

# Engineering Solutions for the PCB Industry



Each Nu/Clean has three Paxton AT-Series blowers

## Overview

Technical Devices Company serves the printed circuit board (PCB) industry, manufacturing machines which solder circuit boards; specialized circuit board cleaning machines to remove chemical residue, and de-ionizing units. The company, based in Torrance, California, has served an international client base in the PCB field for over five decades. Technical Devices' products incorporate up-to-the-minute technology including touch screen controls, cascade water knives, and high efficiency drying.

## The Challenge

In 2006, Technical Devices shipped several of their Nu/Clean Inline Aqueous Cleaners, which incorporate Paxton blowers, to a new client with PCB-manufacturing facilities in China. This new client had requested that the Cleaners come equipped

with a very high level of power. At the client's plant, these machines suffered repeated blower failures. Technical Devices' China-based customer expressed dissatisfaction, leaving the business relationship in danger. Technical Devices turned to Paxton Products to correct the problem.

## Analysis

"Paxton was highly responsive to our concerns" says Ron Berri, Vice President of Engineering at Technical Devices. "They immediately formulated a plan of action for correcting the problem." That plan began with tests of the blowers in a situation which simulated the way they were used in Technical Devices' machines. In the application, the blowers were larger and more powerful than the usual solution per the end users request, so Paxton reproduced this in the test room. These tests showed that the blower flow rates were low, but within what Paxton had determined acceptable in the past. Paxton engineers then requested that the failed blower heads from the client site be sent to them for study and review.

Upon receipt of the failed blower heads, inspection revealed that the failure stemmed from the blower head bearings, most likely because of high temperatures. But because the test room units did not fail, more investigation was needed.

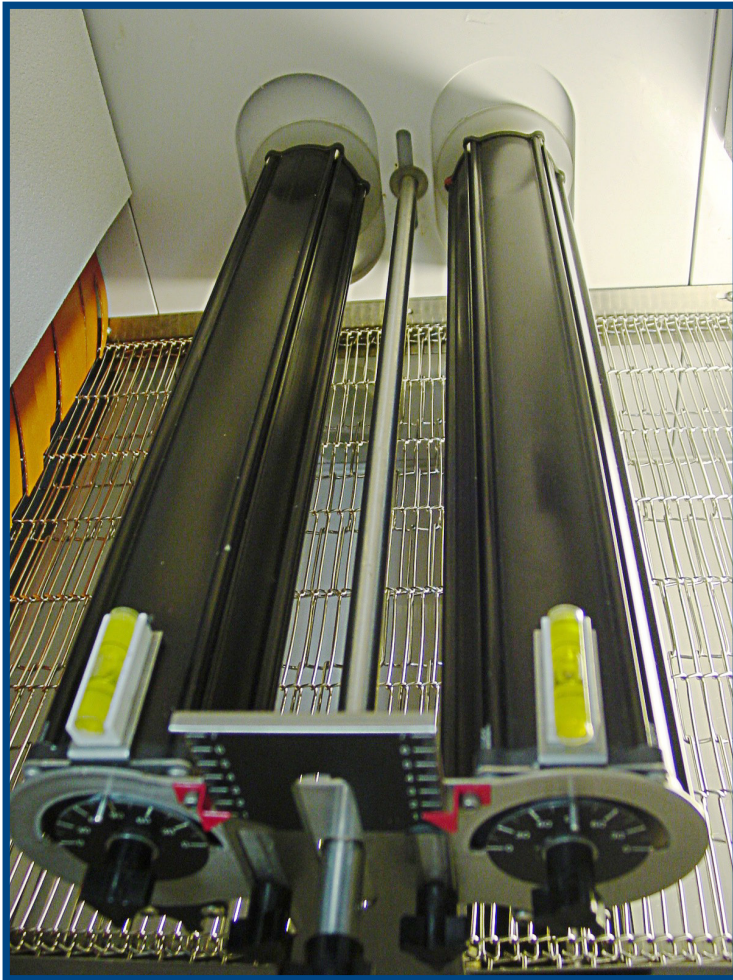
- The end-user's requested level of high power actually provided more power than was necessary. The extra power/energy in the system resulted in the blowers running hotter than they should.
- Because the end user had requested bigger blowers than would normally be used, the blowers then needed to be throttled back during normal operation. The end user had throttled down the system by partially closing the butterfly valves, restricting flow out of the blower. Restricted flow also results in hotter operation.
- The end user's facilities had a warmer (95°F), more humid environment than previous purchasers of the same Technical Devices machines. The warm temperatures increased the operating temperature of the blower.
- Finally, inspection showed a build-up of residue in the blower head, indicative of a failure by the end user to change the blower head filters frequently enough. The residue in the head coupled with the reduced flow caused by clogged filters also restricted flow through the blower, creating hotter operation.
- The combination of these factors – excess power/energy (heat), high environmental temperatures, and reduced flow due to clogged filters and the throttling down with the valve – resulted in blowers running too hot and the blower head bearings failing.



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Paxton Air Knives are positioned precisely to provide blow off of the circuit boards

people hand-in-hand, helping us maintain an important end-user relationship.” In addition to a win with this customer, all of Technical Devices’ machines have been redesigned for higher air flow rates, higher efficiency and performance, using the learnings from this investigation. The TD machines now fully use the capacity of the blower for drying, and run cooler with no issues.

## Conclusion

“What we offer that our competitors don’t,” says Paxton Engineering Manager Steve Pucciani, who worked closely with Berri and the Technical Devices team to enhance the blowers, “Is not simply customer service, but a willingness to re-think the definition of “standard” and to admit there’s always room for improvement. The fact that we are always growing, always learning means we offer the best and most effective drying systems.” Ron Berri concurs, noting that “I have really positive feelings about Paxton, both their products and their service. Any company that needs air products would be wise to choose Paxton.”

## Solution

Paxton built six new blowers, reconfigured to run at a slower speed. By reducing the blower speed, the power/energy generated by the power was reduced. The butterfly valves no longer needed to be throttled back, so flow increased. Flow was further increased by replacing the filters at the recommended interval so they didn’t fail, put residue in to the blower heads, and cause low flow rates. The better flow resulted in the blower having better “self cooling,” despite the high ambient temperatures, ensuring that the bearings were cooler. The result was a blower that operated about 15 degrees cooler. Paxton engineers visited the end customer facility in China to replace problematic blowers with the new ones customized to the end-user’s unique requirements. The blower failures ceased with the installation of the new, cooler blowers. The client ordered additional machines from Technical Devices.

## How Technical Devices Benefits From Using Paxton Products

“We’re a small company” says Berri. “When I look for a company to supply a part which is integral to our product, I need to have confidence that their engineering department will provide us with the expertise that enables us to compete against the big guys. Paxton went above and beyond the call, not only fixing the problem, but working with our



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