



DELTA EL NILE FOR INDUSTRY · EST. 1996

# Preform Incoming Inspection Manual

Every preform defect a buyer may observe on receipt — symptom, likely cause, first action, diagnosis, fix and prevention — for incoming QC before the blow line.

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Generated **2026-06-27** from Delta's live defect database · 31 defects · Delta El Nile for Industry

Use this manual at incoming inspection of Delta El Nile preforms, before running them on your stretch-blow line. Each defect lists the symptom, the most likely causes, the first action to take, how to diagnose it, how to resolve it with Delta, and how to prevent recurrence. Generated from the same defect database as the on-site defect advisor ([deltaelnile.com/en/defect-lookup.html](http://deltaelnile.com/en/defect-lookup.html)).

## Quick reference — all defects

### GEOMETRIC — DIMENSIONS OUT OF SPEC

- Preform weight outside tolerance band
- Preform length outside tolerance band
- Preform body outer diameter out of spec
- Gate vestige not centered (offset from preform axis)
- Preform body not round (ovality)
- Neck thread / sealing diameter outside tolerance
- Preform wall thickness varies around circumference
- Gate vestige too tall (>1 mm)

### NECK — THREAD, SUPPORT-RING, SEALING SURFACE

- Incomplete or partial thread profile
- Thread flash / excess material at parting line
- Support ring chipped / damaged
- Neck out of round (ovality)
- Gate vestige inside neck (mold misplacement)
- Preform top sealing surface damaged (scratches, nicks, gate vestige)
- Preform neck wall thickness undersize at sealing area

### VISUAL — COLOUR, HAZE, SPECKS, SURFACE

- Color streaks / marbled masterbatch dispersion
- Color off-target (different from approved sample)
- Preform hazy / cloudy appearance
- Black specks / burnt material visible in wall
- Gel inclusions (unmelted material) in wall
- Foreign contamination visible in preform

### MATERIAL — IV, CRYSTALLINITY, BRITTLENESS, MOISTURE

- Preform brittleness (cracks under bend test)
- Preform semi-crystalline (whitened body)
- Preforms moisture-contaminated (after delivery)
- Low intrinsic viscosity (weak preforms)
- Regrind ratio exceeded / unauthorized regrind

### PACKAGING & TRANSIT

- Carton damage visible at receipt
- Contamination inside carton (dust, debris, water)
- Surface scratches / handling marks on preforms
- Preforms inverted / disordered in carton
- Moisture / condensation inside carton

## Geometric — dimensions out of spec

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### CRITICAL Preform weight outside tolerance band

Sample weight on calibrated scale is outside the  $\pm 0.3g$  tolerance band of the Delta-published nominal weight for the SKU. Lighter preforms produce thin-walled bottles; heavier preforms over-stretch and may pearlescence.

#### LIKELY CAUSES

- Wrong SKU shipped (carton mislabeled)
- Mold cavity drift at Delta plant (worn or off-spec cavity)
- Resin shot weight programming drift at Delta IM line

#### FIRST ACTION

STOP receiving. Weigh 30 preforms across the carton; calculate mean and range.

#### DIAGNOSE

- Weigh 30 preforms from random positions in the carton on a 0.01g scale
- Calculate mean, standard deviation, and range
- Compare mean to Delta SKU spec sheet nominal
- Check carton label matches the ordered SKU

#### FIX

- Step 1: If mean is off by  $>0.3g$ , contact Delta with weight data + carton lot number
- Step 2: Do not run production until Delta confirms the lot is acceptable
- Step 3: Document with photographs of scale + carton label for QA file

#### PREVENT

- Incoming QC: weigh 30 preforms from each pallet lot
- Maintain calibrated scale (annual calibration certificate)
- Reject lots outside tolerance and request replacement under Delta's quality guarantee

Sources: *Petcore Preform QA Guidelines 2020 · AMI Injection Molding PET §4.2*

**MAJOR** Preform length outside tolerance band

Preform overall length deviates >0.5 mm from the SKU nominal. Length is critical for stretch ratios — too short produces high HSR/low ASR (yellow stretch), too long inverts.

**LIKELY CAUSES**

- Wrong SKU shipped
- IM cycle cooling time too short — preforms not fully solidified before ejection
- Mold cavity wear at gate end

**FIRST ACTION**

Measure 20 preforms with calipers; verify mean length vs SKU spec sheet.

**DIAGNOSE**

- Use a digital caliper (0.01 mm resolution) on 20 random preforms
- Measure from top of neck (sealing surface) to bottom of gate vestige
- Calculate mean and compare to SKU nominal length

**FIX**

- Step 1: If mean is off by >0.5 mm, contact Delta with measurements
- Step 2: Provide caliper photos + lot number for QA traceability

**PREVENT**

- Incoming QC: length-check 20 preforms per pallet
- Calibrated caliper (annual certificate)

Sources: Petcore Preform QA §3.1

**MAJOR** Preform body outer diameter out of spec

Body OD measurement outside Delta's  $\pm 0.2$  mm tolerance. Affects HSR (hoop stretch ratio) calculations and bottle wall distribution. Larger-than-spec OD produces under-stretched body.

**LIKELY CAUSES**

- IM mold core drift (wear or thermal expansion)
- Wrong SKU shipped

**FIRST ACTION**

Measure OD at body midpoint on 20 preforms with calipers or micrometer.

**DIAGNOSE**

- Measure OD at 3 vertical positions: 5mm below ring, midpoint, 5mm above gate
- Calculate mean per position; compare to spec
- Measure ovality: max OD – min OD at the same height (4 angular positions)

**FIX**

- Step 1: Report mean OD deviation to Delta
- Step 2: Calculate impact on planned HSR — if HSR moves outside green band, request lot replacement

**PREVENT**

- Quarterly OD audit on representative SKUs from Delta

Sources: AMI §4.3

**MAJOR** Gate vestige not centered (offset from preform axis)

Gate vestige (small mark at the bottom dome where injected material entered) is not on the centerline. Asymmetric gate causes asymmetric wall distribution in blown bottles.

**LIKELY CAUSES**

- IM mold gate insert misaligned at Delta plant
- Resin flow non-axisymmetric due to viscosity variation

**FIRST ACTION**

Place 10 preforms on flat surface gate-down; gate vestige off-center will rock.

**DIAGNOSE**

- Inspect 20 preforms; measure offset of gate vestige from preform centerline
- Centerline determined by neck axis
- Accept  $\leq 0.5$  mm offset; flag  $> 0.5$  mm

**FIX**

- Step 1: Document offset measurements with photos
- Step 2: Contact Delta engineering with lot number

**PREVENT**

- Visual inspection of 10 preforms per pallet during incoming QC

Sources: AMI §4.4

**MAJOR** Preform body not round (ovality)

Body OD varies around the circumference. Roll-test on flat surface shows wobble. Ovality >0.3 mm produces uneven bottle walls.

**LIKELY CAUSES**

- IM mold core not parallel or off-center
- Differential cooling at Delta plant (uneven mold temp)
- Preform demolded too hot (deformed during ejection)

**FIRST ACTION**

Roll 20 preforms on a flat surface; mark any that wobble.

**DIAGNOSE**

- Roll-test 20 preforms; should roll smoothly
- For suspect preforms, measure OD at 4 angular positions (0°, 90°, 180°, 270°) using micrometer
- Calculate ovality = max OD – min OD

**FIX**

- Step 1: If ovality >0.3 mm in >5% of sample, contact Delta
- Step 2: Quarantine suspect lot

**PREVENT**

- Roll-test 20 preforms per incoming pallet

Sources: Petcore Preform QA §3.2

**CRITICAL** Neck thread / sealing diameter outside tolerance

Critical sealing surfaces (E-dimension, T-dimension on the neck thread profile) outside tolerance. Cap will not seat correctly; leak risk after fill.

**LIKELY CAUSES**

- Wrong SKU shipped
- Neck insert worn at Delta plant

**FIRST ACTION**

STOP receiving. Test 20 preforms with the matching neck gauge ring.

**DIAGNOSE**

- Apply Go/No-Go neck gauge ring to 20 preforms
- All should accept Go ring; all should reject No-Go ring
- Document failures with gauge model + preform lot

**FIX**

- Step 1: Quarantine lot if any preform fails gauge test
- Step 2: Contact Delta with photos of gauge test + lot number

**PREVENT**

- Maintain calibrated neck gauge ring set per Delta SKU
- Gauge-test 20 preforms per incoming pallet

Sources: Kronos Incoming Preform Inspection Standard

**MAJOR** Preform wall thickness varies around circumference

Wall section measured at 4 points (0°, 90°, 180°, 270°) at body midpoint varies >0.15 mm. Causes asymmetric bottle walls after blowing.

**LIKELY CAUSES**

- IM mold core off-center (Delta plant issue)
- Asymmetric cooling
- Resin viscosity drift during shot

**FIRST ACTION**

Cross-section 5 preforms; measure wall at 4 angular positions.

**DIAGNOSE**

- Cut preform horizontally at body midpoint with a fresh blade
- Measure wall thickness at 0°, 90°, 180°, 270° using a 0.01 mm micrometer
- Calculate (max – min) variation

**FIX**

- Step 1: If variation >0.15 mm on multiple samples, contact Delta
- Step 2: Provide measurements + photos of cross-section

**PREVENT**

- Cross-section audit of 5 preforms per quarterly Delta lot

Sources: Petcore §3.3

**MAJOR** Gate vestige too tall (>1 mm)

Gate vestige (residual mark at bottom of preform) protrudes >1 mm. May cause bottle base defects — stress concentration, leak point.

**LIKELY CAUSES**

- Gate cutoff timing at Delta plant
- Cooling time too short (gate not yet solid when cutoff applied)
- Worn gate cutter / hot runner

**FIRST ACTION**

Measure gate vestige height on 20 preforms with calipers.

**DIAGNOSE**

- Place preform on flat surface and measure protrusion of gate dot
- Accept ≤1 mm; flag >1 mm

**FIX**

- Step 1: Document vestige heights
- Step 2: Contact Delta if >5% of sample exceeds 1 mm

**PREVENT**

- Visual + caliper check on 20 preforms per pallet

Sources: AMI §4.5

**CRITICAL** Incomplete or partial thread profile

Threads on the neck are partial, shallow, or missing in places. Caused by short-shot in IM cycle — material did not fill the thread cavities completely.

**LIKELY CAUSES**

- IM shot size short at Delta plant
- Injection pressure too low
- Thread mold cavity worn / contaminated

**FIRST ACTION**

STOP receiving. Visual inspection + gauge test on 30 preforms.

**DIAGNOSE**

- Visually inspect threads with magnifier on 30 preforms
- Apply Go/No-Go neck gauge to each
- Photograph 5 worst examples

**FIX**

- Step 1: Quarantine lot
- Step 2: Contact Delta with photos + gauge results

**PREVENT**

- Magnifier + gauge inspection on every incoming pallet

Sources: Krones Standard

**MAJOR** Thread flash / excess material at parting line

Thin flash of material extends from the thread profile at the mold parting line. Cap will not seat smoothly; thread engagement irregular.

**LIKELY CAUSES**

- IM mold clamping force insufficient at Delta plant
- Thread insert worn at parting
- Injection pressure too high

**FIRST ACTION**

Inspect 30 preforms with magnifier; measure flash height with caliper.

**DIAGNOSE**

- Magnifier inspection at thread region
- Caliper-measure flash height (acceptable:  $\leq 0.1$  mm)
- Test cap-on with sample cap; should torque smoothly

**FIX**

- Step 1: If flash  $> 0.1$  mm on  $> 5\%$  of sample, contact Delta
- Step 2: Document with photos

**PREVENT**

- Magnifier inspection of 30 preforms per pallet

Sources: AMI §4.6

**CRITICAL** Support ring chipped / damaged

Support ring (the flange below the threads) is chipped, cracked, or has missing pieces. Transfer chucks grip the support ring during blow molding; damaged rings cause transfer failure or dropped bottles.

**LIKELY CAUSES**

- Damage during demold at Delta plant
- Transit damage in shipping
- Mold ring insert chipped

**FIRST ACTION**

STOP receiving. Inspect support rings on 50 preforms.

**DIAGNOSE**

- Inspect support ring with magnifier on 50 preforms
- Look for chips, cracks, rough edges
- Document any damage photographically

**FIX**

- Step 1: Quarantine entire lot if  $> 2\%$  have damaged rings
- Step 2: Contact Delta immediately

**PREVENT**

- Support ring inspection on every incoming pallet

Sources: Krones Standard

**CRITICAL Neck out of round (ovality)**

Neck cross-section is oval rather than circular. Cap sealing fails on the oval axis. Common with hot-demolded preforms.

**LIKELY CAUSES**

- Preform demolded too hot at Delta plant (neck still soft)
- Mold neck insert worn

**FIRST ACTION**

Apply neck Go/No-Go gauge to 30 preforms.

**DIAGNOSE**

- Test 30 preforms with Go ring (should accept) and No-Go ring (should reject)
- Measure neck OD at 4 angular positions on a sample
- Ovality acceptable: max – min ≤ 0.1 mm

Sources: Kronen Standard

**FIX**

- Step 1: Quarantine lot if >2% fail gauge
- Step 2: Contact Delta with measurements

**PREVENT**

- Gauge test on incoming inspection

**CRITICAL Gate vestige inside neck (mold misplacement)**

Gate vestige appears inside the neck region rather than at the dome. Indicates incorrect mold or wrong SKU entirely.

**LIKELY CAUSES**

- Wrong SKU shipped
- Carton labeled incorrectly at Delta

**FIRST ACTION**

STOP receiving. Verify SKU label vs preforms visually.

**DIAGNOSE**

- Inspect 10 preforms from the lot
- Gate should always be at the bottom dome
- If at neck, this is a wrong-SKU situation

Sources: AMI §4.7

**FIX**

- Step 1: Verify carton label against order
- Step 2: Contact Delta immediately

**PREVENT**

- Visual SKU verification at receipt

**CRITICAL Preform top sealing surface damaged (scratches, nicks, gate vestige)**

The horizontal top sealing surface of the preform (where the closure liner / inner seal mates) has visible scratches, nicks, sink marks, or gate-vestige protrusions. Caused by mold gate damage, conveyor abrasion during transit, or handling damage at the bottler. Even microscopic defects (~0.05mm) cause CO2 leakers in carbonated applications — the closure may be perfect, the capper torque may be in-spec, but the bottle still leaks because the preform side of the seal is compromised. Often discovered AFTER replacing closure stock and re-validating capper torque without success.

**LIKELY CAUSES**

- Mold gate / cavity surface damage at Delta IM line (rare; periodic mold inspection at Delta)
- Handling abrasion during transit (carton interior wear, pallet shifting)
- Conveyor scuff on the bottler intake conveyor before capping (rails dragging on neck top)
- Gate vestige height above 1.0 mm (interferes with seal — separate from "off-center gate")

**FIRST ACTION**

Invert a preform and inspect the top sealing surface under angled bright LED (~30° to surface). Magnify with 5x loupe if available. Compare to a known-good preform from a different lot.

**DIAGNOSE**

- Invert 30 preforms; inspect top sealing land under angled LED
- Photograph 5 worst examples with rule for scale
- Functional test: apply closures by hand at SKU-rated torque, then pressure-test the bottle at SKU pressure rating, submerge — bubbles indicate seal failure
- Cross-check vs closure-side defects: if leakers persist after switching to a different closure lot, preform sealing land is the cause

Sources: ISBT PCO 1881 Sealing Standards · Bevcap Seal Land Inspection Guide · Delta Preform QC Manual

**FIX**

- Step 1: Quarantine the preform lot; report to Delta with photos + leaker rate + bottle pressure spec
- Step 2: Delta cavity inspection on the source mold cavity (cavity ID molded into the preform body)
- Step 3: Mold gate refurbishment / cavity replacement at Delta if cavity-side cause confirmed
- Step 4: Replacement lot from validated cavities

**PREVENT**

- Incoming preform QC: top sealing surface visual inspection on 30 preforms per pallet
- Use UHMWPE conveyor rails on bottle intake (no metal contact on neck top)
- Gate vestige height check at incoming (≤1.0 mm)

**CRITICAL** Preform neck wall thickness undersize at sealing area

Wall thickness at the bottle finish sealing area (just below the support ring) is below SKU specification. PCO 1881 nominal: 1.6-2.2 mm; PCO 1810: 2.0-2.6 mm; 32/15 1.8-2.4 mm. Undersize wall deforms under capper downforce — the neck flexes inward, the sealing surface tilts, and the closure seals on a moving target. Result: intermittent leakers that pass initial QC but fail in storage. Often misdiagnosed as capper torque issue when the real cause is preform geometry.

**LIKELY CAUSES**

- Mold cavity drift at neck core (worn neck-forming pin at Delta IM line)
- Resin shot weight too low (cavity not fully packed in neck area)
- Cooling time too short — neck wall not fully formed before ejection
- Wrong SKU shipped (misabeled carton with thinner-wall variant)

**FIRST ACTION**

Section 5 preforms transversely through the sealing land area with a clean blade. Measure wall thickness at 4 points (0°, 90°, 180°, 270°) with a micrometer or calibrated profile projector. Mean must meet SKU spec.

**DIAGNOSE**

- Section 5 preforms at the sealing land area (just below support ring)
- Measure wall thickness at 4 equally-spaced points per preform with 0.01mm micrometer
- Calculate mean, min, range per preform
- Compare to SKU spec (PCO 1881: 1.6-2.2 mm; verify against Delta SKU sheet)

**FIX**

- Step 1: Quarantine lot; contact Delta with sectioned-sample measurements + photos
- Step 2: Delta cavity inspection — neck-forming pin wear at the source cavity
- Step 3: Mold pin refurbishment or replacement at Delta
- Step 4: Replacement lot from validated cavities with neck wall measurements certified on CoA

**PREVENT**

- Incoming QC: wall thickness sample on 5 preforms per pallet for CSD programs
- Request neck wall thickness on Delta CoA for CSD lots
- Calibrated micrometer (annual NIST calibration)

Sources: ISBT PCO 1881 Geometry Standards · Petcore Preform Geometry Guide §3.4 · Bevcap CSD Application Manual

**Visual — colour, haze, specks, surface**

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**MAJOR** Color streaks / marbled masterbatch dispersion

Visible color streaks, swirls, or patches indicating incomplete masterbatch dispersion. Bottles produced will show similar streaks. Brand-customer rejection risk.

**LIKELY CAUSES**

- Masterbatch dosing rate inconsistent at Delta plant
- Masterbatch carrier not compatible with PET (clumping)
- Mixing screw worn

**FIRST ACTION**

Visually inspect 30 preforms under standard daylight; flag any with visible streaks.

**DIAGNOSE**

- Inspect 30 preforms against a white background under 5000K daylight
- Document streak pattern photographically
- Compare to approved color sample from Delta

**FIX**

- Step 1: If >5% of sample shows streaks, contact Delta
- Step 2: Quarantine the lot pending Delta inspection

**PREVENT**

- Approved color reference sample retained on site
- Visual inspection at incoming QC

Sources: Petcore Color Brief 2021

**MAJOR Color off-target (different from approved sample)**

Overall color tint differs from the approved Delta sample. May be brighter, darker, more yellow, more blue.

**LIKELY CAUSES**

- Different masterbatch lot at Delta plant
- Masterbatch dosing rate drift
- Resin lot change (different IV / additives)

**FIRST ACTION**

Compare 5 preforms to retained approved sample under standardized lighting.

**DIAGNOSE**

- Place new preform alongside reference sample under D65 (6500K) light
- Compare to retained approved sample
- If using spectrophotometer, measure  $\Delta E$ ; should be  $<2.0$

**FIX**

- Step 1: If  $\Delta E >2.0$  or visible difference, contact Delta with photos
- Step 2: Provide masterbatch lot number from carton

**PREVENT**

- Retain a sealed reference sample for each program
- Annual color reference update with Delta

Sources: Petcore Color Brief 2021

**CRITICAL Preform hazy / cloudy appearance**

Preform appears cloudy or hazy rather than clear. Caused by moisture-induced hydrolysis during injection molding. Bottles will be hazy and structurally weakened.

**LIKELY CAUSES**

- Resin not dried sufficiently before IM at Delta plant (dewpoint  $>-40^{\circ}\text{C}$ )
- Wet PET pellets at Delta

**FIRST ACTION**

STOP receiving. Hazy preforms produce structurally weak bottles.

**DIAGNOSE**

- Hold preform up to light against dark background
- Clear preform: transmits light clearly
- Hazy preform: milky / cloudy transmission
- Photograph for Delta reference

**FIX**

- Step 1: Quarantine entire lot
- Step 2: Contact Delta immediately with photos + lot number
- Step 3: Request full lot replacement under quality guarantee

**PREVENT**

- Reject any hazy preform on incoming inspection

Sources: Petcore Drying Brief 2020

**CRITICAL Black specks / burnt material visible in wall**

Visible black or dark specks in the preform wall. Burnt material from IM extruder hot spot or contaminated regrind. Bottles will have visible specks; structural weakness at speck location.

**LIKELY CAUSES**

- Burnt material from extruder dead zone at Delta plant
- Contaminated regrind
- Foreign material in resin feed

**FIRST ACTION**

STOP receiving. Inspect 50 preforms; count those with visible specks.

**DIAGNOSE**

- Inspect 50 preforms under bright light against white background
- Use a magnifier for small specks
- Photograph 5 worst examples for Delta

**FIX**

- Step 1: Quarantine lot if  $>2\%$  of sample shows specks
- Step 2: Contact Delta with photos + count

**PREVENT**

- Magnifier inspection of 50 preforms per pallet

Sources: Petcore Specks Defect Brief 2020

**CRITICAL Gel inclusions (unmelted material) in wall**

Transparent or translucent inclusions in the preform wall, appearing as small lumps or specks. PET has not fully melted, or PET has undergone hydrolysis. Causes pinhole defects in blown bottles.

**LIKELY CAUSES**

- IM barrel temperature too low at Delta plant
- Wet PET pellets producing hydrolysis
- Resin lot quality issue

**FIRST ACTION**

Inspect 30 preforms under bright transmitted light.

**DIAGNOSE**

- Backlight preform with bright LED; rotate slowly
- Gels appear as small refractive distortions in the wall
- Photograph worst examples

**FIX**

- Step 1: Quarantine if >3% of sample shows gels
- Step 2: Contact Delta with photos + lot number

**PREVENT**

- Backlight inspection on 30 preforms per pallet

Sources: Petcore Gels Brief 2020

**CRITICAL Foreign contamination visible in preform**

Non-PET material visible inside the preform wall — dust, fiber, paper, metal fragments. Causes catastrophic bottle failure at the contamination point.

**LIKELY CAUSES**

- Resin contamination at Delta supplier
- Foreign material in Delta IM feed system
- Carton contamination during packing

**FIRST ACTION**

STOP receiving. Inspect 100 preforms thoroughly.

**DIAGNOSE**

- Inspect 100 preforms under bright light
- Identify type of contamination if possible (fiber/metal/dust)
- Photograph each instance

Sources: Petcore Contamination Brief 2021

**FIX**

- Step 1: Quarantine entire lot
- Step 2: Contact Delta engineering with photos + lot number
- Step 3: Request full replacement and root-cause report

**PREVENT**

- 100-preform incoming inspection for any sealed lot

**Material — IV, crystallinity, brittleness, moisture**

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**CRITICAL Preform brittleness (cracks under bend test)**

Preform cracks or fractures under hand bend test. PET has degraded — either from excessive regrind, hydrolysis, or thermal abuse during IM. Blown bottles will fail.

**LIKELY CAUSES**

- High regrind ratio at Delta plant (>30%)
- IM barrel temperature too high (thermal degradation)
- Wet PET (hydrolysis)

**FIRST ACTION**

STOP receiving. Hand bend-test 10 preforms.

**DIAGNOSE**

- Hold preform horizontal; bend gently 30°
- Good preform: flexes back without cracking
- Brittle preform: cracks or fractures
- Test 10 preforms per pallet for statistical validity

Sources: Petcore IV Brief 2021

**FIX**

- Step 1: Quarantine entire lot if any preform cracks
- Step 2: Contact Delta immediately with photos
- Step 3: Request IV test results from Delta

**PREVENT**

- Bend-test 10 preforms from each incoming pallet

**CRITICAL** **Preform semi-crystalline (whitened body)**

Preform body shows white or opaque coloration instead of being clear. PET has converted to crystalline phase — cannot blow into a usable bottle (will pearlescence or crack).

**LIKELY CAUSES**

- IM cooling time too long at high temp (Delta plant)
- IM barrel temperature too high
- Resin grade incorrect for IM conditions

**FIRST ACTION**

STOP receiving. Visual inspection: clear vs white-tinted body.

**DIAGNOSE**

- Hold preform up to light
- Clear preform: transparent body
- Crystalline preform: white opacity in body
- Tap suspect preform — brittle = confirmed crystalline

**FIX**

- Step 1: Quarantine lot
- Step 2: Contact Delta — this is a critical defect

**PREVENT**

- Visual inspection at receipt

Sources: *Petcore Crystallinity Brief*

**CRITICAL** **Preforms moisture-contaminated (after delivery)**

Preforms received in sealed cartons that have been opened, water-damaged, or stored in high-humidity conditions. PET absorbs moisture; subsequent blow molding will produce hazy bottles with gels.

**LIKELY CAUSES**

- Carton seal broken in transit
- Storage in humid warehouse without sealed packaging
- Carton water-damaged during transit

**FIRST ACTION**

Inspect carton seals; if any broken, run dewpoint check before processing.

**DIAGNOSE**

- Inspect all cartons for seal integrity
- For broken-seal cartons, weigh 10 preforms after 4 hours at 80°C drying
- Mass loss >0.2% indicates moisture absorption

**FIX**

- Step 1: Quarantine broken-seal cartons
- Step 2: Optionally re-dry preforms at 80°C for 4 hours before use
- Step 3: Contact Delta if extensive lot moisture-damaged

**PREVENT**

- Seal integrity inspection at receipt
- Climate-controlled warehouse storage (RH <50%)

Sources: *Petcore Drying Brief 2020*

**CRITICAL** **Low intrinsic viscosity (weak preforms)**

Preform has lower IV than specified — typically caused by excessive regrind or hydrolysis. Visible as slightly hazy preforms with reduced strength. Bottles will be weak and burst-prone.

**LIKELY CAUSES**

- Excessive regrind ratio (>30%) at Delta plant
- Hydrolysis (wet PET) reduces IV
- Wrong resin lot used

**FIRST ACTION**

Request IV test certificate from Delta for the lot.

**DIAGNOSE**

- Request Certificate of Analysis (COA) from Delta for the lot
- IV should be  $\geq 0.74$  dL/g for CSD;  $\geq 0.72$  for water
- If COA unavailable, send 5 preforms for independent IV test

**FIX**

- Step 1: Quarantine lot pending IV confirmation
- Step 2: If IV below spec, contact Delta with COA + measurements for lot replacement under quality guarantee

**PREVENT**

- Require COA with each pallet from Delta

Sources: *Petcore IV Brief 2021*

**CRITICAL** Regrind ratio exceeded / unauthorized regrind

Preforms show signs of high regrind content: slight color drift, increased haze, dark specks. Regrind ratio above the agreed-upon limit weakens bottles.

**LIKELY CAUSES**

- Delta plant exceeded contracted regrind ratio
- Regrind contamination from other resin grades

**FIRST ACTION**

Inspect 50 preforms for color drift and specks; request COA.

**DIAGNOSE**

- Compare lot to reference sample for color drift
- Count specks per 50 preforms
- Request COA stating regrind ratio

**FIX**

- Step 1: If COA shows >30% regrind, contact Delta about contract terms
- Step 2: For brand-customer programs, often spec is 0% regrind

**PREVENT**

- Contract specification of regrind ratio
- COA requirement per lot

Sources: Petcore Regrind Guidelines

**Packaging & transit**

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**MAJOR** Carton damage visible at receipt

Cartons are crushed, torn, water-stained, or have visible damage on arrival. Internal preforms may be damaged from impact or contaminated from exposure.

**LIKELY CAUSES**

- Transit impact / forklift damage
- Stack collapse during shipping
- Water exposure during transit

**FIRST ACTION**

Photograph all damaged cartons before opening; document on receiving log.

**DIAGNOSE**

- Photograph each damaged carton (4 angles)
- Open damaged cartons last; inspect preforms inside
- Reject visibly contaminated preforms

**FIX**

- Step 1: Document damage on receiving paperwork
- Step 2: File claim with carrier if transit damage
- Step 3: Contact Delta if packaging-related

**PREVENT**

- Receiving SOP: photograph all damaged cartons before unloading

Sources: Petcore Packaging Guidelines

**MAJOR** Contamination inside carton (dust, debris, water)

Foreign material visible inside the carton — dust, debris, water marks, insect remains. Risk of contaminating preforms.

**LIKELY CAUSES**

- Carton not sealed at Delta plant
- Seal broken in transit
- Pest infestation in warehouse

**FIRST ACTION**

Quarantine the carton; do not process preforms until inspected.

**DIAGNOSE**

- Inspect carton contents under bright light
- Identify contamination type and quantity
- Inspect preforms for contamination on surface

**FIX**

- Step 1: Reject visibly contaminated preforms
- Step 2: Wash uncontaminated preforms with deionized water if needed (program-specific)
- Step 3: Contact Delta with photos

**PREVENT**

- Sealed carton inspection at receipt
- Pest control in warehouse

Sources: Petcore Packaging Guidelines

**MINOR Surface scratches / handling marks on preforms**

Visible scratches, scuff marks, or contact marks on preform body surface. Caused by preforms rubbing against each other in transit. Cosmetic defect; doesn't affect function but may transfer to bottles.

**LIKELY CAUSES**

- Insufficient packing density (preforms shifting)
- Carton damage allowing internal movement
- Rough handling during transit

**FIRST ACTION**

Visual inspection of 30 preforms; rate scratch severity 1-5.

**DIAGNOSE**

- Inspect 30 preforms under standard daylight
- Categorize: minor (barely visible), moderate, severe
- Photograph severe examples

**FIX**

- Step 1: If >10% show moderate-severe scratches, contact Delta
- Step 2: Some programs (premium brands) reject any scratched preforms

**PREVENT**

- Visual inspection at receipt

Sources: Petcore Packaging Guidelines

**MAJOR Preforms inverted / disordered in carton**

Preforms found inverted (gate-up instead of neck-up) or randomly oriented in the carton. Causes problems with automatic feeders that expect oriented preforms.

**LIKELY CAUSES**

- Packing line orientation failure at Delta
- Carton dropped or jostled in transit

**FIRST ACTION**

Open one carton; verify all preforms oriented neck-up.

**DIAGNOSE**

- Inspect 5 cartons from the lot
- All preforms should be neck-up
- Document any inverted preforms

**FIX**

- Step 1: If >1% inverted, contact Delta
- Step 2: Manually re-orient if small quantity

**PREVENT**

- Carton inspection at receipt

Sources: Petcore Packaging Guidelines

**CRITICAL Moisture / condensation inside carton**

Water droplets, condensation, or wet preforms visible inside the carton. PET absorbs moisture; affected preforms will produce hazy bottles with gels.

**LIKELY CAUSES**

- Carton stored in temperature-shifting environment (condensation)
- Water ingress during transit
- Carton wasn't fully dry when sealed

**FIRST ACTION**

STOP. Quarantine entire affected lot.

**DIAGNOSE**

- Inspect carton for condensation
- Weigh 10 preforms; should match reference within 0.05%
- Optionally: dry at 80°C for 4 hours and re-weigh

**FIX**

- Step 1: Quarantine lot
- Step 2: Re-dry preforms at 80°C x 4 hours before use, OR reject lot
- Step 3: Contact Delta with photos

**PREVENT**

- Climate-controlled warehouse
- Carton seal integrity inspection

Sources: Petcore Drying Brief 2020

## Appendix — Incoming QC Checklist

Minimum sampling at goods-in, against the Delta spec sheet for the ordered SKU. Reject and quarantine any lot outside tolerance and contact Delta with data + lot number under the quality guarantee.

CHECK	SAMPLE	ACCEPT
<b>CARTON</b>		
Carton seal integrity + label matches ordered SKU	Every carton	Seals intact; SKU + lot match PO
Carton damage / water staining / crush	Every carton	No visible damage or moisture
Preforms oriented & undisturbed in carton	Spot-check	Neck-up, ordered, dry
<b>DIMENSIONAL</b>		
Net weight on 0.01 g scale	30 / pallet lot	Mean within $\pm 0.3$ g of nominal
Overall length (caliper)	20 / pallet lot	Mean within $\pm 0.5$ mm
Body outer diameter (caliper)	20 / pallet lot	Within $\pm 0.2$ mm
Neck / sealing-surface diameter	20 / pallet lot	Per finish spec
<b>VISUAL</b>		
Colour vs approved reference sample	5 / lot	No visible difference
Haze / specks / gels / contamination	5 / lot	None visible in wall
<b>MATERIAL</b>		
Resin IV & AA on lot COA	Lot COA	Within application target
Regrind declaration	Lot COA	Authorised ratio only