

SULLAIR TANDEM IS KEY TO ENERGY SYSTEM THAT SAVES £125,400 (\$206,910 USD) ANNUALLY FOR ELECTRONICS MANUFACTURER

Bourns Electronics Ireland, located in Cork, Ireland, produces an extensive range of ceramic-based thick film trimming resistors and resistor networks for the European market. Bourns recently installed a company-wide energy-savings system that has yielded significant savings. This system includes, as a key component, a water-cooled Sullair TS tandem two-stage rotary screw compressor, which provides air for manufacturing processes and also recycles the cooling water through a heat recovery system.

Well known electronics producer

Bourns Electronics Ireland is a wholly owned subsidiary of Bourns Incorporated, Riverside, California, U.S.A., which designs electronic components and subsystems for computer, telecommunications, industrial and automotive markets worldwide. Bourns' ongoing mission is to serve the electronics industry as an innovative supplier of quality passive component solutions.

High profile customers

The high quality products manufactured in Cork are shipped directly to Bourns' European customers, which include Olivetti, Hewlett Packard, Siemens, Ericsson, IBM, Phillips, Xerox and Lucas; and Bourns' Ireland customers, which include 3COM, SCI, Motorola, Cableton and Apple.

Committed to excellence

Bourns' dedication to quality is unequalled in the electronics industry. The company incorporates environmental testing, failure analysis, design reviews, repeatability monitoring and statistical sampling methods to provide an integrated approach to measuring product quality.

Sullair quality recognized

Because of its own emphasis on quality, Bourns sets rigorous standards for its equipment suppliers. Sullair Corporation and its business unit, Sullair Europe, meet these high standards. As one of the world's leading compressor manufacturers, with more than 30 years of experience in rotary screw compression technology, Sullair has the expertise to provide the best compressed air solutions available. Compressed Air Centre (C.A.C.) of Drogheda, the Sullair distributor who worked closely with Bourns throughout the project, possesses impressive credentials as well.

Energy cost a competitive factor

According to a Bourns spokesman, energy cost has a major bearing on the company's competitive market position and on its worldwide manufacturing operations. In 1994, in an effort to reduce energy costs, Bourns undertook an Energy Utilization Survey at the Cork plants.



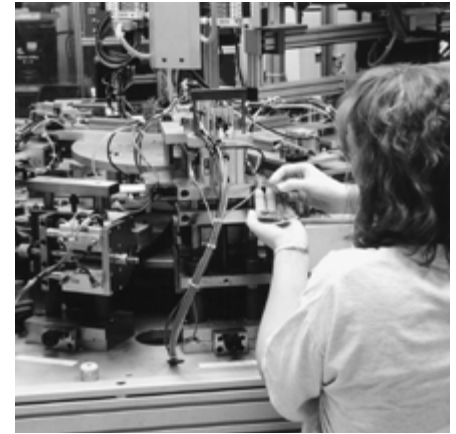
A view of the manufacturing complex in Cork, Ireland, where Bourns Electronics Ireland produces electronic components for the European market.



Michael Boland, Plant Maintenance Engineer, and Stan Waldron, QA and Technical Services Manager, with the Sullair tandem compressor that helps save energy at Bourns Electronics.

Situation analysis

During the survey's 12-month period (1994-95), Bourns' total equivalent energy consumption amounted to 52,050 GJ at a total cost of £562,907 (\$928,797 USD). The two main energy sources used on the site were electricity and natural gas. It was found that compressed air used 20.8% of the electricity at the plants.



This manufacturing equipment, which includes various air-actuated components, was designed and built by Bourns engineers to meet the plant's special needs.

22.8% energy reduction possible

The Energy Utilization Survey concluded that a 22.8% reduction in site energy could be achieved. C.A.C. was engaged to evaluate the company's compressed air system, optimize the existing system and propose an improved alternate system.

Compressed air improvements needed

Compressed air was targeted for improvement for a number of reasons. The existing equipment was inefficient at 26 hp/100 cfm. It was also unreliable and prone to failure. There was no spare capacity and there were production restraints. The distribution and Plant Room were poorly engineered. Maintenance costs were excessive.

Improvements in 3 phases

The priority: to improve the compressed air facility with potential for optimizing heat recovery.

Phase 1.

Select a new compressor system with specific design criteria:

- 2000 cfm capacity
- 20 hp/100 cfm performance
- Varying load characteristic
- Quality: -40 C PDP with less than 1% purge loss
- Heat recovery potential from water cooling transfer
- Central Plant Room with best possible distribution

Phase 2.

Achieve the best possible results for potential heat recovery:

- Minimize reliance on gas usage in Networks building
- Reclaim heat from process water effluent
- Eliminate need for high flow/high power water heaters in process

Phase 3.

Install Building Energy Management System (BEMS) to control Networks building:

- Utilize heat recovery wherever possible
- Achieve primary process control
- Control all air conditioning in the building

Sullair compressor specified

For Phase 1, C.A.C. recommended a Sullair TS Series 32/25 400 hp (300 kW) water-cooled two-stage tandem rotary screw air compressor with 2200 cfm (62.3 m³/min.) capacity. At the time, this was the largest output screw compressor of its type in Europe. A combined refrigerant /heatless regenerative air dryer and a Baltimore aircoil were recommended to complete the system.

For Phase 2, C.A.C. recommended Alpha-Laval heat exchangers, Lowera pumps and Siemens fully programmable speed control.

For Phase 3, a complete building energy management system was installed.

Sullair compressor exceeds expectations

In June, 1995, the Sullair compressor began taking up the plant load for compressed air. The savings on electrical energy were immediately obvious. On full load, the machine was developing 19 hp/100 cfm (14 kW/100 cfm). In the first 12 months of operation, the electrical savings were £30,100 (\$49,665 USD) compared to the previous compressed air system, with no constraints to production and no breakdowns.

Sullair Tandem efficiency

Using two sets of rotors to stage compression, and dividing compression equally between two stages, Sullair TS Series tandem compressors perform with unmatched efficiency. At full load, they are 10 to 13% more efficient than single-stage compressors. At 60% load, they provide 10 to 15% more energy savings than single-stage compressors with capacity control systems, and 25 to 30% more savings than single-stage compressors with suction throttling. Sullair tandem compressors are available in standard and 24KT models (which use 24KT fluid and carry a 10-year air end warranty), from 100 to 600 hp, 515 to 3100 cfm.

Spiral valve contributes to energy efficiency

The TS Series tandem features a variable capacity control system which matches compressor displacement with output need. The system's unique spiral control valve assures precision operation for virtually any part load need. By activating automatically when the unit is operating under partial load, and allowing the compression of only the required quantity of air, the spiral valve increases the efficiency of the capacity control system. The ultimate result is greater compression efficiency and reduced power consumption.

Constant heat recovery cuts energy costs

The objective of Phase 2 was to utilize the primary heat recovery from the compressor system. Heat recovery was constant, due to the action of the Sullair compressor's spiral valve. In 1996, the heat recovery system saved £17,415 (\$28,735 USD) in natural gas cost and £22,500 (\$37,125 USD) in electrical water heating cost.

Building control system essential for savings

While Phase 3 results cannot be quantified, the bulk of the heat recovery would not be possible without an excellent control system.

Total savings: £125,400 (\$206,910 USD)

The total savings for energy and maintenance at both Bourns plants in 1996 were: Electricity savings: £60,685 (\$100,130 USD) Natural gas savings: £17,415 (\$28,735 USD) Maintenance savings: £47,300 (\$78,045 USD) Bourns reduced electric power consumption 11.5% and realized a 36.9% savings in natural gas.

Production employees applaud Sullair system

The improvement in compressed air service has been very visible to all Bourns plant employees, since they were aware of the production restrictions imposed by the original system. Many employees have noted that the Sullair compressor's spiral valve has eliminated system-wide pressure variations.

Additional benefits

A company spokesman pointed out that employees also regard the maintenance reduction as a great improvement, and appreciate the stability of room temperatures and humidity control resulting from the heat recovery system.

Working together: Sullair and C.A.C.

Sullair and Compressed Air Centre are proud to have been a part of Bourns' highly successful energy-saving project. Through dedicated teamwork, innovative product offerings and exceptional customer service, Sullair and C.A.C. offer customers throughout Ireland the most energy-efficient solutions for their compressed air problems.

Bourns is National Technology Winner for Efficient Compressed Air

In 1997, Bourns Electronics Ireland received a prestigious award recognizing its achievements in energy conservation. The company was selected as the National Technology Winner for Efficient Compressed Air by the Electricity Supply Board of Ireland. This award caps a broad compressed air and energy saving project carried out at Bourns Electronics manufacturing facilities in Cork, Ireland during 1994-96.



John Bryne, Compressed Air Centre, looks on as Michael Boland of Bourns and Euan McCulloch of Sullair Europe display the award from the Electricity Supply Board of Ireland recognizing Bourns Electronics for "improved efficiency and better utilization of electricity."



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