

Knock Down Fitting: Cam and Dowel Engagement Verification

1.0 Objective & Quality Standard

The objective of this procedure is to ensure that all cam and dowel connections in knock-down (KD) fittings are fully engaged, aligned, and torqued to specification, preventing joint failure or misalignment in the final assembly. The acceptable tolerance for cam rotation is 180 degrees $\pm$ 5 degrees from the start position, and the dowel must be seated flush within 0.5mm of the panel surface.

2.0 Required Tools & Gauges

- Torque screwdriver (calibrated, range 0.5-2.0 Nm)
- Digital caliper (0-150mm, resolution 0.01mm)
- Feeler gauge set (metric, 0.1-1.0mm)
- Cam and dowel engagement verification jig (if available)
- Marking pen (non-permanent, for red-tagging)

3.0 Safety & Material Handling

- Wear cut-resistant gloves when handling KD fittings to avoid sharp edges.
- Ensure panels are placed on a clean, flat assembly table to prevent scratches.
- Use ergonomic lifting techniques when positioning heavy panels to avoid strain.

4.0 Step-by-Step Procedure

1. Inspect the cam and dowel components for visible damage, burrs, or debris before assembly.
2. Insert the dowel into the pre-drilled hole on the first panel, ensuring it is fully seated and flush within 0.5mm of the surface.
3. Align the second panel so the cam hole is positioned directly over the dowel.
4. Insert the cam into its designated hole with the arrow or indicator pointing toward the dowel entry point.
5. Using the torque screwdriver, rotate the cam clockwise until it reaches the stop position (approximately 180 degrees). Apply a torque of 1.2 Nm $\pm$ 0.1 Nm.
6. Verify that the cam is fully engaged by checking that the arrow or indicator points away from the dowel and the cam head is flush with the panel surface.
7. Measure the gap between the two joined panels using a feeler gauge; the gap must not exceed 0.3mm.
8. Check for any lateral movement by gently pushing the joint; there should be no play or shifting.
9. Repeat steps 2-8 for all remaining cam and dowel connections on the assembly.
10. Document the torque reading and gap measurement for each joint on the QA checklist.

5.0 Verification & Defect Reporting

1. If the cam does not rotate the full 180 degrees or the torque exceeds 1.3 Nm, remove the cam, inspect for obstructions, and reinstall. If the issue persists, red-tag the panel for rework.
2. If the gap between panels exceeds 0.3mm, verify dowel seating and cam engagement. Adjust or replace components as needed.
3. Log all out-of-tolerance defects in the ShopDocs QA module, including the panel ID, defect type, and corrective action taken.
4. Escalate recurring defects to the production supervisor for root cause analysis and process improvement.

Regulatory Disclaimer: This document is a generic quality assurance template. The end-user assumes all liability for validating all dimensional tolerances, testing procedures, and engineering specifications against actual production requirements before deployment.