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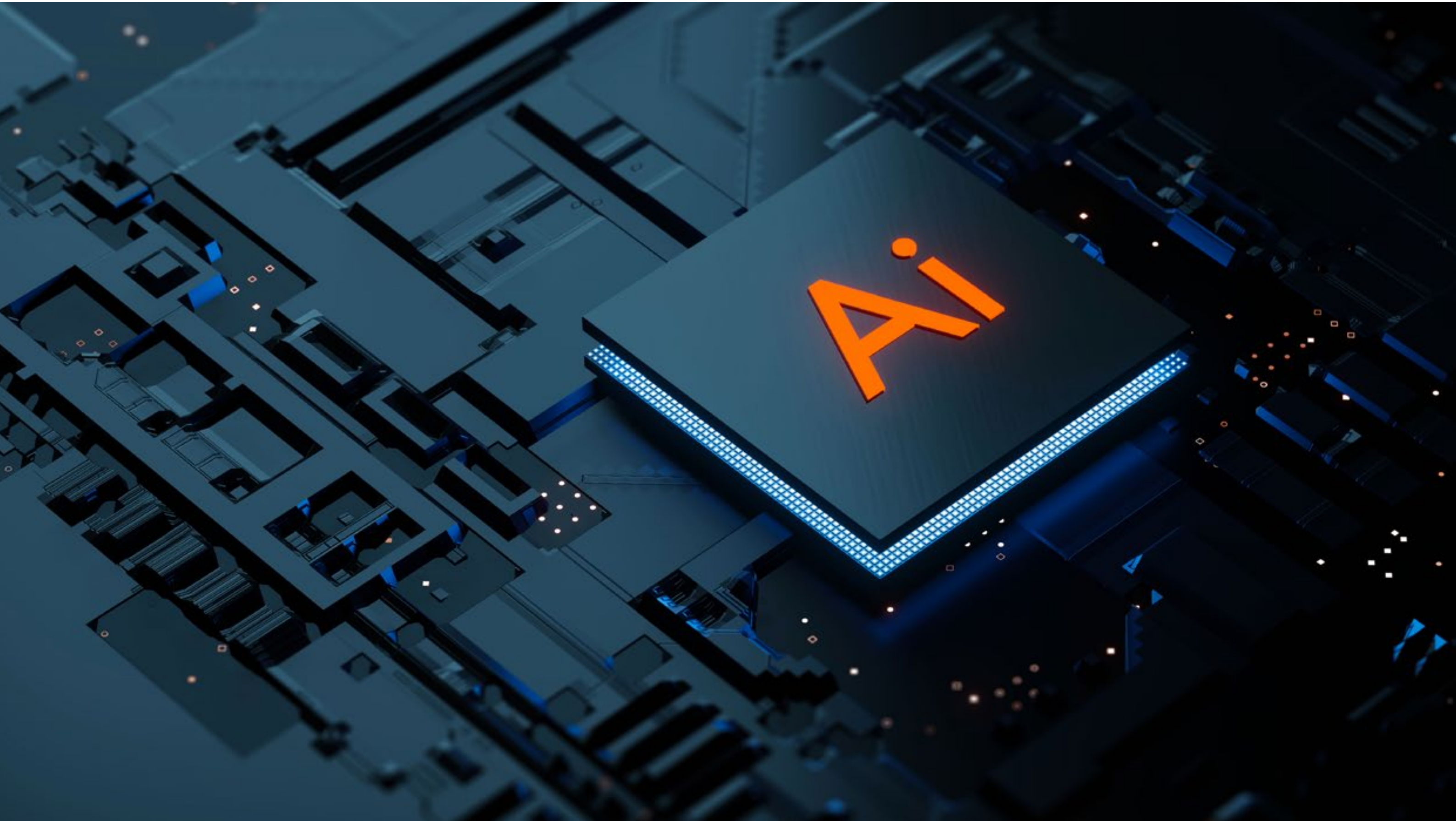
Electronics



AP500X

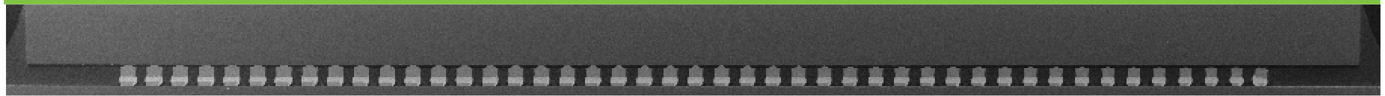
AP500X Water Soluble Flux

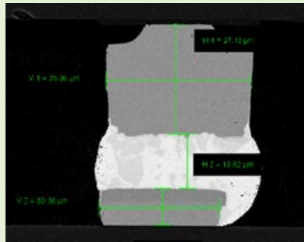
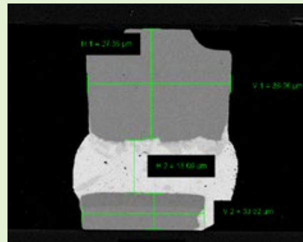
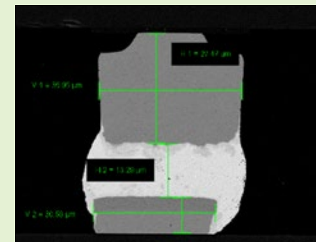
AP500X is a water soluble halogen zero tacky flux specifically engineered for ultra-fine bump pitch flip chip attach and BGA attach applications. AP500X flux delivers superior wettability on various pad finishes such as Copper Organic Solderability Preservative (CuOSP) and Electroless Nickel Immersion Gold (ENIG), and offers long work life and easy cleanability by DI water after reflow.

Key Features

- Water soluble
- Halogen zero
- Superior wettability
- ≥12hr work life
- Effective removal of OSP layer on Cu OSP pads
- Enables ultra-fine bump pitch flip chip attach with zero defects

Ultra-Fine Bump Pitch Flip Chip Attach : X-SEM Analysis

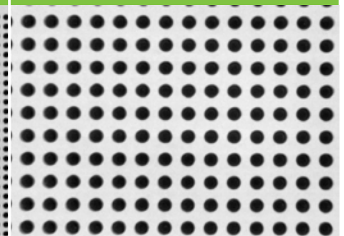


Bump 1	Bump 2	Bump 3
		

- AP500X showed good wetting with 30~35um Cu pillar bump on ENIG surface.
- No cold joint, solder creeping or bridging observed at Cu pillar joints after reflow.

Flip Chip Test Vehicle Details

Chip size	2x3mm
Cu pillar size	35um
Cu pillar pitch	60um
Cu pillar height	40um
Cu pillar alloy	Cu + SnAg

X-Ray Imaging Overview	X-Ray Imaging Center
	

No significant solder void observed at the Cu pillar bump under X-ray inspection.

Organic Solderability Preservative (OSP) Removal

600 X 700 um Cu OSP Pads	Before Reflow - Control	Reflow with Flux A - Ineffective OSP Removal	Reflow with AP500X Flux - Effective OSP Removal
Light optical microscope observation			
Element analysis (SEM-EDX)	S8 Wt% σ Cu 59.2 0.4 C 36.5 0.3 N 2.7 0.4 O 1.6 0.1	S12 Wt% σ Cu 79.7 0.4 C 15.3 0.3 N 3.4 0.3 O 1.6 0.1	S4 Wt% σ Cu 94.8 0.4 C 4.4 0.3 O 0.8 0.2

- OSP are organic compounds containing significant amount of C, N and O.
- AP500X flux effectively removes OSP layer

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The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for particular application. The Heraeus logo, Heraeus, Welco and the Welco figurative mark are trademarks or registered trademarks of Heraeus Holding GmbH or its affiliates. All rights reserved.

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