UKPACK Airless Bottle Quality Control Standard

Scope

This standard applies to incoming inspection of the bottle body, cap, and pump assembly for the 14 mL airless bottle configuration.

Bottle Body

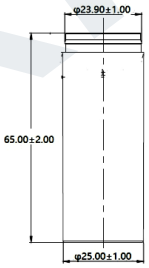
No.	Inspection item	Acceptance criteria and tolerances	Inspection method
1	**Color**	Color must be relatively uniform across the lot, with no obvious color differences, and must be within the limits established by the approved upper and lower reference samples.	Visually compare with the approved reference samples.
2	**Cleanliness**	Interior and exterior surfaces must be clean and free from rust, oil marks, water marks, paper scraps, insects, hair, fibers, glass fragments, metal, and other foreign material adhering to the surfaces.	Visual inspection.
3	**Odor**	There must be no unusual odor other than the inherent odor of the material.	Smell the component.
4	**UV particles**	UV particles must not be readily visible at 30 cm. None are permitted on the primary viewing surface. On non-primary viewing surfaces, up to 2 spots are permitted, each ≤ 0.1 mm².	Visual inspection with a film defect gauge.
5	**Appearance**	1. Body: The bottle must stand level and upright and have a smooth surface. It must be free from deformation, roughness, cracks, damage, hard inclusions, black spots, rust, scuffing, and burrs. Numbers, letters, symbols, and graphics must be complete. Line edges must be crisp, and the placement must be accurate. There must be no defects that affect appearance. 2. Mouth: The mouth must be even and smooth, with no burrs, sharp projections, or ridges above the lip plane. There must be no defects that affect sealing. 3. Threads: Threads must be complete, with no missing sections, skew, displacement, scoring, hard inclusions, deformation, burrs, or sharp projections. There must be no defects that affect sealing. 4. Base: The bottle must stand level and upright. The base must have no obvious raised or recessed areas, impressions, deformation, or similar defects. Impressions must have a width and depth of ≤ 0.05 mm, must not expose the underlying color or extend beyond the bottle body, and must not affect the overall appearance. There must be no defects that affect code marking, upright placement, or appearance. 5. Interior: The interior must be smooth and even, with no adhered material, sharp projections, or missing material. There must be no defects that interfere with filling.	Inspect the individual packaging component and the assembled components visually and by touch. Use a steel ruler with 0.5 mm graduations, a film defect gauge, and a feeler gauge.

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6	**Bubbles and pinholes**	Primary viewing surface: Defects must not be readily visible at 30 cm. Up to 2 are permitted, each with an area ≤ 0.3 mm², provided they do not affect logos, trademarks, or printing. Non-primary viewing surfaces: Defects must not be readily visible during a 3 s inspection at 30 cm. Each must have an area ≤ 0.3 mm² and must not affect printing. Up to 1 defect is permitted, or up to 3 if they are on different surfaces.	Inspect the individual packaging component and the assembled components visually with a film defect gauge.
7	**Oxidation spots, impressions, oil spots, cold spots, streaks, waviness, and off-color spots**	Primary viewing surface: Defects must not be readily visible during a 3 s inspection at 30 cm. Up to 2 are permitted, each with an area ≤ 0.3 mm², provided they are close to the packaging color and do not affect logos, trademarks, or printing. Non-primary viewing surfaces: Defects must not be readily visible during a 3 s inspection at 30 cm. Each must have an area ≤ 0.3 mm², be close to the packaging color, and not affect printing. Up to 1 defect is permitted, or up to 3 if they are not within the same 1 cm² area.	Inspect the individual packaging component and the assembled components visually with a film defect gauge.
8	**Scratches and lines**	Primary viewing surface: Defects must not be readily visible at 30 cm. Each must be ≤ 10 mm long and ≤ 0.2 mm wide, close to the packaging color, and must not affect logos, trademarks, or printing. Up to 1 is permitted, or up to 2 if they are at least 50 mm apart. Non-primary viewing surfaces: Defects must not be readily visible at 30 cm. Each must be ≤ 10 mm long and ≤ 0.2 mm wide, close to the packaging color, and must not affect printing. Up to 2 are permitted, or up to 3 if they are at least 50 mm apart.	Inspect the individual packaging component and the assembled components visually using a steel ruler with 0.5 mm graduations, a film defect gauge, and a vernier caliper with 0.01 mm graduations.
9	**Mold parting line**	The surface must be smooth and even. There must be no deformation, irregularities, missing material, sharp edges that pose a safety hazard, obvious protrusion (maximum protrusion 0.3 mm), or misalignment between double parting lines. Parting lines must be in the same position throughout the lot.	Inspect visually and by touch. Use a steel ruler with 0.5 mm graduations, a film defect gauge, and a vernier caliper with 0.01 mm graduations.
10	**Material**	Polypropylene (PP).	Visually compare with the approved reference samples.
11	**Component fit**	Components must assemble smoothly and fit securely. They must not be too loose or too tight. There must be no thread slippage, leakage, obvious misalignment, visible opening, or obvious step between adjoining surfaces. The step must be ≤ 0.5 mm. After assembly, there must be no obvious gap. The gap must be ≤ 0.5 mm and its variation around the full circumference must be ≤ 0.2 mm. The gap must not impair sealing or appearance.	Assemble the components. Check with a feeler gauge, a vernier caliper with 0.01 mm graduations, a steel ruler with 0.5 mm graduations, and a film defect gauge. Compare with the approved reference samples.

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12	**Print content and placement**	1. Text and graphics must match the approved artwork. Print size must fall within the limits established by the approved reference samples. 2. Text and graphics must be aligned. There must be no crowding, text encroachment, overlap, or similar defects that affect appearance. Print spacing must be relatively uniform throughout the lot. Vertical and horizontal spacing, overall vertical and horizontal placement, and skew must meet the approved artwork and the limits established by the approved reference samples. Net quantity declaration: character height ≥ 2 mm.	Inspect visually and compare with the approved artwork and reference samples. Use a steel ruler with 0.5 mm graduations, a vernier caliper with 0.01 mm graduations, and a film defect gauge.
13	**Leak tightness**	There must be no liquid leakage under vacuum at −0.06 MPa, during inverted storage, or after a cold–hot cycle.	Take 15 sample sets. Fill each bottle with purified water to the product's nominal fill quantity and assemble all components. • Place 5 sets upside down in a vacuum drying chamber at −0.06 MPa for 5 min and visually inspect. • Store 5 sets upside down for 72 h and inspect. • Lay 5 sets on their sides in a freezer at −7 ± 1 °C for 24 h. Remove them, let them return to room temperature, and inspect. Transfer them to an oven at 50 ± 1 °C for 24 h. Remove them, let them return to room temperature, and inspect.
14	**Brimful capacity**	18.6 ± 1.5 mL.	Test at 22 ± 5 °C. Measure the water temperature with a general-purpose thermometer and keep water temperature variation within ±1 °C throughout the test. Use an electronic balance and a graduated cylinder. Place the dry, empty component on the balance and tare it. Fill the bottle with water to the brim, ensuring there are no air bubbles. Weigh the water to determine brimful capacity.
15	**Cold resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets. Fill each bottle with product formulation or purified water to the product's nominal fill quantity and assemble all components. Hold the assemblies at −15 ± 5 °C for 48 h, then remove and inspect them.
16	**Heat resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets and assemble all components. Place the assemblies in a heated chamber at 50 ± 1 °C for 24 h. Let them return to room temperature and inspect.
17	**Coating, spray finish, print, and hot-stamp adhesion**	1. Print and hot stamping: After the 3M 810 tape test, the detached area must be < 5% of the tested area. Text must remain legible. 2. Coating and spray finish: Cut edges must be	Inspect visually using a steel ruler and a film defect gauge. 1. Print and hot stamping: Apply 3M 810 tape to the printed and hot-stamped

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<table>
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<tr><td></td><td></td><td>completely smooth. After the 3M 810 tape test, the detached area within the grid must be < 5% of the tested area. Any text in the tested area must remain legible.
3. Rub test: After 10 rubs against the inside of the corresponding outer product packaging, inspect visually at 30 cm. There must be no obvious scratches, and printing and hot stamping must show no detachment or scuffing.
4. Shake test: After shaking the bag of 10 loose bottles for 3 min, inspect visually at 30 cm. There must be no obvious scratches, and printing and hot stamping must show no detachment or scuffing.</td><td>areas. Smooth the tape to remove trapped air. Pull it off quickly at a 45° angle. Perform the same procedure 3 times.
2. Coating and spray finish: Use a blade to make 6 parallel cuts through the finish. Make another 6 parallel cuts perpendicular to the first set. Apply 3M 810 tape to the grid parallel to one set of cuts. Within 5 min of applying the tape, hold its free end and peel it off steadily at approximately 60° in 0.5–1.0 s. Perform the tape test 3 times and inspect.
3. Rub test: Rub the bottle against the inside of the corresponding outer product packaging 10 times.
4. Shake test: Place 10 unpackaged bottles in a bag in any arrangement. Seal and strap the bag, place it in a basket, and shake it repeatedly for 3 min.</td></tr>
<tr><td>18</td><td>Drop test</td><td>Under the specified drop test conditions, the assembly must remain leak-free and fully functional. Cosmetic damage, including cracks, is acceptable if it causes no leakage and does not impair normal use.</td><td>Take 5 sample sets. Fill each bottle with product formulation or purified water to the product’s nominal fill quantity and assemble all components. Release each assembly from a height of 1 m so that it falls freely onto concrete or granite. Drop it once in each orientation: vertical (base down), inclined at 45°, and horizontal. Inspect visually.</td></tr>
<tr><td>19</td><td>Dimensions and weight</td><td>

<table>
<tr><th>Parameter</th><th>Nominal value</th><th>Tolerance</th></tr>
<tr><td>Bottle weight (g)</td><td>Not specified</td><td>±0.50</td></tr>
<tr><td>Bottle mouth outside diameter (mm)</td><td>23.90</td><td>±1.00</td></tr>
<tr><td>Bottle outside diameter (mm)</td><td>25.00</td><td>±1.00</td></tr>
<tr><td>Bottle height (mm)</td><td>65.00</td><td>±2.00</td></tr>
</table>
Apply the ±0.50 g tolerance only when a nominal weight has been specified for the component.</td><td>Measure with a steel ruler with 0.5 mm graduations, a vernier caliper with 0.01 mm graduations, and an electronic balance.</td></tr>
</table>

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No.	Inspection item	Acceptance criteria and tolerances	Inspection method
20	**Microbial limits**	Total colony count: ≤ 100 CFU per component. Total mold and yeast count: ≤ 10 CFU per component.	Take 5 test components. Use sterile physiological saline as the eluent and shake for 2 min, or swab each component separately with a cotton ball moistened with sterile physiological saline. Prepare a 1:10 test dilution. Inoculate a culture plate with 1 mL of the test dilution and prepare two plates per group. Follow the test method in the 2015 edition of China's Safety and Technical Standards for Cosmetics.
21	**Outer carton labeling**	The label must match the contents of the carton and be completed in full using the prescribed format. Include the product name, manufacturer's name, production date, and quantity.	Visual inspection.
22	**Packing method**	Use corrugated cartons with intact plastic bag liners. Pack equal quantities in each carton. Seal and strap each carton neatly and securely.	Visual inspection.
23	**Outer carton condition**	The carton must be dry and clean, with no damage or signs of impact, moisture exposure, or contamination. The sealing tape must be straight and intact and must seal the carton. The carton must have adequate compression strength.	Visual inspection.

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Cap

No.	Inspection item	Acceptance criteria and tolerances	Inspection method
1	**Color**	Color must be relatively uniform across the lot, with no obvious color differences, and must be within the limits established by the approved upper and lower reference samples.	Visually compare with the approved reference samples.
2	**Cleanliness**	Interior and exterior surfaces must be clean and free from rust, oil marks, water marks, paper scraps, insects, hair, fibers, glass fragments, metal, and other foreign material adhering to the surfaces.	Visual inspection.
3	**Odor**	There must be no unusual odor other than the inherent odor of the material.	Smell the component.
4	**Appearance**	The cap must be even and straight, with a smooth surface, complete structure, and uniform thickness. It must be free from deformation, roughness, cracks, damage, hard inclusions, black spots, rust, oxidation spots, waviness, oil spots, cold spots, scuffs, burrs, sharp projections, and streaks.	Visual inspection.
5	**Bubbles and pinholes**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each defect must have an area ≤ 0.2 mm². Up to 1 is permitted, or up to 2 if they are on different surfaces.	Visual inspection with a film defect gauge.
6	**Oxidation spots, impressions, oil spots, cold spots, streaks, waviness, and off-color spots**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each defect must have an area ≤ 0.1 mm², be close to the packaging color, and not affect logos, trademarks, or printing. Up to 1 is permitted, or up to 2 if they are on different surfaces.	Visual inspection with a film defect gauge.
7	**Scratches and lines**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each must be ≤ 5 mm long and ≤ 0.1 mm wide, close to the packaging color, and must not affect logos, trademarks, or printing. Up to 1 is permitted, or up to 2 if they are on different surfaces.	Visual inspection using a steel ruler with 0.5 mm graduations, a film defect gauge, and a vernier caliper with 0.01 mm graduations.
8	**Mold parting line**	The surface must be smooth and even. There must be no deformation, irregularities, missing material, sharp edges that pose a safety hazard, obvious protrusion (maximum protrusion 0.05 mm), or misalignment between double parting lines. Parting lines must be in the same position throughout the lot.	Visual inspection.
9	**Material**	Polypropylene (PP).	Visually compare with the approved reference samples.

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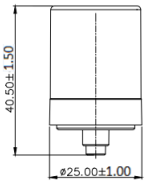
No.	Inspection item	Acceptance criteria and tolerances	Inspection method
10	**Component fit**	Components must assemble smoothly and fit securely. They must not be too loose or too tight. There must be no thread slippage, leakage, obvious misalignment, visible opening, or obvious step between adjoining surfaces. The step must be ≤ 0.5 mm. After assembly, there must be no obvious gap. The gap must be ≤ 0.5 mm and its variation around the full circumference must be ≤ 0.2 mm. The gap must not impair sealing or appearance.	Assemble the components. Check with a feeler gauge, a vernier caliper with 0.01 mm graduations, a steel ruler with 0.5 mm graduations, and a film defect gauge. Compare with the approved reference samples.
11	**Cold resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets. Fill each bottle with product formulation or purified water to the product's nominal fill quantity and assemble all components. Hold the assemblies at −15 ± 5 °C for 48 h, then remove and inspect them.
12	**Heat resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets and assemble all components. Place the assemblies in a heated chamber at 50 ± 1 °C for 24 h. Let them return to room temperature and inspect.
13	**Drop test**	Under the specified drop test conditions, the assembly must remain leak-free and fully functional. Cosmetic damage, including cracks, is acceptable if it causes no leakage and does not impair normal use.	Take 5 sample sets. Fill each bottle with product formulation or purified water to the product's nominal fill quantity and assemble all components. Release each assembly from a height of 1 m so that it falls freely onto concrete or granite. Drop it once in each orientation: vertical (base down), inclined at 45°, and horizontal. Inspect visually.
14	**Outer carton labeling**	The label must match the contents of the carton and be completed in full using the prescribed format. Include the product name, manufacturer's name, production date, and quantity.	Visual inspection.
15	**Packing method**	Use corrugated cartons with intact plastic bag liners. Pack equal quantities in each carton. Seal and strap each carton neatly and securely.	Visual inspection.
16	**Outer carton condition**	The carton must be dry and clean, with no damage or signs of impact, moisture exposure, or contamination. The sealing tape must be straight and intact and must seal the carton. The carton must have adequate compression strength.	Visual inspection.

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Pump Assembly

No.	Inspection item	Acceptance criteria and tolerances	Inspection method
1	**Color**	Color must be relatively uniform across the lot, with no obvious color differences, and must be within the limits established by the approved upper and lower reference samples.	Visually compare with the approved reference samples.
2	**Cleanliness**	Interior and exterior surfaces must be intact, smooth, clean, and free from rust, oil marks, water marks, paper scraps, insects, hair, glass fragments, metal, and other foreign material.	Visual inspection.
3	**Odor**	There must be no unusual odor other than the inherent odor of the material.	Smell the component.
4	**Appearance**	The pump must be even and straight and have a smooth surface. It must be free from deformation, roughness, cracks, damage, hard inclusions, black spots, rust, scuffing, burrs, and other defects that affect appearance.	Visual inspection.
5	**Bubbles and pinholes**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each defect must have an area ≤ 0.2 mm^2. Up to 1 is permitted, or up to 2 if they are on different surfaces.	Visual inspection with a film defect gauge.
6	**Oxidation spots, impressions, oil spots, cold spots, streaks, waviness, and off-color spots**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each defect must have an area ≤ 0.2 mm^2 and be close to the packaging color. Up to 1 is permitted, or up to 2 if they are on different surfaces and do not affect logos, trademarks, or printing.	Visual inspection with a film defect gauge.
7	**Scratches and lines**	Defects must not be readily visible during a 3 s inspection at 30 cm. Each must be ≤ 5 mm long and ≤ 0.1 mm wide and close to the packaging color. Up to 1 is permitted, or up to 2 if they are on different surfaces and do not affect logos, trademarks, or printing.	Visual inspection using a steel ruler with 0.5 mm graduations, a film defect gauge, and a vernier caliper with 0.01 mm graduations.
8	**Mold parting line**	The surface must be smooth and even. There must be no deformation, irregularities, missing material, sharp edges that pose a safety hazard, obvious protrusion (maximum protrusion 0.05 mm), or misalignment between double parting lines. Parting lines must be in the same position throughout the lot.	Visual inspection.
9	**Material**	Polypropylene (PP).	Visually compare with the approved reference samples.
10	**Component fit**	Components must assemble smoothly and fit securely. They must not be too loose or too tight. There must be no thread slippage, leakage, obvious misalignment, visible opening, or obvious step between adjoining surfaces. The step must be ≤ 0.5 mm. After assembly, there must be no obvious gap. The gap must be ≤ 0.5 mm and its variation around the full circumference must be ≤ 0.2 mm. The gap must not impair sealing or appearance.	Assemble the components. Check with a feeler gauge, a vernier caliper with 0.01 mm graduations, a steel ruler with 0.5 mm graduations, and a film defect gauge. Compare with the approved reference samples.

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11	**Initial priming strokes**	The pump must dispense within 8 strokes, return fully after each stroke, and operate normally.	Take 10 sample sets. Fill each bottle with product formulation to the product's nominal fill quantity and assemble all components. Store 5 sets upright for 72 h and 5 sets upside down for 72 h. Actuate the pump at 1 stroke per second until product dispenses. Check that the pump returns fully after each stroke and operates normally. Record the number of strokes to first dispense.
12	**Dispensing performance and fatigue resistance**	The pump must dispense normally without interruption or empty strokes and remain usable after 50 strokes or once all product has been dispensed.	Continue testing with the same samples used for the initial priming test. Actuate at 20 strokes/min for 50 strokes or until all product has been dispensed. Observe dispensing performance.
13	**Output per stroke**	0.23 ± 0.04 g.	Take 5 sample sets. Fill each bottle with purified water to the product's nominal fill quantity. Actuate each pump 15 times as in normal use, then collect the output from 10 full strokes. Weigh the combined output from those 10 strokes as M. Calculate the average output per stroke as m_1 = M / 10.
14	**Cold resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets. Fill each bottle with product formulation or purified water to the product's nominal fill quantity and assemble all components. Hold the assemblies at −15 ± 5 °C for 48 h, then remove and inspect them.
15	**Heat resistance**	There must be no obvious change in appearance compared with the pre-test condition. Components must not detach when shaken.	Take 5 sample sets and assemble all components. Place the assemblies in a heated chamber at 50 ± 1 °C for 24 h. Let them return to room temperature and inspect.
16	**Structure and component disassembly**	The construction must match the approved reference sample. On disassembly, no parts may be missing or added. Check parts such as the spring, cap, snap-fit clips, and piston.	Compare against the approved reference sample. Disassemble the component and inspect its parts.
17	**Leak tightness**	There must be no liquid leakage under vacuum at −0.06 MPa, during inverted storage, or after a cold–hot cycle.	Take 15 sample sets. Fill each bottle with purified water to the product's nominal fill quantity and assemble all components. • Place 5 sets upside down in a vacuum drying chamber at −0.06 MPa for 5 min and visually inspect. • Store 5 sets upside down for 72 h and inspect. • Lay 5 sets on their sides in a freezer at −7 ± 1 °C for 24 h. Remove them, let them return to room temperature, and inspect. Transfer them to an oven at 50 ± 1 °C for 24 h. Remove them, let them return to room temperature, and inspect.

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