

Inert Wave Soldering



Advanced Nitrogen Inerting Technology Can Lower the Cost of Ownership in Wave Soldering



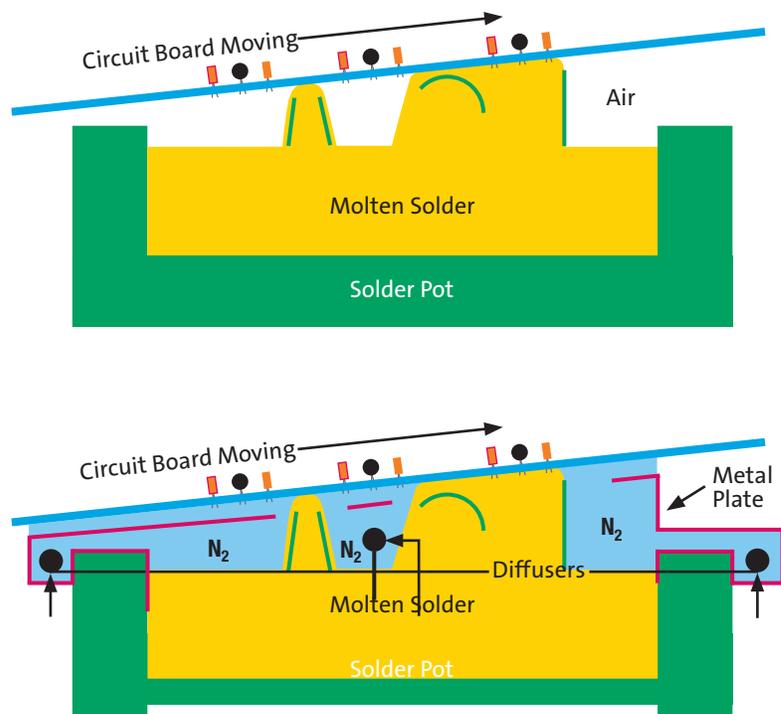
At Air Products, we are committed to being the total solutions supplier to the global electronics assembly and packaging industry, and offering innovative and proven technology for wave soldering. Our inert wave soldering technology is a system for wave soldering in a controlled inert atmosphere that is optimized for your specific lead-free soldering process, whether it uses new or existing soldering equipment. A technology with demonstrated superior performance, Air Products' inert wave soldering is both cost-effective and user friendly. Inert wave soldering and nitrogen inerting can reduce your cost of ownership through an increase in solder joint quality and a decrease in manufacturing costs which can include one or more of the following benefits:

Benefits of inert wave soldering

- Increased productivity
- Enhanced quality
- Better first pass yields
- Improved process savings
- Efficient nitrogen usage
- Reduced dross
- Lower maintenance & cleaning costs
- Reduced joint defects
- Flux consumption decreased
- Reduced solder/dross hazardous waste disposal costs
- Elimination of post-soldering cleaning

Additional benefits can include lower retrofitting cost, an option for flux vapor collection, and a lower tendency of diffuser clogging.

Figure 1: Solder Defect Comparison Between Air and Nitrogen



Benefits of Nitrogen Inerting for Wave Soldering

- Reduced oxygen in the soldering atmosphere leads to a reduction in solder joint defects such as shorts and icicles
- Improved solder wetting = increased plated through hole top side fillet with greater wetting force and decreased wetting time
- Enables implementation of no clean flux processes, reducing the volume of flux per board and allowing the use of less active flux chemistry
- Dramatic reduction in dross formation = less cleaning, reduced equipment maintenance expense, reduced materials cost, and increased productivity
- Minimization of solder ball formation
- Wider process window and increased uptime

Figure 2: Dross reduction is one of the most important advantages of inert atmosphere wave soldering.

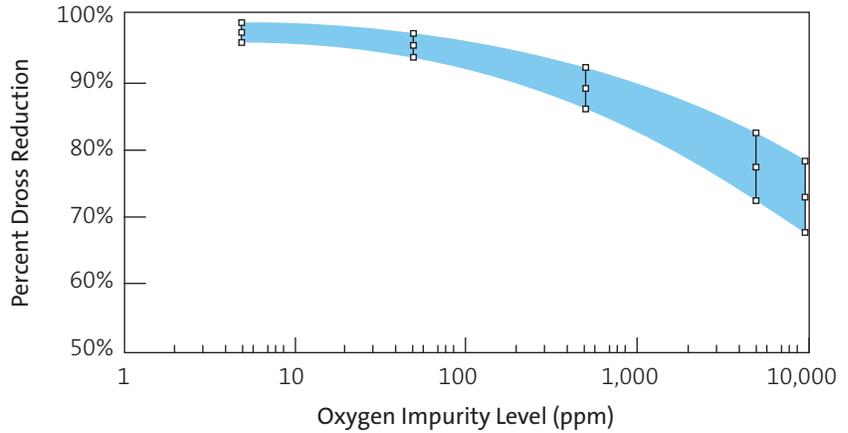
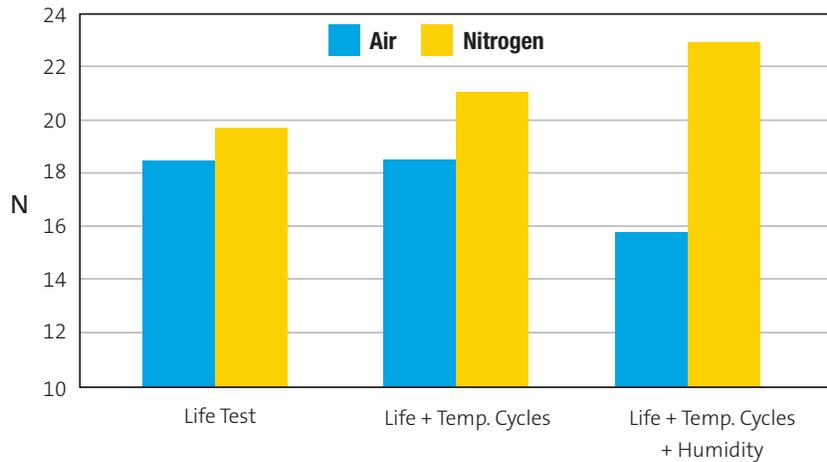


Figure 3: Joint quality and reliability



Test conditions

- Life test: 1000 hrs. at 125 °C
- Shear test
- Temperature cycling: 100 cycles, -55 °C/+125 °C
- Shear test
- Humidity test: -120 °C, 85% RH, 64 hrs.
- Shear test

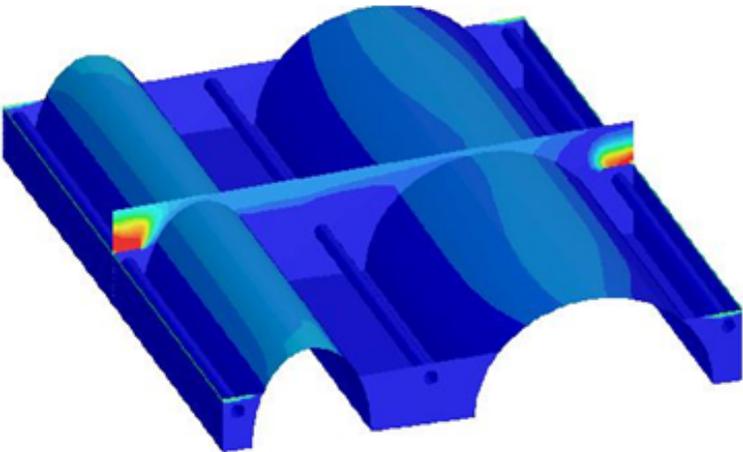
Shear test — joint strength



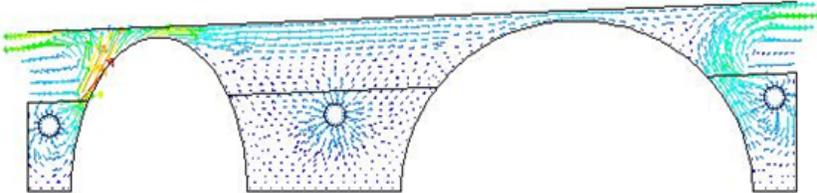
Figure 4: Process Diagram of Air Products Inert Wave Soldering System

Proven Results

Air Products' inert wave soldering technology has yielded dramatic results for leading electronics assembly companies around the world, with more than 50 units installed in Europe, Asia and Mexico. At an Asian-based electronic assembly firm, it reduced key defects by 90% and dross formation by 96% in day-on-day production rates.



Oxygen Distribution



Nitrogen Flow Field



New-Generation Technology

By partnering with Air Products' Electronics Packaging, Assembly and Test applications team, you gain access to a broad range of established and leading edge application technologies. Backed by a technical and research staff at our Advanced Technology Center, our global team combines the latest technological developments with hands-on process knowledge so that you can achieve your process goals. To learn how our inert wave soldering can help you achieve a lower cost of ownership, please visit our website or contact us.



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