all SMT assembly methods.
5. Compatible with infrared and vapor phase reflow solder process.
6. Compatible with automatic placement equipment.
7. This product doesn't contain restriction Substance, comply ROHS standard.

## ● Applications:

1. Automotive : Dashboards, stop lamps, turn signals.
2. Backlighting : LCDs, Key pads advertising.
3. Status indicators : Consumer & industrial electronics.
4. General use.

## ● Package Dimensions:



### NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.10\text{mm}$  (0.004") unless otherwise specified.
3. Specifications are subject to change without notice.

## ● Absolute Maximum Ratings(Ta=25°C)

| Parameter                | Symbol          | Rating       | Unit |
|--------------------------|-----------------|--------------|------|
| Power Dissipation        | Pd              | 96           | mW   |
| Forward Current          | I <sub>F</sub>  | 30           | mA   |
| Peak Forward Current * 1 | I <sub>FP</sub> | 100          | mA   |
| Reverse Voltage          | V <sub>R</sub>  | 5            | V    |
| Operating Temperature    | Topr            | -40°C ~85°C  | -    |
| Storage Temperature      | Tstg            | -40°C ~100°C | -    |
| Soldering Temperature    | Tsol            | See Page6    | -    |

\* 1 Condition for I<sub>FP</sub> is pulse of 1/10 duty and 3 msec width.

## ● Electrical and optical characteristics(Ta=25°C)

| Parameter                | Symbol            | Condition            | Min. | Typ. | Max. | Unit |
|--------------------------|-------------------|----------------------|------|------|------|------|
| Forward Voltage          | V <sub>f</sub>    | I <sub>F</sub> =20mA | 2.8  | 3.0  | 3.4  | V    |
| Luminous Intensity       | I <sub>v</sub>    | I <sub>F</sub> =20mA | -    | 490  | -    | mcd  |
| Peak Wave Length         | λ <sub>p</sub>    | I <sub>F</sub> =20mA | -    | 460  | -    | nm   |
| Dominant Wave Length     | λ <sub>d</sub>    | I <sub>F</sub> =20mA | 460  | -    | 470  | nm   |
| Spectral Line Half-width | Δλ                | I <sub>F</sub> =20mA | -    | 30   | -    | nm   |
| Reverse Current          | I <sub>R</sub>    | V <sub>R</sub> =5V   | -    | -    | 10   | μA   |
| Viewing Angle            | 2θ <sub>1/2</sub> | I <sub>F</sub> =20mA | -    | 120  | -    | deg  |

## ● Typical Electro-Optical Characteristics Curves

Fig.1 Relative intensity vs. wavelength

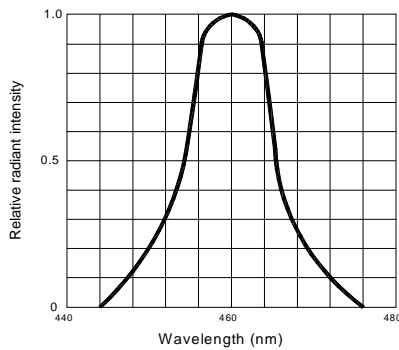


Fig.2 Forward current derating curve vs. ambient temperature

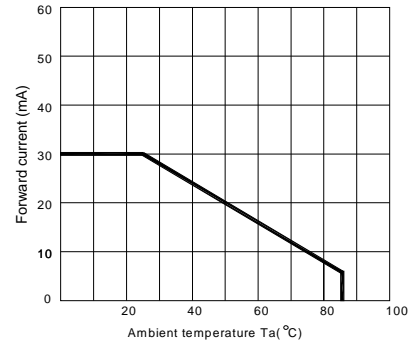


Fig.3 Forward current vs. forward voltage

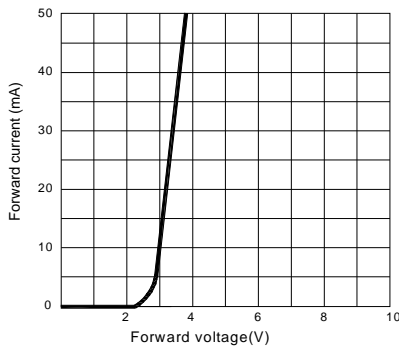


Fig.4 Relative luminous intensity vs. ambient temperature

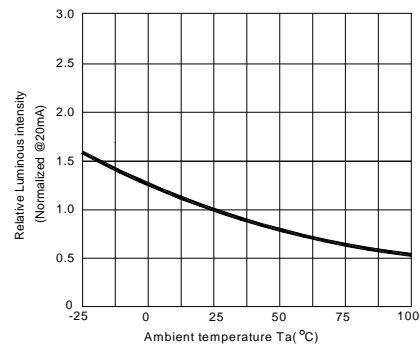


Fig.5 Relative luminous intensity vs. forward current

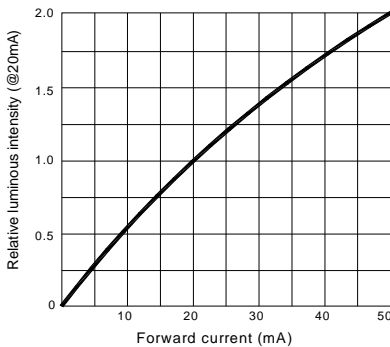
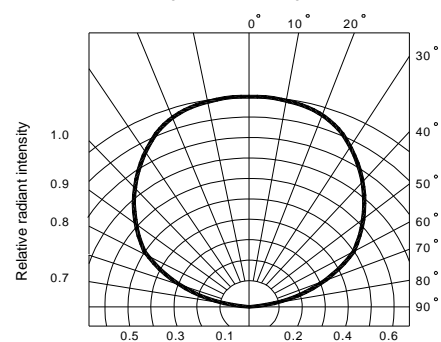
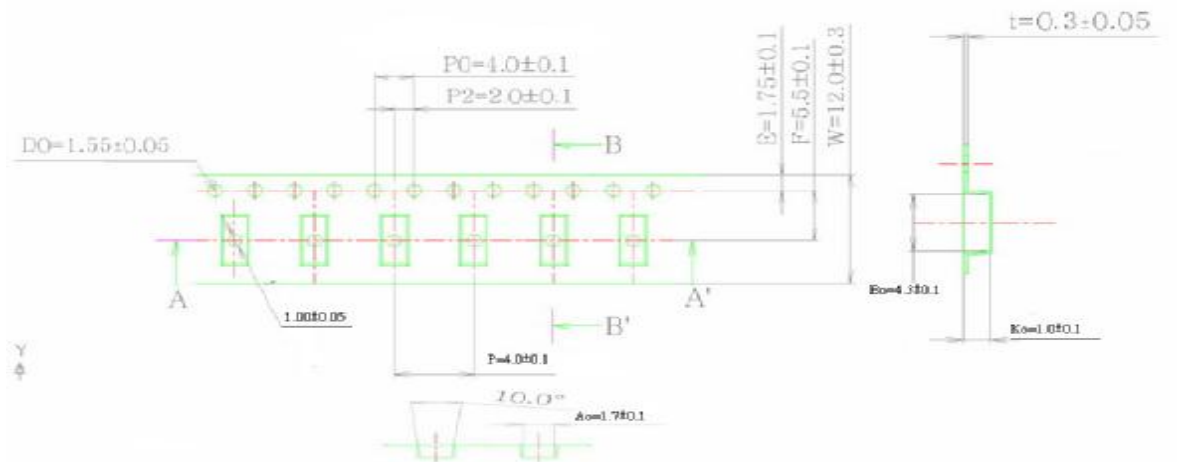


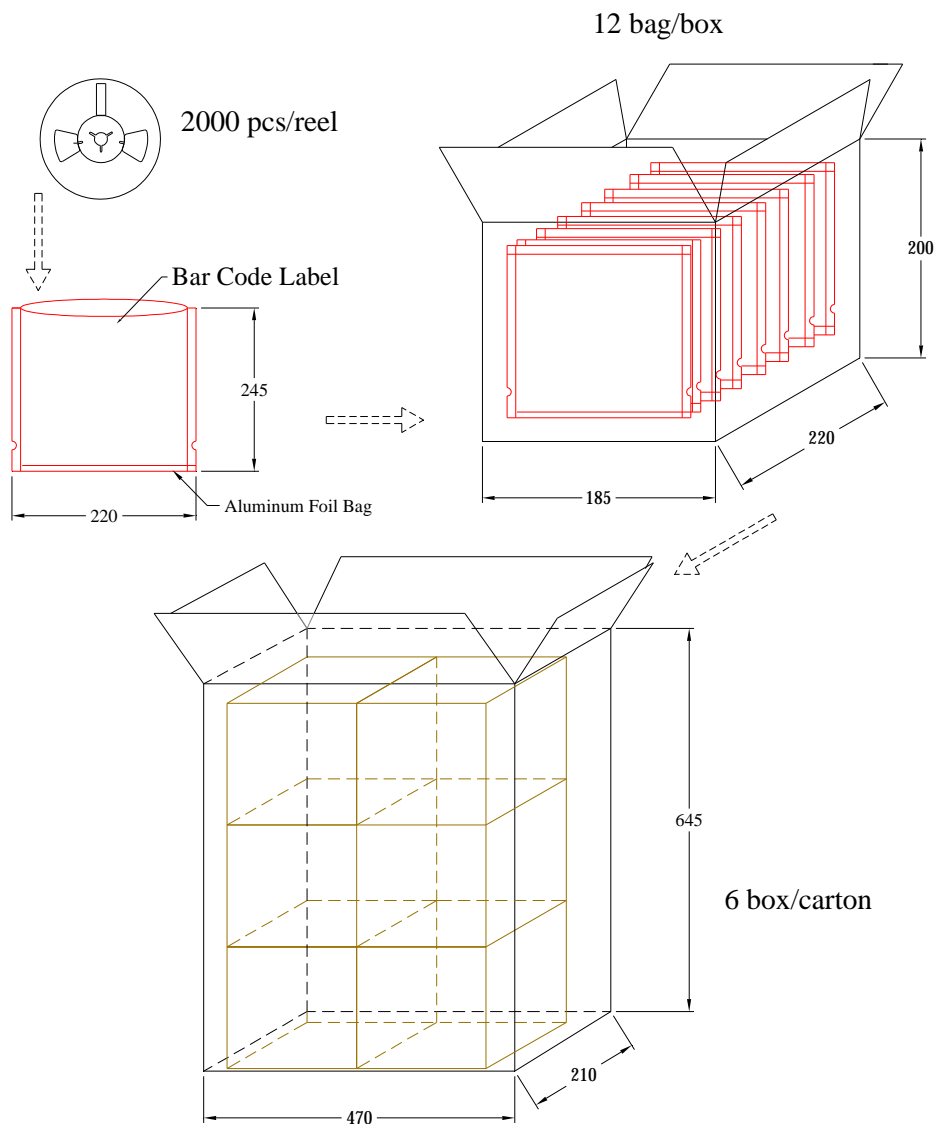
Fig.6 Radiation diagram



● Tapping and packaging specifications(Units: mm)



● Package Method:(unit:mm)



## ● Bin Limits

Intensity Bin Limits (At 20mA)

| BIN CODE | Min. (mcd) | Max. (mcd) |
|----------|------------|------------|
| S        | 210        | 317        |
| T        | 317        | 475        |
| U        | 475        | 715        |

Tolerance for each Bin limit is  $\pm 15\%$ .

Forward Voltage Bin Limits (At 20 mA)

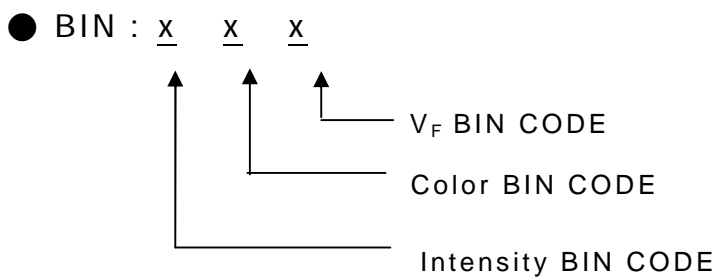
| BIN CODE | Min.(V) | Max.(V) |
|----------|---------|---------|
| F        | 2.6     | 2.8     |
| G        | 2.8     | 3.0     |
| H        | 3.0     | 3.2     |
| J        | 3.2     | 3.4     |

Tolerance for each Bin limit is  $\pm 0.02V$ .

Color Bin Limits (At 20 mA)

| BIN CODE | Min. (nm) | Max. (nm) |
|----------|-----------|-----------|
| 3        | 460       | 465       |
| 4        | 465       | 470       |

Tolerance for each Bin limit is  $\pm 1nm$



## ● Reliability Test

| Classification     | Test Item                              | Reference Standard  | Test Conditions  | Result |
|--------------------|--|---|--|--------|
| Endurance Test     | Operation Life                         | MIL-STD-750:1026<br>MIL-STD-883:1005<br>JIS-C-7021 :B-1                     | Connect with a power $I_f=20\text{mA}$<br>$T_a$ =Under room temperature<br>Test time=1,000hrs  | 0/20   |
|                    | High Temperature High Humidity Storage | MIL-STD-202:103B<br>JIS-C-7021 :B-11  | $T_a=+65^\circ\text{C}\pm 5^\circ\text{C}$<br>RH=90%-95%<br>Test time=240hrs   | 0/20   |
|                    | High Temperature Storage               | MIL-STD-883:1008<br>JIS-C-7021 :B-10  | High $T_a=+85^\circ\text{C}\pm 5^\circ\text{C}$<br>Test time=1,000hrs  | 0/20   |
|                    | Low Temperature Storage                | JIS-C-7021 :B-12  | Low $T_a=-35^\circ\text{C}\pm 5^\circ\text{C}$<br>Test time=1,000hrs   | 0/20   |
| Environmental Test | Temperature Cycling                    | MIL-STD-202:107D<br>MIL-STD-750:1051<br>MIL-STD-883:1010<br>JIS-C-7021 :A-4 | $-35^\circ\text{C} \sim +25^\circ\text{C} \sim +85^\circ\text{C} \sim +25^\circ\text{C}$<br>60min 20min 60min 20min<br>Test Time=5cycle                  | 0/20   |
|                    | Thermal Shock                          | MIL-STD-202:107D<br>MIL-STD-750:1051<br>MIL-STD-883:1011                    | $-35^\circ\text{C}\pm 5^\circ\text{C} \sim +85^\circ\text{C}\pm 5^\circ\text{C}$<br>20min 20min<br>Test Time=10cycle                                     | 0/20   |
|                    | Solder Resistance                      | MIL-STD-202:201A<br>MIL-STD-750:2031<br>JIS-C-7021 :A-1                     | Preheating :<br>$140^\circ\text{C}-160^\circ\text{C}$ , within 2 minutes.<br>Operation heating :<br>$235^\circ\text{C}$ (Max.), within 10seconds. (Max.) | 0/20   |

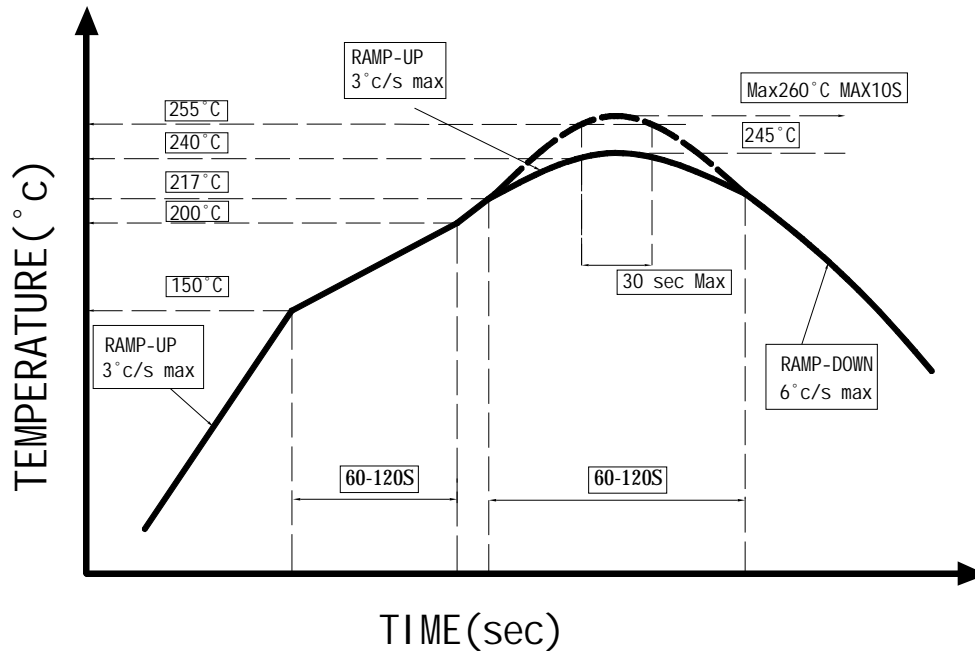
## ● Judgment criteria of failure for the reliability

| Measuring items    | Symbol             | Measuring conditions | Judgement criteria for failure |
|--------------------|--------------------|----------------------|--------------------------------|
| Forward voltage    | $V_F$ ( V )        | $I_F=20\text{mA}$    | Over $U_{x1.2}$                |
| Reverse current    | $I_R(\mu\text{A})$ | $V_R=5\text{V}$      | Over $U_{x2}$                  |
| Luminous intensity | $I_v$ ( mcd )      | $I_F=20\text{mA}$    | Below $SX0.5$                  |

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

## ●IR-Reflow



- 1、 Avoid any external stress applied to the resin while the LEDs are at high temperature, especially during soldering.
- 2、 Avoid rapid cooling or any excess vibration during temperature ramp-down process
- 3、 Although the soldering condition is recommended above, soldering at the lowest possible temperature is feasible for the LEDs

## ●IRON Soldering

350°C Within 3 sec, one time only.

## ● Handling : Handling :

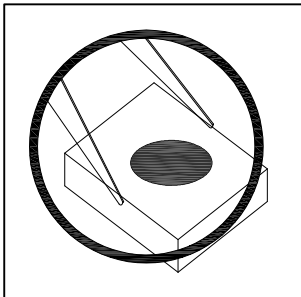
Care must be taken not to damage LED's epoxy resin while exposing to high temperature or contact LED's epoxy resin with hard or sharp objects, such as metal hook, tweezer or sand blasting.

### Handling Precautions

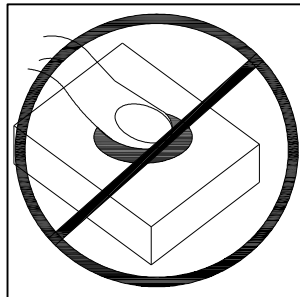
Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.

As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

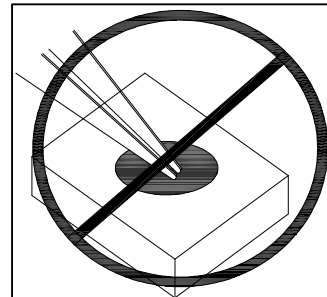
1. Handle the component along the side surfaces by using forceps or appropriate tools. (pic.1)
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry. (pic.2, pic.3)
3. Do not stack together assembled PCBs, containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry. (pic.4)
4. The outer diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks. The inner diameter of the nozzle should be as large as possible. (pic.5)
5. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup. (pic.5)
6. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production. (pic.5)



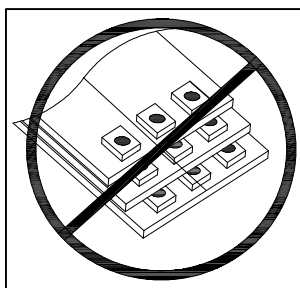
**Pic.1**



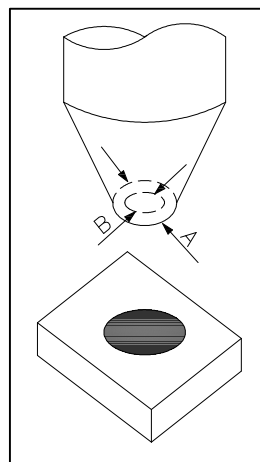
**Pic.2**



**Pic.3**



**Pic.4**



**Pic.5**



## ● Notes for designing:

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the LEDs.

## ● Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

- (1) Temperature : 5°C-30°C(41°F) Humidity : RH 60% Max.
- (2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
  - a. Completed within 24 hours.
  - b. Stored at less than 20% RH.
- (3) Devices require baking before mounting, if:
  - 2a or 2b is not met.
- (4) If baking is required, devices must be baked under below conditions:
  - 48 hours at 60°C±5°C.

## ● Package and Label of Products:

- (1) Package: Products are packed in one bag of 2000 pcs (one taping reel) and a label is attached on each bag.
- (2) Label:

