# TECHNICAL SPECIFICATION

*Installation and Field Assembly of HDPE Cabinet Systems*

**Specification No.:** AK-CAB-001

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**Application:** Indoor and exterior base cabinets, islands, wall cabinets, panels, and appliance enclosures

**Primary Principle:** Anchor the system securely while allowing every HDPE component to expand and contract without binding.

**Critical fastening rule** Use corrosion-resistant bolts through oversized or slotted holes with broad metal load-spreading washers and resilient EPDM/neoprene rubber washers. Tighten only enough to seat and restrain the assembly. Do not clamp the HDPE rigidly, crush the sheet, or prevent thermal movement.

## 1. Scope and installer responsibility

This specification defines ArmorKore minimum requirements for receiving, storing, laying out, leveling, joining, anchoring, fastening, sealing, and inspecting HDPE cabinet systems. It applies to cabinet-to-cabinet connections and attachment to floors, walls, structural bases, appliance frames, end panels, and accessory supports.

The installer shall follow the approved shop drawings, local code, appliance listings, countertop requirements, and project engineering. More restrictive requirements govern. Installers may and shall increase bolt size, support, anchorage, movement clearance, corrosion resistance, heat shielding, waterproofing, or bracing when required for safe workmanship or code compliance.

## 2. HDPE thermal expansion

- King Plastic reports a coefficient of linear thermal expansion of approximately 6 × 10^-5 in./in./°F for King StarBoard-type HDPE, equal to approximately 1/32 in. per foot for a 40°F temperature change.
- Calculate movement from the component temperature at installation to the expected hot and cold service temperatures. For exterior cabinets, include solar heating; dark surfaces can become substantially hotter than ambient air.

**Expansion calculation** Movement (in.) = component length (in.) × 0.00006 × temperature change (°F). Example: a 96 in. cabinet run exposed to an 80°F change may move about 0.46 in. total. If restrained near the center, provide roughly half the calculated movement toward each end, plus installation tolerance.

| Item | Minimum requirement | Acceptance / notes |
|---|---|---|
| **48 in. component / 40°F** | 48 × 0.00006 × 40 = 0.115 in. | Approximately 1/8 in. movement. |
| **96 in. run / 40°F** | 96 × 0.00006 × 40 = 0.230 in. | Approximately 1/4 in. movement. |
| **96 in. run / 80°F** | 96 × 0.00006 × 80 = 0.461 in. | Approximately 15/32 in. movement. |

## 3. Materials and fasteners

| Item | Minimum requirement | Acceptance / notes |
|---|---|---|
| **Primary bolts** | 304 stainless steel minimum; 316 stainless steel for exterior, coastal, chlorinated, or severe environments. Use through-bolts wherever both sides are accessible. | Diameter and spacing per loads and drawings; 1/4 in. minimum. |
| **Oversized holes** | Drill clearance holes larger than the bolt shank or provide elongated slots parallel to expected movement. Size for calculated travel plus at least 1/8 in. field tolerance. | Bolt shall not contact the hole edge at either movement extreme. |
| **Washer stack** | Use broad stainless fender/load-spreading washer plus EPDM or neoprene rubber washer against the HDPE. Provide isolation washer where dissimilar metals could contact. | Rubber washer remains continuous, flexible, UV/ temperature compatible, and not extruded. |
| **Nuts** | Use stainless prevailing-torque locknuts, all-metal locknuts where heat requires, or double nuts. | Do not use nut torque to clamp HDPE rigidly. |
| **Screws** | Use only where through-bolting is impractical. Use stainless coarse-thread screws in correctly sized pilot holes; counterbore/countersink only as detailed. | Do not use drywall screws or unapproved self-drilling screws. |
| **Shims / pads** | Use nonabsorbent HDPE, polypropylene, EPDM, or approved composite shims. | No wood, paper, cardboard, or water-sensitive shims. |
| **Sealants** | Neutral-cure, non-staining, exterior-rated flexible sealant compatible with HDPE and adjacent materials. | Sealant does not replace required mechanical attachment. |

## 4. Site and substrate requirements

- Verify finished floor, curb, wall, slab, and structural backing locations against approved drawings before unloading or drilling.
- Substrates shall be sound, capable of carrying cabinet, countertop, appliance, wind, seismic, and service loads, and free of standing water or uncorrected drainage defects.
- Establish cabinet control lines and finished elevations. Unless drawings require tighter tolerances, finished cabinet tops shall be level within 1/8 in. over 10 ft and adjacent cabinets within 1/16 in.

- Locate plumbing, gas, electrical, drains, vents, irrigation, waterproofing, post-tension cables, and concealed utilities before drilling. Penetrations through waterproofed surfaces require approved sleeves and sealant details.
- Provide structural blocking or anchors appropriate to the substrate. Do not rely on finish cladding, stucco, veneer, drywall, thin sheet metal, or nonstructural masonry faces.

## 5. Cabinet layout and base installation

1. Inspect cabinet boxes, doors, panels, hardware, and predrilled attachment points. Report damage or dimensional conflicts before installation.
2. Place cabinets in approved sequence without dragging exposed finished surfaces. Maintain required gaps at walls, columns, appliances, and fixed structures.
3. Level the first cabinet on nonabsorbent shims at structural bearing points. Support the cabinet continuously or at the locations shown on the shop drawings; do not create isolated point loads that distort the box.
4. Set adjacent cabinets, align faces and top rails, and temporarily clamp with padded clamps. Confirm door and drawer reveals before drilling or bolting.
5. Connect cabinets using the oversized-hole bolted method in Section 6. Do not pull distorted or out-of-square cabinets into alignment by tightening bolts.
6. Anchor the assembled run to the floor, wall, or structural base using approved movement-accommodating brackets. Recheck level, square, plumb, and openings after every anchor group.
7. Install structural countertop sub-base, appliances, fillers, end panels, and accessories only after the cabinet run has been accepted.

## 6. Cabinet-to-cabinet bolted connections

### 6.1 Preferred connection assembly

- Provide one designated fixed/reference connection near the center of each independent cabinet run or movement zone. Remaining connections shall permit movement using oversized round holes or slots oriented along the run.
- At each moving connection, assemble the bolt with a broad stainless washer outside the rubber washer. Place the EPDM/neoprene washer directly against the HDPE unless the approved detail shows a sleeve or isolator.
- Where a bolt passes through two independently moving HDPE panels, provide clearance on both panels or use a slotted joining plate so neither panel is pinned unintentionally.
- Hand-tighten the nut until components are seated and rattle is removed, then stop. The rubber washer may be lightly compressed but shall not bulge, split, squeeze out, or cause visible panel dish.

- After tightening, verify the washer can slide over the HDPE under anticipated movement or that the bolt remains centered with the full required clearance. Mark the nut/bolt for visual inspection.

### 6.2 Connection spacing and edge distance

- Use ArmorKore shop drawings where provided. In their absence, place cabinet-to-cabinet connections near the front and rear structural rails and at intermediate structural rails; do not exceed 24 in. vertically or horizontally without approval.
- Maintain bolt-hole centerline edge distance of at least two bolt diameters and never less than 1 in. from a free HDPE edge unless a reinforced factory detail permits less.
- Use backing plates or larger fender washers where localized bearing could elongate the hole. Reinforce highly loaded hinge, pull-out, cantilever, and appliance-support locations.
- Do not drill holes with square inside corners, notches, or tool damage. De-burr all holes and slots without reducing required bearing area.

## 7. Floor, wall, and island anchorage

| Item | Minimum requirement | Acceptance / notes |
|---|---|---|
| **Floor anchorage** | If Needed-Use corrosion-resistant angle brackets or base plates connected to cabinet structural rails. Slot the cabinet-side connection in the movement direction; anchor the building side rigidly to structure. | Avoid direct rigid pinning of long HDPE bases at multiple locations. |
| **Wall anchorage** | Fasten to verified structural blocking/studs/masonry with approved anchors. Use slotted stainless brackets between wall structure and HDPE cabinet. | Do not anchor only to cladding or drywall. |
| **Island restraint** | Provide concealed structural anchorage capable of overturning, sliding, wind, seismic, and appliance loads. Coordinate with waterproofing and utilities. | Use engineer-designed frames for large islands, cantilevers, or high wind exposure. |
| **End conditions** | Provide calculated clearance at walls, columns, masonry, and fixed appliance bodies; minimum 1/8 in., increased as movement requires. | Do not fill movement space with rigid grout or trim. |

## 8. Additional HDPE assembly recommendations

- Support loaded HDPE panels with rails, ribs, stretchers, or frames. King Plastic states its marine-grade polymer sheets are strong but are not structural materials and require load-bearing support.
- Use mechanical fasteners as the primary structural connection. Do not rely on ordinary construction adhesive; polyethylene is a low-surface-energy plastic and typically requires specialized adhesive and surface validation.

- Pilot-drill screws and use counterbores/countersinks only where the factory detail requires a flush head. Avoid wedging action, overdriven heads, and stress concentrations.
- Use rounded internal corners and smooth transitions at large cutouts. Provide reinforcement around sinks, appliances, access openings, and concentrated hardware loads.
- Break long straight runs into movement zones where practical. Align cabinet breaks with countertop sub-base gaps, countertop joints, filler panels, or flexible trim locations.
- Isolate aluminum or carbon steel from wet HDPE assemblies where galvanic corrosion is possible. Use 316 stainless and compatible isolation materials in coastal, pool, and chlorine environments.
- Do not obstruct ventilation, drainage, weep paths, electrical access, gas shutoffs, or appliance service removal with brackets, sealant, insulation, or anchors.

## 9. Heat, water, and exterior protection

- Maintain every appliance-listed clearance. Use listed insulated jackets, noncombustible shields, ventilated air spaces, and structural supports at grills, burners, ovens, heaters, and other heat sources.
- Prevent direct radiant or conducted heat from reaching HDPE. Do not allow metal brackets, countertop sub-bases, or appliance flanges to bypass the required thermal break.
- Seal exterior wall/floor penetrations and cabinet penetrations using compatible flexible sealant and sleeves. Maintain drainage so water cannot become trapped inside bases or between cabinets.
- Use UV-stabilized, exterior-rated rubber washers, gaskets, sealants, and isolators. Replace any rubber component that is cracked, hardened, swollen, or permanently extruded.
- Keep cabinet bottoms above standing water and irrigation discharge. Provide drainage clearance and avoid sealing the entire base perimeter where trapped water cannot escape.

## 10. Final adjustment and inspection

| ✓ | Acceptance item |
|---|---|
| ☐ | Cabinet run matches approved plan, elevation, and appliance openings. |
| ☐ | Cabinets are level, square, plumb, aligned, and supported without distortion. |
| ☐ | Thermal design range and expansion calculation are documented. |
| ☐ | One fixed/reference point is identified for each independent movement zone. |
| ☐ | Remaining bolts pass through correctly oversized holes or slots. |
| ☐ | Broad stainless washers and EPDM/neoprene rubber washers are installed. |
| ☐ | Bolts are seated but not overtightened; HDPE is not crushed or visibly dished. |
| ☐ | Locknuts/retention devices are secure and witness-marked where appropriate. |
| ☐ | Floor/wall anchors connect to verified structure and allow cabinet-side movement. |
| ☐ | Heat shields, ventilation, drainage, waterproofing, and service access are complete. |
| ☐ | Doors, drawers, fillers, appliances, and panels operate without binding through expected movement. |
| ☐ | Installer has documented deviations and obtained required approvals. |

## 11. Limitations

This document provides ArmorKore minimum installation criteria and is not a substitute for project-specific structural, wind, seismic, fire, waterproofing, gas, electrical, or appliance design. The authority having jurisdiction, design professional, appliance manufacturer, approved shop drawings, and current product instructions may require more. Any field modification affecting cabinet structure, heat clearances, anchorage, or movement shall be approved before work proceeds.

## 12. Technical references


- King Plastic Corporation, “Does King StarBoard expand and contract?” https://www.kingplastic.com/qa/king-starboard-expand-contract/
- King Plastic Corporation, King StarBoard product and fabrication resources. https://www.kingplastic.com/products/king-starboard/
- King Plastic Corporation, “Support Techniques for King StarBoard.” https://www.kingplastic.com/category/cnc-and-fabrication/
- King Plastic Corporation, Information Guide for Tools and Fabrication Techniques. https://www.kingplastic.com/how-to-cnc-fabricate-polymer/
- 3M, “Categorizing Surface Energy” (polyethylene as a low-surface-energy plastic). https://www.3m.com/3M/en_US/bonding-and-assembly-us/resources/science-of-adhesion/categorizing-surface-energy/