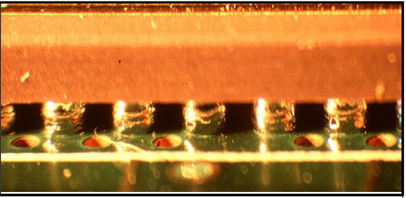
BALL GRID ARRAY - BGA

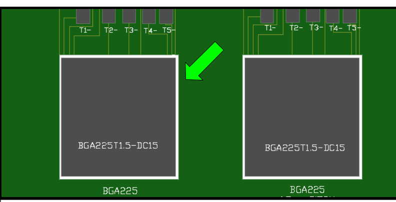
Ball Grid Array packages were designed to provide a device having high density input/output (I/O) array pattern interconnects, while minimizing device footprint and temperature coefficient (TC) problems. The array design features a low profile with shorter interconnections – resulting in superior electrical performance, speed, heat dissipation and noise reduction.

The placement of the interconnects on the bottom of the package limits visual inspection of the inner terminations, requiring the use of special microscopes or three-dimensional X-ray.



PREFERRED

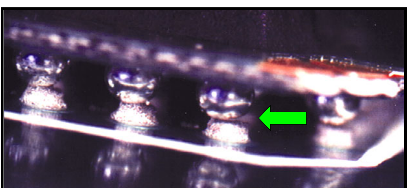
Solder terminations are smooth and rounded, with a clearly defined boundary. Terminations exhibit no voids, and are of the same diameter, volume, darkness and contrast. Registration is straight, with no pad overhang or rotation. No solder balls are present.



PREFERRED
FIDUCIAL ALIGNMENT

Alignment within the fiducial marks provides a rapid, visual indication of proper device alignment.

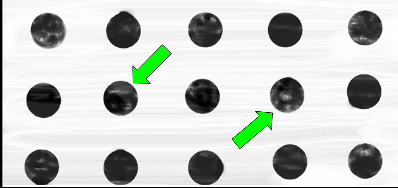
Best Workmanship Practice



ACCEPTABLE
PAD OVERHANG

Pad overhang is less than 25%.

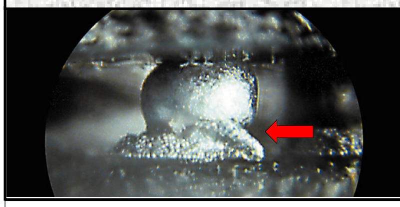
Best Workmanship Practice



ACCEPTABLE
VOIDS

Terminations that exhibit less than 10% voiding in the ball-to-board interface are acceptable.

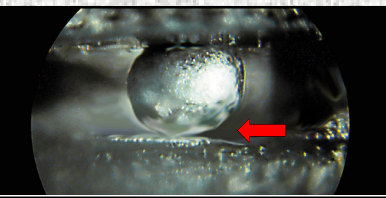
Best Workmanship Practice



UNACCEPTABLE
NON-REFLOW

Lack of proper reflow indicates poor process controls, typically insufficient heat during reflow.

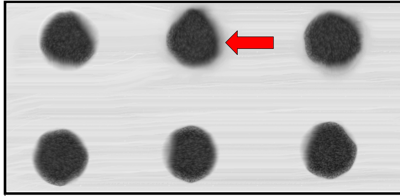
Best Workmanship Practice



UNACCEPTABLE
NON-WETTING

Non-wetting is an indicator of poor process controls.

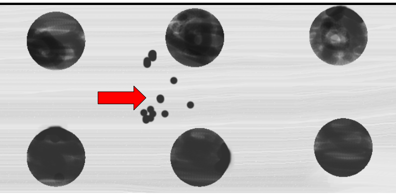
Best Workmanship Practice



UNACCEPTABLE
POOR DEFINITION

Solder joint boundaries exhibiting poor definition, appear fuzzy, or which blend in with the background, indicate insufficient reflow.

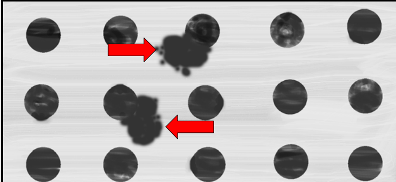
Best Workmanship Practice



UNACCEPTABLE
SOLDER BALLS

Solder ball(s) that violate the minimum electrical clearance shall be cause for rejection.

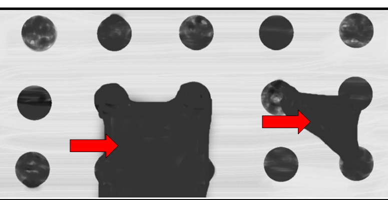
Best Workmanship Practice



UNACCEPTABLE
SOLDER BALLS

Solder balls that bridge more than 25% of the distance between the leads shall be cause for rejection.

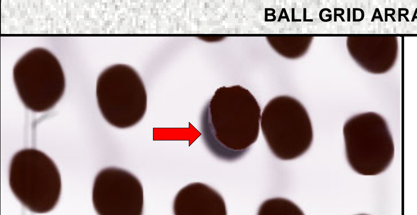
Best Workmanship Practice



UNACCEPTABLE
SOLDER BRIDGE

Solder bridging is an indicator of improper process, typically excess paste deposit.

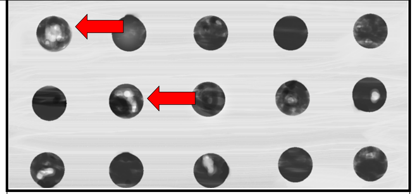
Best Workmanship Practice



UNACCEPTABLE
SOLDER OPENS

Solder opens are an indicator of improper process, typically insufficient paste deposit.

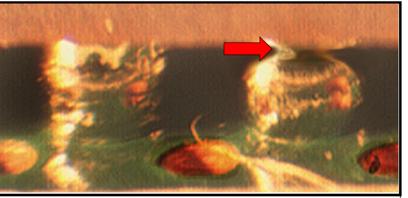
Best Workmanship Practice



UNACCEPTABLE
VOIDING

Terminations that exhibit 10% (or more) voiding in the ball-to-board interface shall be grounds for rejection.

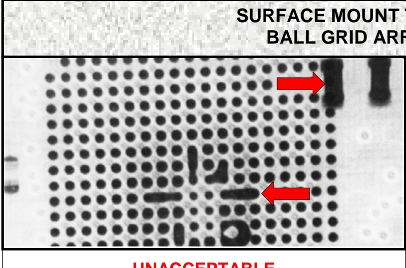
Best Workmanship Practice



UNACCEPTABLE
POOR FLOW

The fillet shall not exhibit poor or uneven flow at the top of the solder fillet.

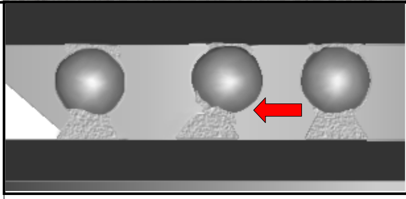
Best Workmanship Practice



UNACCEPTABLE
DARK SPOTS

Dark spots in the x-ray view, which cannot be attributed to circuitry (traces) or components underneath the BGA, shall be cause for rejection.

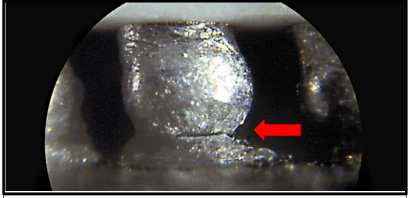
Best Workmanship Practice



UNACCEPTABLE
EXCESSIVE PAD OVERHANG

Pad overhang shall not exceed 25%.

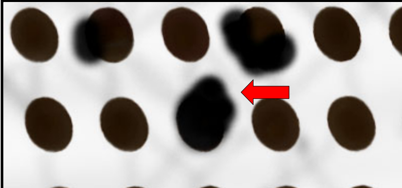
Best Workmanship Practice



UNACCEPTABLE
FRACTURE

Terminations exhibiting fractures in the ball-to board interface are unacceptable.

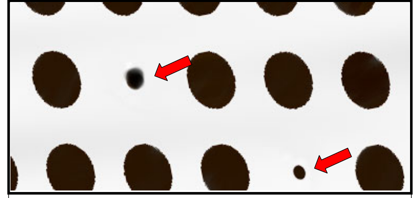
Best Workmanship Practice



UNACCEPTABLE
MISALIGNMENT

Misalignment is an indicator of improper process controls.

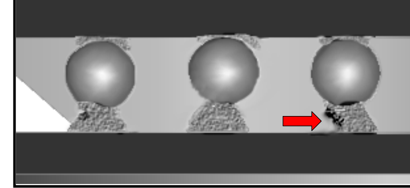
Best Workmanship Practice



UNACCEPTABLE
MISSING BALL

BGAs exhibiting missing solder balls shall be rejected.

Best Workmanship Practice



UNACCEPTABLE
MISSING SOLDER

Missing solder is an indicator of improper process controls.

Best Workmanship Practice