YBB

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Combinational Closures of PP for Plastic Infusion Containers (with Ring-pull)

塑料输液容器用聚丙烯组合盖（拉环式）

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Combinational Closures of PP for Plastic Infusion Containers (with Ring-pull)

This standard applies to combinational closures of PP for plastic infusion containers (with ring-pull), which consists of ring-pull outer closure (made of the principal material PP), inner closure (made of the principal material PP) and liner.

The polyisoprene liner in combinational closures shall satisfy the requirements of the *Synthetic Polyisoprene Liners for Pharmaceutical Use* (YBB00232004-2015).

Part 1 – Outer Closure

[Appearance] Take 125 outer closures; conduct visual inspection from the front view under sufficient natural light. There shall be no scars, lacerations, bubbles, inclusions of foreign matters, burrs or other defects. The quantity of samples not satisfying the requirements above shall not be greater than 10.

[Opening force of ring-pull] Take 10 outer closures; place in a high-pressure sterilizer to heat to 121°C ± 2°C; hold for 30 min; after cooling to room temperature, fix to the clamp of tensionmeter; fix ring-pull to a mobile clamp. Along the direction forming an angle of 23° to the perpendicular direction, apply tensile force to ring-pull at the speed of 200 mm/min ± 20 mm/min; record the force value at which ring-pull is broken. The opening force shall not exceed 80 N; during the test process, other areas surrounding the puncture area shall not be torn, and ring-pull shall not be broken (during the test process, take another sample to conduct test once again if ring-pull is broken in the clamp).

[Leakproofness of ring-pull cutting place] Take 10 outer closures; place in a high-pressure sterilizer to heat to 121°C ± 2°C; hold for 30 min; after cooling to room temperature, use a penetrating agent (of 65% ethyl alcohol: 10 g/L methylene blue solution = 100:5) to fill to 2/3 of the height; place on the filter paper to hold for 60 min. No leakage shall occur in the cutting place of ring-pull.

[Soluble substance test] Preparation of test solution: take 40.0 g of outer closure; use water to wash; after drying at room temperature, place in a 500-ml conical flask; add 200 ml of water; seal; place in a high-pressure sterilizer; heat to 121°C ± 2°C; hold for 30 min; cool to room temperature as test solution; take water to repeat the operation as blank solution, and then conduct the following test.

Readily Oxidizable Substances Measure accurately 20 ml of test solution; add accurately 20 ml of potassium permanganate titration solution (0.002 mol/L) and 2 ml of dilute sulphuric acid; boil for 3 min; cool abruptly; add 0.1 g of potassium iodide; place in the dark for 5 min; use sodium thiosulfate titration solution (0.01 mol/L) to titrate until light brown; then add 5 drops of starch indicator solution to titrate until colourless. Take blank solution to repeat the operation. The difference of the consumptions of sodium thiosulfate titration solution (0.01 mol/L) of the two shall not be greater than 3.0 ml.

Involatile Substances Measure accurately 50 ml of test solution and blank solution each; place in an evaporating dish of constant weight; evaporate dry in a water bath; dry to constant weight at 105°C. The difference between the two shall not be greater than 12.5 mg.

Figure 1 and Figure 2 to puncture the marked part of the liner of combinational closures; then pull out at the speed of 200 mm/min ± 20 mm/min. The separating force for the plastic puncture device shall not be less than 5.0 N; the separating force for the metal puncture device shall not be less than 1.0 N.

Static Retention Force of Puncture Device Take 10 samples above mentioned to mount respectively to the matched plastic infusion containers; seal the containers after injecting the marked volume of infusion water. First use the plastic puncture device as specified in Figure 1 to puncture vertically the marked part of the liner to ensure the puncture device penetrates the rubber liners and inner closures; hang the containers upside down; hang weights of 0.3 kg to the puncture device. The puncture device shall be retained for 4 h before being pulled out and the punctured part shall have no leakage.

Leakproofness of Drug Injection Point Take 10 samples above mentioned to mount respectively to the matched plastic infusion containers; seal the containers after injecting the marked volume of infusion water; use an injection needle to puncture vertically for 3 times at three different points of the drug injection point of combinational closures; after pulling out the injection needle, place the plastic infusion containers between two parallel plates; apply an internal pressure of 20 kPa; hold for 15 s. The drug inject point shall have no leakage.

[Bacterial Endotoxin] Take an appropriate amount of combinational closures; mix in accordance with the proportion of adding to each sample 50 ml of bacterial endotoxin test water; shake for 1 min; use the moist heat sterilization method to heat to 121°C ± 2°C; hold for 30 min; cool to room temperature as test solution; conduct measurement by law (General Rule 1143 of Part 4 of Chinese Pharmacopoeia 2015). The amount of endotoxin in each 1 ml of test solution shall not be greater than 0.25 EU.

[Storage] The inner packing shall be sealed with LDPE pouches for pharmaceutical packaging and stored in a clean, ventilated place.

Annex – Inspection Rules

1. Product inspection is divided into full inspection and partial inspection.

2. In case of any of the following circumstances, a complete inspection shall be conducted as required by standards.

   (1) Product registration;

   (2) Resumption of production after a major quality accident of product.

3. In case of any of the following circumstances, the inspection for the items except “**” shall be conducted as required by standards.

   (1) Inspection by attributes for supervision;

   (2) Resumption of production after a production halt.

4. After the approval registration of product, the inspection for the items except “*” and “**” may be conducted as required by standards, provided that there is no change in the place of origin of materials, additives, production process or other aspects of the manufacturer and user of pharmaceutical packaging materials.

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