



CASE STUDY

Reshaping Capacitor Bank Function to Correct Low Power Factor

The Challenge

An aluminum extrusion manufacturer was facing power efficiency issues — and steep utility penalties to match. With a poor power factor of .79, they were far below their utility requirement of .95. Penalties upwards of \$20,000 per month began to stack up.

Despite having power factor correction equipment on site, the issue persisted. What was going on? The company needed to get to the root of why their power factor was so low and get a clearer picture of their load profile within their defective equipment.

They turned to
Powerside for help.

Challenge

Poor power factor

Project Type

Power system analysis

Equipment

PQube® 3, QubeScan,
PowerVar Hybrid
Capacitor Bank

The Solution

To better understand the load profile of the aluminum extrusion process, Powerside ran a full [Power System Analysis](#). This comprehensive service was completed in three easy steps:

- 1 Powerside sent the manufacturer a portable [PQube® 3](#) advanced power analyzer, which was easily installed across the five main services operating an aluminum extrusion press.
- 2 The PQube® 3 monitored the facility's power quality and fed findings into [QubeScan](#) monitoring software.
- 3 Powerside developed a comprehensive report on the findings, including data pulled from QubeScan's live meters (Figure 1). Recommendations were uniquely tailored to the manufacturer's specific power factor challenges.



Figure 1: Data pulled from live meters. Every two minutes, the aluminum extrusion pressing cycle occurred, as seen in current peaks, voltage drops, and increases in power factor and kVAR. Such data proved instrumental in understanding the application and load.

The Power System Analysis detected and determined that the manufacturer's existing power factor correction equipment was not adequately compensating for the extrusion process's repetitive and rapid load changes. This dynamic load profile led Powerside to develop a unique, custom solution.

Powerside modified multiple [PowerVar Capacitor Banks](#), including a 1,000 kVAR bank with 800 kVAR of contactor switching and two 200kVAR total thyristor-switched stages. The thyristors respond in as few as three 60 Hz cycles to match the rapid load changes of the aluminum extrusion process, while the contactor handles stable loads. To prevent harmonic resonance, the system includes detuned reactors in series with the capacitors, transforming it into a shunt filter. This design avoids amplifying harmonics, ultimately ensuring system stability.

Check out a detailed video explaining the process [here](#).

The Results

The capacitor bank has replaced the patchwork of failing corrections equipment the company had previously relied on. It now seamlessly handles the extrusion process's cyclical demands, eliminating resonance issues, avoiding harmonic amplification, and wiping out a hefty monthly penalty.

Even more transformative, the PQube 3 power analyzer and QubeScan monitoring platform have become the backbone of their power system. Now embedded into the correction solution itself, the PQube 3 automatically alarms to issues like blown fuses or undercompensation. The system keeps disturbances in check and power factor within compliance — no expert maintenance team required.



Detect and correct the power quality issues plaguing your business. Request a Power System Analysis today.

[Request Analysis](#)