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BIOGAS

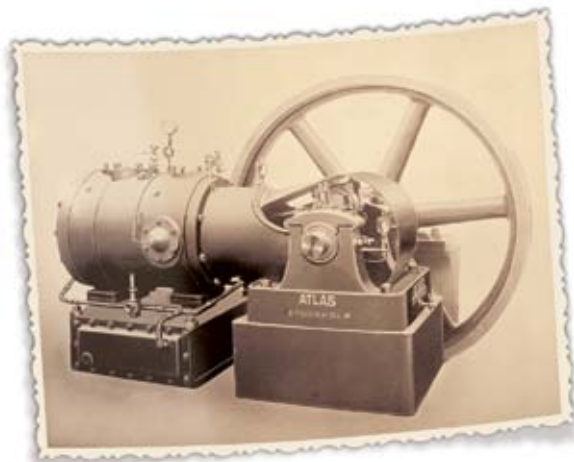
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It's our birthday, celebrate with us



One of our earliest models – the LV5A compressor

This year, Atlas Copco is celebrating 140 years of global innovation. Technology sure has changed during this time and the pace of innovation will never slow at Atlas Copco. We have been very humbled by some of our recent accolades, but we know they were only possible due to working with so many great customers across the world.

During the last two years, Atlas Copco was again recognized among the top 100 sustainable companies in the world and continues to be a member of the Dow Jones Sustainability World Index. We have also been recognized by Forbes, Thomson-Reuters, and Newsweek for our commitment to innovation and sustainability.

So what is the best way to celebrate this key milestone in our history? Simply, we want to say thank you to the customers that made it possible. We look forward to serving you far into the future and invite you to be part of the celebration @ [facebook.com/atlascopcousa](https://www.facebook.com/atlascopcousa).



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Hitachi continues to innovate newer and more efficient compressed air technologies. This innovation enables our expansion of the DSP Series Oil-Free Compressors to the DSP *Next* Generation. The DSP *Next* Series is a continuation of our focus towards environmentally friendly and energy conscious products.



The DSP *Next* Series contains rotors with a revised profile resulting in greater efficiency. Hitachi patents for thermally compensated non-contact rotor profile with 1st and 2nd stage stainless rotors and Hitachi HX Series PTFE Free Coatings are the foundation for the increased efficiency and high reliability. Standard on Hitachi DSP Series and DSP *Next* Series compressors.



Gearcase oil mists are not vented to atmosphere, but recaptured, using Hitachi's patented oil mist remover. Oil mists are recycled, saving maintenance oil, eliminating possibility of emissions into the environment, and ensuring purity of air compression. Standard on Hitachi DSP Series and DSP *Next* Series compressors.

Hitachi SRL Series: The Oil-free design of Hitachi Scroll compressors contains absolutely no oil. This results in an Oil-Free compressor that has zero harmful emissions to the environment. With industry leading sound levels (48-61 dBA), the SRL Series can be placed in most any setting within the workplace.

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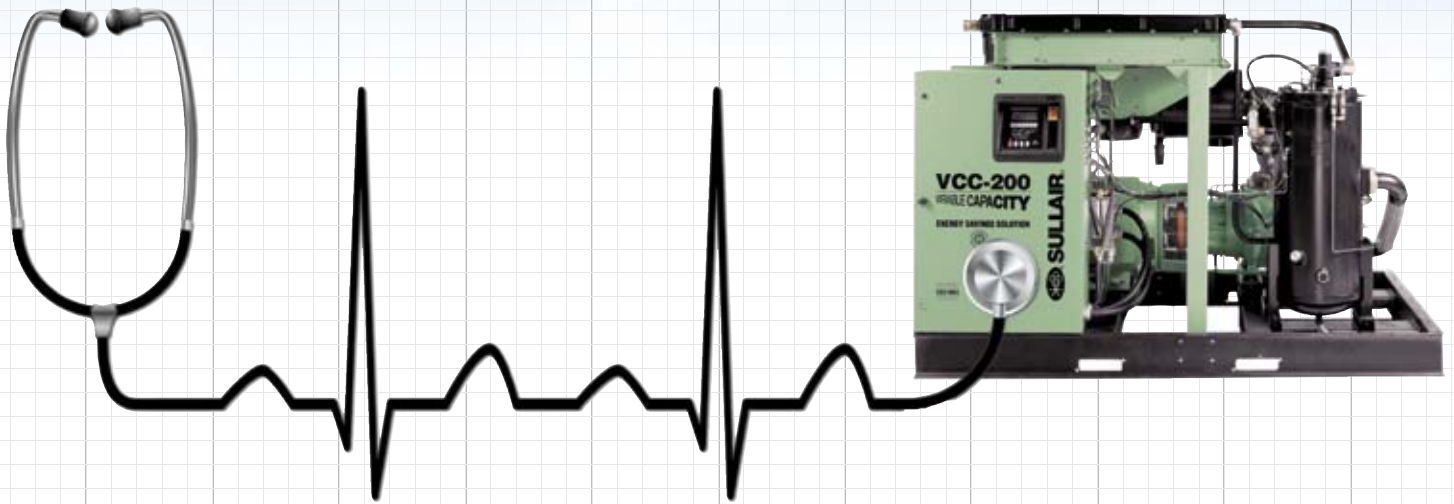


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Buying an air compressor?

First, get an air audit. If you don't, you're writing a prescription without proper diagnosis.

And that's malpractice!



What to consider when purchasing a compressed air system:

The buyer who's looking for an air compressor should consult an air audit expert who understands air system, applications and demand-side management. Without an audit, you could live for years with a costly mistake in system efficiency.

An air audit expert will advise on the proper equipment for your applications. If you don't get an audit, you're writing a prescription without a proper diagnosis. *And that's malpractice.*

A compressed air audit by one of Sullair's team of certified auditors is the best way to guarantee maximum efficiency of a compressed air system.

To get contact information about your local Sullair certified auditor, scan this QR code or visit us online at: www.sullairinfo.com/audit.





FROM THE EDITOR

Biogas



Our industry plays a critical role in the biogas industry — an industry many are forecasting to be a significant growth industry of the future. The City of Indianapolis, for example, recently ruled that all “Heavy Fleet” vehicles will run off of compressed natural gas (CNG) in the near future. Blowers, boosters, air compressors and dryers all play significant roles in the process of “biogas upgrading”. Biogas sources range from factories with food products, wastewater sludge, landfills and algae — to corn and sugar beet farms.

No stranger to processing crops, Archer Daniels Midland BioProducts operates one of the largest compressed air installations in North America. The company has a strong energy management program focused on the #1 renewable energy source — energy savings. Compressed Air Best Practices® Magazine spoke with their Sustainability & Energy Manager, Rodney Dayson, who provided us with insights to their approach in executing energy-saving projects.

A significant factor, in system design, is how to meet ambient air regulations covering VOCs. Also known as “methane slip limits”, each country has different regulations. Gas compressor industry veteran, Robert A. Sturdy, provides us with an excellent article titled, “The Evolution of Biomass Compressors” reviewing how our industry has met and exceeded regulations with Vapor Recovery Unit (VRU) compressors and systems.

Pneumatech provides biogas dryers in close to 80 biogas sites in North America. Some are landfill skid packages while others are dryers used in beer distillers. Each dryer is unique as landfills provide a different natural gas “cocktail” than the waste gases captured in the fermentation process of the yeast and hops in making beer. This article also reviews the unique benefits of Pneumatech ConservAir Intermediate Flow Controllers and how they reduce compressed air energy costs.

At North America’s largest metal fabrication and welding technology show, FABTECH 2012, yours truly learned a lot about how our industry is helping welders, surface finishers and metal fabricators get the job done. This report reviews the air compressors, dryers, chillers, pneumatics, and nitrogen generators exhibited at the show and some things I learned along the way.

Ron Marshall, from the Compressed Air Challenge®, outlines the journey auditing veteran Steve Briscoe, from Industrial Air Centers, took to become an auditor. It’s a great story exploring his experience from having completed over 500 compressed air system assessments!

We thank the authors above for sharing their knowledge and thank you for your support and for investing in **Compressed Air Best Practices®**. 

ROD SMITH

Editor

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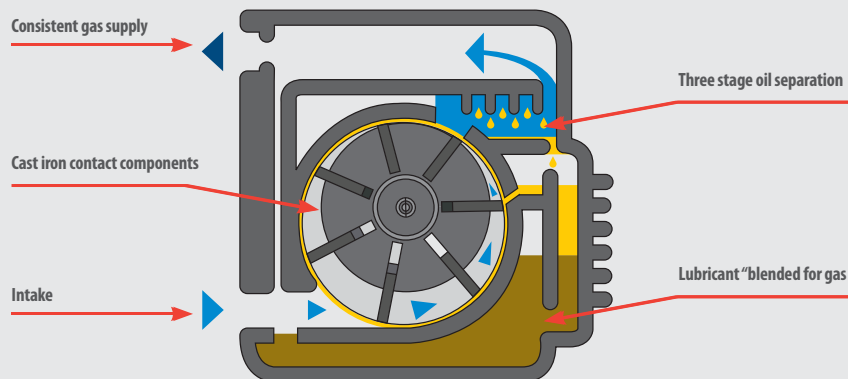
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COMPRESSED AIR, PNEUMATICS, VACUUM & BLOWER INDUSTRY NEWS

Fusheng Acquires ALMiG Kompressoren

Fusheng Industrial Company recently announced the acquisition of ALMiG Kompressoren GmbH headquartered in Kongen, Germany. Fusheng Industrial Company also owns the U.S.-based air compressor companies FS-Curtis and FS-Elliott.

According to the company web site, Fusheng was founded in 1953, in Taiwan, and began manufacturing air compressors in 1961. The company acquired the Plant Air Package (PAP) Division of Elliott Turbomachinery and established FS-Elliott in 2003. In 2005 the firm acquired Curtis Toledo, based in St. Louis, and established FS-Curtis. In 2008 the founding family partnered with Oaktree Capital Management to privatize Fusheng and delisted from the Taiwan Stock Exchange.

Sullair Joins Neodyne Industries

BC Partners and global alternative asset manager The Carlyle Group announced the completion of their previously announced acquisition of Hamilton Sundstrand Industrial from United Technologies Corporation in a transaction valued at \$3.46 billion. With the sale, the newly independent company is now Neodyne Industries. Neodyne, a manufacturer of highly engineered, mission-critical pumps and compressors for the global industrial, infrastructure and energy markets, operates three global industrial businesses — Milton Roy, Sundyne and Sullair.

“The Neodyne brand reflects our renewed emphasis on product innovation, engineering and manufacturing excellence. We will focus on our core industrial products businesses while we better position our company for sustained global growth,” stated John Doucette, President and Chief Executive Officer of Neodyne. “Neodyne will continue to deliver strong

engineering and proprietary design technology behind all of our industrial products.”

In a joint statement, Carlyle and BC Partners said, “Neodyne has consistently achieved best-in-class performance in its highly engineered products and we are excited about the company’s continued growth prospects, especially in high-value product segments and emerging markets. We believe the combination of our resources and expertise, the company’s experienced leadership and the continued growth trends in the energy, chemicals and industrials sectors will help us achieve a successful future for Neodyne as an independent global company.”

About Neodyne Industries

Neodyne Industries is a leading global provider of highly engineered industrial solutions and aftermarket parts and services serving a broad array of end-markets. The company operates through two strategic platforms: Flow Control and Industrial Air Compressors and goes to market under the Milton Roy, Sundyne and Sullair family of brands. The company employs approximately 3,300 people globally and operates 19 high-quality manufacturing facilities in seven countries across four continents. For more information, please visit www.miltonroy.com, www.sundyne.com and www.sullair.com.

Indianapolis Converts Heavy Fleet to Compressed Natural Gas (CNG)

Calling it a vital national security issue, Indianapolis Mayor Greg Ballard signed, in December 2012, Executive Order #6, 2012 making Indianapolis the first city in the nation to require the purchase of either electric or plug-in hybrid vehicles for the city’s non-police fleet. Mayor Ballard outlined his proposal this morning in a speech to the Greater Indianapolis Progress Committee.

“The United States’ current transportation energy model, driven by oil, exacts an enormous cost financially and in terms of strategic leverage,” said Mayor Ballard, a retired Marine Officer and Gulf War Veteran. “Our oil dependence in some cases places the fruits of our labor into the hands of dictators united against the people of the United States.”

Mayor Ballard also outlined steps to modernize the entire city fleet to electric or plug-in hybrid by 2025. “Over the course of the last century, Indianapolis has been a leader in automotive development, so it is perfectly fitting we lead the way again.” Thanks to the leadership of Energy Systems Network working with its industry partners through the Project Plug-IN initiative, Indianapolis has already been recognized by Toyota, Ford and the U.S. Department of Energy as a one of the top communities for deployment of plug-in vehicles and charging stations with more than 200 charging stations installed across Central Indiana. Mayor Ballard’s proposal contains the following initiatives:

- **Executive Order #6, 2012 requires the purchasing of electric or plug-in hybrid vehicles for non-police fleet use.** The city fleet of approximately 500 non-police fleet cars will be replaced, as needed, saving taxpayers approximately \$12,000 per vehicle over the ten-year life cycle of each car.
- **Conversion of heavy fleet vehicles to Compressed Natural Gas (CNG).** The city is currently working with partner organizations including Energy Systems Network and finance experts to convert the city’s heavy fleet, including snow plows, trash trucks and fire apparatus to CNG.

➤ **Developing the world's first plug-in hybrid police vehicle.** Finally, the city is seeking to partner with one or more automakers to develop a plug-in hybrid police vehicle that meets the safety, power, electronic and range needs of a modern urban police force. If a plug-in hybrid electric car could achieve just 40 MPG and meet the needs of police officers, city taxpayers would save up to \$10 million per year. The city's current police vehicles average 10 MPG.

For more information about Mayor Ballard's post-oil transportation plans, visit www.indy.gov/IndyEnergySecurity

U.S. Senate Reaffirms Support for Military's Use of Advanced Biofuels

The U.S. Senate backed Department of Defense (DoD) plans to use advanced biofuels as part of its strategy to achieve important national security objectives.

A broad coalition of organizations representing farmers who grow energy crops, the advanced biofuels industry which converts these feedstocks into drop-in fuels, the customers who procure the fuels, and national security organizations thanked Sens. Kay Hagan (D-N.C.), Tim Johnson (D-S.D.), Mark Udall (D-Colo.), Patty Murray (D-Wash.), Susan Collins (R-M.E.) and other cosponsors for their important amendment to the National Defense Authorization Act for Fiscal Year 2013.

The Defense Production Act (DPA) Advanced Drop-In Biofuels Production Project is focused on creating a public-private partnership that will provide incentives for private-sector investment in cost competitive, advanced biofuels production capability. DPA's long-term track record of success dates back to the 1950s. Its legislative authority has been used to support the development of critical U.S. defense industries including steel, aluminum, titanium, beryllium, semi-conductors, radiation-hardened electronics, and even the Navy's nuclear program.

Adopting advanced "drop-in" biofuels will help the DoD and the nation achieve broader national security objectives. Over-reliance on oil puts U.S. troops at risk of supply

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COMPRESSED AIR, PNEUMATICS, VACUUM & BLOWER INDUSTRY NEWS

disruptions during military or humanitarian missions. Moreover, the oil market is unpredictable and the price per barrel of oil often fluctuates dramatically, which can have a significant impact on military budgets.

It is increasingly important to find domestically produced alternatives to improve the country's energy security, meet global energy demands, and provide jobs, while strengthening our military and domestic industry. The DoD's partnership with private industry is a critical step towards achieving these goals. Already, private companies have made substantial investments in research and development to develop these advanced biofuels. The amendment offered by the senators today will allow DoD to enter into contracts to build and refurbish facilities to refine biofuels. The amendment was passed by the Senate 54-41 on a bipartisan vote.

New SAIT Compressed Air Workshop

SAIT Polytechnic, based in Calgary, announces a one-day hands-on workshop utilizing a fully operational compressed air system (CALES Platform). The workshop will explore the individual compressed air system components in an entire system. The CALES platform visually illustrates in real time

data streams and visual reference devices during the workshop. System performance is reviewed including compressor demand (kW), flow (scfm), pressure and temperatures including pressure dewpoint and ambient air temperature and relative humidity.

The workshop presenter is Don Dyck, President of Compressed Air Performance Specialists Inc. Now taking inquiries/reservations for the 2013 January & February workshops at the SAIT campus location at the MacPhail School of Energy in Calgary.

Email: henrietta.dyck@sait.ca
Tel: (403) 284-8113

Compressor World Expands Operations

Compressor World (www.compressorworld.com), a leading, online, global provider of compressors for businesses using air compressor products, announced today that it has acquired a new building and will relocate its corporate headquarters and storage facilities to a location in Pembroke, MA.

Matt Mazanec, a principal at Compressor World, said that the firm has purchased an 18,750 square foot building in the North River Industrial Park in Pembroke, adjacent to Route 139 and near the interchange of Route

3. The building more than doubles the size of Compressor World, which currently operates a location in South Easton, MA, of about 3,000 square feet, and a warehouse in Worcester, which is 5,000 square feet. Compressor World will consolidate their operation into this one facility, which has not only more than double their square footage but also 50' ceilings. Mazanec said he hopes that Compressor World will be fully operational in the Pembroke location by January of 2013.

The additional space will help with the company's warehousing needs, as they continue to expand. At any given time, Compressor World has more than 300 compressors in stock. The company's expansion plans include franchising and they anticipate that, as they add franchisees and new territories, additional space will be helpful.

Mazanec noted that Compressor World is unique in their industry in that ordering is done online. "Historically, many in the business of providing compressors did so in the brick-and-mortar environment," he said, adding, "Expanding our business via the web has enabled us to increase our territory and undertake this franchising model."



The SAIT Polytechnic Compressed Air Workshop.



Compressor World Expands Operations.

The growing company recently signed its first franchisee, who will operate a territory in Alabama and Georgia.

Compressor World markets its own brand of compressors and also carries a number of major manufacturer brands including Quincy, Ingersoll Rand, Chicago Pneumatic, Powerex, and Rotair. Approximately 60% of the compressors that the company sells are their own brand. As the company franchises its brand, the Pembroke location will serve as the warehouse and Operations Center from which all products are ordered and shipped.

Visit www.compressorworld.com or email: info@compressorworld.com

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THE ENERGY MANAGER

Compressed Air Energy Savings Project at Archer Daniels Midland BioProducts *(This article is Part 1 of a two-part series.)*

By Scott Bogue, Contributing Editor, Compressed Air Best Practices®



Brent Darnell, John Henry Foster Company.



Rodney Dayson, Sustainability & Energy Manager,
ADM BioProducts

Project Background

► The Archer Daniels Midland BioProducts plant in Decatur, Ill. (“ADM Bio”) produces products such as lysine and threonine for the feed industry and lactic acid, xanthan gum and crystalline sorbitol for food products including soft drinks, sauces and chewing gum. It has four departments, each of which could be a plant in its own right:

- Fermentation (producing the basis for lysine, threonine, lactic acid, xanthan gum)
- Refinery (processing lysine, threonine, lactic acid from Fermentation)
- BioII (processing xanthan gum from Fermentation)
- Polyol (processing lactic acid from Refinery and sorbitol from the Corn Plant)

This facility operates one of the largest compressed air installations in industry, with 21 4000 hp process air and five 750 hp instrument air centrifugal compressors to support large-scale aerobic fermentation and related processes that require large volumes of oxygen.

In 2012, in partnership with electric utility Ameren Illinois and Ingersoll-Rand distributor John Henry Foster (JHF), ADM Bio completed a system survey that identified a total savings opportunity of ~6,300 kW and, when Phase I was implemented, yielded verified savings of 670 kW (daily average) and an annualized 5,869,200 kWh. At a U.S. Energy Information Administration (USEIA) national average cost of \$0.072/kWh for industrial electricity (as of September 2012), that's \$422,582.

Perhaps as important as the achieved energy savings and the identified future savings are the lessons learned about planning, financing, carrying out, and applying the results of a CA system survey. What ADM Bio learned can be applied to any system.

Multiple Challenges

Although he was convinced it was essential, Rodney Dayson, Sustainability & Energy Manager at ADM Bio, faced a number of challenges before this survey could be undertaken:

- The plant's existing metrics indicated that the CA system was operating efficiently

- A prior survey had made recommendations that either could not be justified or, when implemented, did not yield the projected savings
- The potential cost of problems resulting from some of the recommended system changes could be much greater than the projected savings from those changes
- The cost of another survey could not be justified on the basis of ROI
- ADM Bio has a long-standing tradition of self-reliance when it comes to operating, maintaining and upgrading its compressed air systems

“Houston, We Have Ignition”

In July of 2010, a chance meeting at an Ameren symposium between Rodney Dayson and Chad Struckmann, Ingersoll Rand Product Manager, led to further conversation with John Henry Foster.

JHF soon proved themselves to be a key ally in connection with a separate, and much smaller project for ADM Bio's polyol facility. Dayson called JHF and asked for a quote on a replacement air compressor installation consisting of three new centrifugal compressors. Rather than quote on the request as written, JHF asked the question: *Why do you need three compressors?* Of course, this was unexpected, coming from an equipment supplier. JHF offered to investigate the opportunity on their dime, and their recommendations saved ADM Bio more than \$300,000 in equipment and installation costs.

This experience led to an invitation to JHF to visit the plant. After an initial JHF walk-through of the supply side at ADM Bio,

Struckmann issued a formal proposal for a detailed investigation of the entire compressed air system. Recognizing that the plant's CA technology and controls had last been updated in the early 2000s, JHF offered to provide a free pre-audit.

Pre-Audit

Dayson then sent compressor data for a low production, average production and high production month to Brent Darnell, JHF General Manager and an experienced system evaluation expert. He evaluated the data and determined that there was an opportunity for energy savings, since the data indicated that two or more compressors were operating more than necessary (Figure 1). The pre-audit proved to be key in obtaining support for the project from Thomas Mort, ADM's Global Energy Manager.

Selecting an Auditor

Knowing that both future energy savings projects and the credibility of using third-party surveys to identify them were on the line, Dayson established a set of criteria for auditor selection. These criteria can be applied to any system assessment, regardless of the size of the system. According to Dayson:

1. The candidate should provide a sample (sanitized) report. This is important. Any hesitation on the part of the auditor should be a warning.

A review of the report will provide you with a good indication of the depth of the audit that you should expect for your own project, as well as potential findings or solutions. Does it encompass leak assessment only, control valve only solutions, or header additions only? And what of compressor performance? If there is no mention of measuring compressor performance, this should also be a warning.



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THE ENERGY MANAGER | Compressed Air Energy Savings Project at Archer Daniels Midland BioProducts

The ActOnEnergy Program

Ameren Illinois instituted its ActOnEnergy program (www.actonenergy.com) to help manufacturers save money on energy by offering equipment-specific incentives and programs that include compressed air leak survey and repair, steam trap survey and replacement, variable frequency drive (VFD) installs, lighting upgrades, HVAC system and water heater replacements, and custom projects. Over the last four years, ActOnEnergy has:

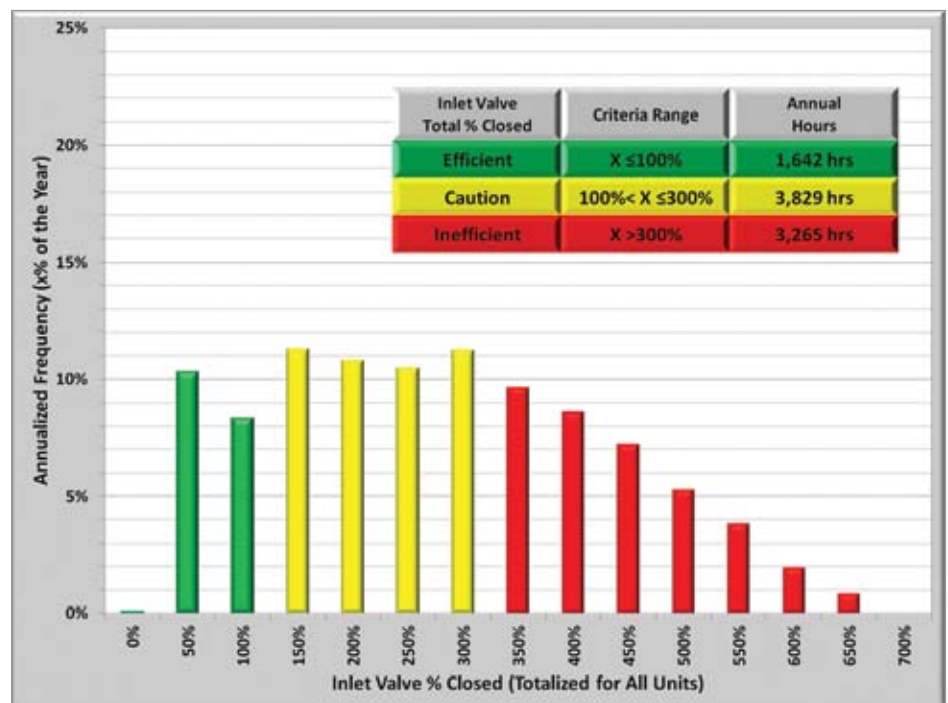
- Provided over \$30 million in incentives to Ameren Illinois electric and gas customers.
- Helped business customers save over 1 billion kWh and over 8 million therms, which equates to over \$82 million in energy costs.

For ADM Bio, ActOnEnergy's Compressed Air Retro Commissioning Program (<http://www.actonenergy.com/for-my-business/explore-incentives/retro-commissioning>) was the perfect fit. This program helps manufacturing and industrial customers optimize the operation of their compressed air systems by paying for up to 100 percent of the cost of the assessment phase for no-cost and low-cost energy efficiency projects that have a simple payback period of up to one year. Such projects may include:

- Leak loss reduction
- Adjustment of an existing flow controller or sequencer to match plant operations
- Correction of inappropriate uses of compressed air such as open blowing.

www.actonenergy.com

2. You should ask: What are your deliverables after the audit? Will you provide a detailed report? Do you release the raw data you collect, or is there an additional cost — or no release at all? As with the sample report, any hesitation about data release should be a warning.
3. Ensure that the auditor will agree to survey the entire CA system, not just the compressor room.
4. Determine whether the auditor is interested in creating a change in operational culture at your plant, or will be satisfied with doing one audit and then moving on.
5. Beware of any proposal that is not vendor-neutral.
6. You should ask: What is your usual audit savings ratio (audit savings/audit costs)? A 2 to 3 ratio is a commonly applied standard, with the very minimum being payback in under one year. Keep in mind that most utilities will only provide funds when the savings are identified upfront.
7. Prior to the start of the audit, establish what pre-audit information the auditor will need, as in P&ID drawings and system information such as storage, operations etc. Good auditors want to hit the floor running instead of trying to gather needed information at audit time. Understanding your system also allows the auditor to start the survey with some possible solutions in mind.
8. Be sure that the proposed system optimization includes the following:
 - Baseline performance
 - Identification of ROI projects
 - Gameplan for realizing ROI projects
 - Development of agreed-upon performance metrics



Pre-audit Results.

- Validation of new baseline
- Game plan for sustaining the gains

Developing the Whiteboard

Drawing on the lessons learned from prior energy audits, in 2010 Dayson developed a preliminary project whiteboard and, after selecting JHF, finalized it with their collaboration in October 2011. Addressing both the efficiency (supply) path and the effectiveness (demand) path, the whiteboard:

- Laid out both JHF (and Ingersoll-Rand) and ADM Bio's roles and responsibilities
- Identified deliverables (JHF/IR) and expectations (ADM)
- Projected the costs of each phase
- Identified some keys to success for the performance testing and scoping audit:
 - The core team was assigned to a daily 30 minute meeting
 - The steering team was to participate in the kickoff and outbriefing meetings
 - Acquisition of production load data for the three main process areas

- Scheduling and scope of site pre-work to maximize auditor/technician time on site
- Listed the key names for both JHF/IR and ADM

Whiteboard development was often the cause of spirited debate among the team members, with Ernie Pither (IR Director of Engineered Products), Brent Darnell and other JHF/IR participants challenging ADM Bio's understanding of system operation, and with ADM Bio pressing JHF/IR to substantiate and justify their recommendations for the audit. Nonetheless, it was this *close collaboration* that Dayson now considers to be a primary contributor to the project's success.

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THE ENERGY MANAGER | Compressed Air Energy Savings Project at Archer Daniels Midland BioProducts

The Repeatability, Resilience and Reliability

During the development of the whiteboard and the early stages of the survey, it became clear to the team that it's not enough to achieve efficiency gains, as important as they are to the plant and to the electric utility. You must also balance system repeatability (how consistently the system responds to changes in operating conditions); system resilience (how well the system responds to upsets); and system reliability. A gain in one may cause an unacceptable loss in another. As Brent Darnell says, "It's like a triangle: if you move one corner, it's going to affect the other two."

Utility Financial Incentives

Knowing that this survey would not take place without financial assistance, Dayson approached ADM Bio's energy utility, Ameren Illinois, about its ActOnEnergy[®] program (see sidebar). Robert Baumgartner is the Industrial Energy Efficiency Manager at SAIC Energy, Environment & Infrastructure, LLC (an Ameren Illinois ActOnEnergy Partner), and manages the energy incentive dollars for Ameren. He recommended applying for ActOnEnergy's Compressed Air Retro-Commissioning Program (<http://www.actonenergy.com/for-my-business/explore-incentives/retro-commissioning>) and then acted as liaison between ADM, JHF and ActOnEnergy. He says, "I advised, consulted, and guided all parties from the incentive application process through project completion. It is important that all parties understand the terms and conditions involved with the energy efficiency incentives."

Based on ADM Bio's achieving a minimum of 3,700,000 kWh annual savings, Ameren Illinois quickly approved \$53,000, which was 100 percent of the cost of the survey as quoted by JHF. (Upon implementation and verification, an additional \$33,722 in implementation incentive was awarded, for a total of \$86,722.)

Implementation and Verification

Phase I consisted of three projects that had to meet a one year or less payback:

- Repair of leaks (175 kW)
- Minimization of purposeful drains (371 kW)
- Installation of a software "watchdog" program that provided start-stop signaling for manual compressor control (124 kW)

These projects will be detailed in Part 2 of this article, and consisted of:

- Repair of leaks. This was a straightforward process that is consistently part of energy efficiency efforts in plants. Approximately 375 leaks totaling 1000 scfm were found, using ultrasonic detectors.
- Minimization of 2555 scfm of purposeful drains, such as condensate drains. Some of these were originally designed into the system, and others, such as multiple two-inch lines found to be blowing continuously, were short-term fixes that turned into long-term problems.

- Installation of a "watchdog" control system program that provided start-stop signaling for manual compressor control. After the initial success with leaks and drains, it was determined that adding this feature to the control system could be done at little additional cost. Prior to the program's installation, the PAC system operated efficiently only 19 percent of the time; when it was properly monitored, the system operated efficiently 38 percent of the time. The results of applying this feature validated the principle of full automatic control.

Keys to Success

Compressed Air Best Practices asked Brent Darnell to identify several key characteristics of a successful compressed air system survey. He said:

- Assess the system, not the individual components.
- Measure improvements not at the demand point of use, but at the compressor room. For example, a new filter reduces the pressure drop at the point of use by 20 psi, but how much effect does that have on the supply side?
- Do not use rules of thumb; *measure, measure, measure*. Is the DOE's recommended 20 fps maximum flow velocity valid for this system? Is 0.5 percent per psi the actual reduction in power required when system pressure is reduced?

- Perform a capability test on every compressor, not just one or two — and do not use the OEM factory capability test results.
- Keep Operations and Maintenance involved from the very first pre-planning step, and listen to what employees of those groups have to say.
- Don't use an auditor who comes in and tells you how he or she is going to perform the survey: use one that asks you for your input from the beginning.
- Validate the audit before you take action on its recommendations.
- Ensure that everyone involved agrees (in writing) how the team will respond to surprises.
- Develop and use a Repeatability, Resilience, and Reliability matrix. (See sidebar.)

But What about Smaller Systems?

Because this was a very large CA system, Compressed Air Best Practices asked Dayson, “What can we say about what you learned from this project that will resonate with owners of smaller systems?” He replied:

“Whether large or small you can get a bad audit, that is, one that includes no actionable capital opportunities and limited or no low cost savings opportunities. My message is: do your homework, demand excellence, and don't be afraid to say no to the audit. Auditors may want you to part with your money and let them audit your facility. I believe that if you want to audit my plant, you should be able to provide some savings incentive beforehand.”

Conclusion

In spite of the scale of the identified savings opportunities, ADM Bio plans to complete its implementation over the next year. The gains, along with additional Ameren funding, will more than justify the necessary capital investment. Projects include:

- Measurement and validation protocol
- Total control and OEM upgrade of (5) 750 hp IAC compressors at 110 psi
- Total control of (8) 4,000 HP PAC compressors at 50 psi
 - Opportunity: 2,238 kW via shutting down one compressor
- Utility Building Temperature Control
 - Opportunity: 1,100 kW via moving the PAC inlet filters outdoors
- OEM upgrade of (2) 4,000 HP compressors
- Total control of (11) additional 4,000 HP compressors
 - Opportunity: 2,238 kW via shutting down one compressor

(Part 2 of this article will focus on the technical details of ADM Bio's implementation of the Phase I survey recommendations.) **BP**

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THE TECHNOLOGY PROVIDER

Pneumatech[®] Biogas Dryers and ConservAir[®] Flow Controllers (Revised Article^{*})

By Richard Stukey, Contributing Editor, Compressed Air Best Practices[®] Magazine

► Energy efficiency and sustainability solutions are often associated with more obvious initiatives — such as installing compact fluorescent bulbs—but those solutions fail to dig deeper for the “hidden gems” that can have a much greater impact. For manufacturing and building engineers or anyone else dealing with high potential energy consumption and inrush current demands, compressed air systems are one of the first places to look for significant energy savings and greater sustainability.

One reason why improvements in compressed air energy efficiency and sustainability are so important is that the overall system, from the compression process to the distribution network, inherently has losses in most systems. Although compressed air systems are essential to many manufacturing and building operations—and often save these operations substantial amounts of time, energy and money when configured and used properly—typically every two psi of unnecessary or lost pressure can equate to 1 percent of the annual energy expenditure, so there is tremendous potential for improvement.

Enter Pneumatech, head-quartered in Rock Hill, South Carolina and with a state-of-the-art production facility in Houston, Texas. Pneumatech is an industry-leading ISO 9001:2008 Certified manufacturer of compressed air and gas treatment solutions to production facilities across the globe. The company has long recognized the importance of managing resources, including compressed air programs and biogas recovery.

One way Pneumatech helps to make compressed air systems more efficient is with their line of ConservAIR[®] Intermediate Control (I/C)[®] units, which monitor and stabilize air pressure by adjusting flow and releasing air from storage to maintain a continuous, optimal air pressure supply within zones. Adjusting air flow to use the right pressure for the zones with a compressed air system is essential for optimal compressed air energy efficiency—and ConservAir I/C units do just that.

“In the early 1990s, the originators of the ConservAir technology saw the benefits of dividing the air flow into multiple parallel

paths, thus reducing the distance traveled by the air,” said Joseph A. Fresch, Vice President, Pneumatech North America. “If you split the flow into two valves, it has to travel much less to provide the same pressure compensation.”

“The benefit,” added Fresch, “is that you react much quicker with changes in downstream demand. You have less overshoot or undershoot (than with a single valve system).”



The Pneumatech ConservAir S-150 Intermediate Control[®] is part of a line of controls designed to stabilize air pressure by adjusting flow.



“We can make bad piping arrangements mediocre and mediocre ones good. It’s rare that we can’t go into an existing system and improve things without all new piping being required.”

— Joseph A. Fresch, Vice President, Pneumatech North America

One reason for the success of the ConservAir (now a division of Pneumatech) since its founding in 1988 has been that their systems do not depend on sophisticated electronic controls. Instead they rely on the multiple valve system described above. “In our smaller sizes we have multiple parallel valves,” Fresch said. “We utilize diaphragm- type valves on systems up to 600 horsepower. These valves are controlled with a pilot regulator. You set the outlet pressure to where you want it, and it senses when pressure wants to rise. The valves choke off to maintain the setpoint. If there is a lot of demand, it senses pressure wanting to go down and adjusts both parallel valves to allow for more air.”

Pneumatech was introduced to ConservAir in 1988, when two Pneumatech distributors, Bob Wilson and Bob Marel, brought the company to the attention of Pneumatech management. Pneumatech sent an engineer out to investigate installations and found that by using multiple valves, ConservAir was able to avoid expensive, sophisticated controllers and control air more efficiently. “My dad was an old manufacturing guy at Ford and realized many of his issues were pressure related – he saw the value [of the ConservAir solutions],” Fresch said. Impressed with the results of the ConservAir solutions, Pneumatech bought a controlling interest in ConservAir in 1991.

The Meaning of Intermediate Control

One way to manage an efficient flow of compressed air would be to use a sophisticated regulator on every point of use in the plant. “You could do the same as ConservAir does and use all the piping as storage,” Fresch said. “One problem with that, however, is that operators usually misdiagnose problems with machines as lack of pressure, so they normally crank up the pressure. This would very often defeat the use of such regulators all over the plant.”

ConservAir takes a different approach, controlling pressure at the intermediate point in the plant. “You supply air to dryers, filters and a header,” Fresch said. “The intermediate control separates supply from demand. By putting it at the intermediate point (after the compressor and before the point of use), we put control in the hands of the compressed air supply — not the point of use equipment operators.”

Subzones of Pressure

The vast majority of systems use 85 psig, but there are often areas that need higher or lower pressure. A baghouse is an example where compressed air pulses under pressure to get the dust off the bags. You would use a secondary receiver controlled at 45 psig air, it fires in 2-3 seconds, you meter the recovery time over a five-minute span, and it is almost undetected by the air compressors because you’ve turned it into a constant load rather than a big event.

“A simple metering valve works like a gate valve that allows the tank to recover,” Fresch said. “A high-performance regulator would control the pressure at 45 psig and let the event happen. Of course, there might be parts of the system that need 110 psig, in which case you might have a line that bypasses the flow controller because this is what it needs.”



Pneumatech ConservAIR S-750 Intermediate Control. ConservAIR Intermediate Controls provide minimum compressed air pressures while continually satisfying demand levels.

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THE TECHNOLOGY PROVIDER | Pneumatech® Biogas Dryers and ConservAir® Flow Controllers

Systems can often be unnecessarily complex and inefficient. “So many systems are a hodgepodge of piping and units accumulated over time,” Fresch said. “We can make bad piping arrangements mediocre and mediocre ones good. It’s rare that we can’t go into an existing system and improve things without all new piping being required.”

We also offer electronically controlled butterfly valves. They use a sophisticated PID control to directly operate a rotary valve based on a pressure signal and without the need for any other complex valving to maintain pressure in the system. There is an overlap between the pneumatic and electronic flow controller designs to meet different customer preferences. I/C valves start at 850 cfm. The electronic flow controller starts at 2-inch, and they go up to an 8-inch, getting up to 9000 cfm flow.

Positive Results Confirmed

One confirmation of the usefulness of ConservAir I/F devices comes from Don Dyck of C.A.P.S. Inc. (Compressed Air Performance

Specialists Inc.), a non-partisan compressed air system performance evaluation firm located in Calgary, Alberta (Canada). The many non-partisan services CAP Inc. provide include extensive performance evaluations to an entire compressed air system within all service sectors including the compressed air supply, air treatment/ management to the downstream CFM production/ process demand side.

CAPE (Compressed Air Performance Evaluation) reports are highly detailed reports of results that CAPS provides to clients, evaluating the entire compressed air systems performance and demand (kW) and energy (kWh) profile. The CAPE includes non-partisan recommendations to optimize compressed air systems and minimize the required horsepower/demand and annual energy consumption.

“Within the marketplace,” Dyck concluded in a recent CAPS case study of Pneumatech Intermediate Flow control units, “these units [are] extremely accurate. Two factors are the extremely low delta of 1 psi or less, and that

they do not have the ability to backflow, as others do.”

Dyck goes on to say that the I/C units are “the singular device which I incorporate into my designs and installations which then guarantees that the compressed air system is going to give my client the savings that I propose. If I say we’re going to have a minimum \$48,536 of energy savings, then the compressor, dryer and remote air receivers are all an integral part of the recommendations. But without that ConservAir unit, appropriately installed, those savings are not achievable. The ConservAir units become an extremely important factor in saving the client real money on their energy costs. Many so-called compressed air systems auditors are running around saying ‘do this or do that,’ or ‘fix your air leaks and your problems are over.’ But I go much deeper than that. The ConservAir unit essentially becomes the matriarch of the entire system.”

Dyck illustrates this with a recent case in point. “I measured 98 to a little better than 100 acfm of non-production demand in the plant,” he said, “and only about 8.3 acfm of that demand was directly attributable to air leaks.” The remainder (91.7 acfm) of that demand went to equipment left on and other ancillary demand. When Dyck goes into a plant initially, a leaking ¼-inch copper tube (for example) might be at 100-120 psig, but later operates at 70-75 psig after the installation of the ConservAir I/C units. “The 91.7 (acfm) would go down (because of the lower pressure necessary), but does not represent the ancillary demand that the client must still address in fixing the leak,” he said.

The ConservAir I/C units are “extremely important in capturing the savings which we identify. Running it in low/no load, I will capture much more savings” than energy auditors with recommendations that do not utilize the Pneumatech I/C units.



MVC 195F Gas Dryer, one of a line of dryers used to prepare gasses from landfills, farms and other operations for combustion.

“Those Intermediate Control units are an extremely important part of what I do,” he said. “I don’t tell a client ‘you have to use this particular unit,’ but I do say, ‘this is what the unit has to perform, this is the criteria that it has to meet.’ ConservAir is one of the few who even come close to meeting those requirements. Their product has made my success rate virtually 100 percent.”

Pneumatech has become one of the “essential ingredients” in the CAPS program for reducing energy costs, which are delivering impressive results (see chart). “During the... new equipment installation period,” Don stated in his case study, “the client made initial alterations, repairs and eliminations to those devices and/or areas recommended by

CAPS Inc. within the CAPE report to reduce the overall compressed air ACFM demand required to operate all of the facilities’ various production and non-production periods. Although not all downstream ACFM demand reductions had yet been completed by the client upon the commissioning of the new compressed air system inclusive of the intermediate control device.” The following annual energy savings were measured/tested and quantified by CAPS Inc.:

DESCRIPTION	ANNUAL ENERGY CONSUMPTION (KWH)	ANNUAL ENERGY COSTS (\$0.87/KWH)
Original 150 HP Air Compressor System	858,753.0	\$74,712.00 (+)
New 75 HP Air Compressor System — Receiver — Intermediate Control	300,870.0	\$26,176.00 (-)
Annual Minimum Energy Savings Obtained	557,883.0	\$48,536.00 (+)

Pneumatech Biogas Dryers Support Sustainability

Energy efficiency is one aspect of sustainability where Pneumatech compressed air solutions excel. But energy savings and sustainability are engineered into all of their solutions. One important example is biogas dryer solutions that are used on farms, landfills, and other sources of gas composition to reduce carbon and other pollutants emanating from them. Biogas processes entail both aerobic and anaerobic sources.

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These are PAC-1.7 LDS/40 model dryers installed at the city landfill in Barrie, Ontario.

“Landfills are not the only source of biogas, but they are the most easily understandable source,” said Fresch. “You have to do something with the methane gas (resulting from waste decomposition). You can’t just exhaust it, and it has been 30 years since people started to realize the importance of providing productive uses for the gas.”

Pneumatech manufactures driers and dryer filters that are used to dry and compress the landfill methane, making it ready for combustion. “The prepared methane is then ready for electricity generation,” Fresch said, most often in nearby industrial applications. In some cases the methane “can be cleaned up so well that it can be added to natural gas in pipelines.”

Today the company participates in close to 75 biogas sites of all types, including many landfill sites, in the US and Canada. There are also 4-5 sites in Mexico, several of them used in well known breweries, some of Mexico’s largest beer distillers. Waste hydrocarbon gases are captured from the by-products of the beer’s

fermentation process, cleaned up and utilized to fuel boilers and supplement natural gas requirements they may have at the facility.

In a landfill to energy project, gasses are developed within the system and collected. A compressor or a blower creates suction that pulls the gases out of the landfill. Scrubbers take some of the gross materials out of the gas stream for the compressor.

A typical Pneumatech “landfill skid package” includes, among other items, a chiller and re-heater. The gas will come in and be pre-cooled by outgoing gas, and then the gas goes to a direct expansion unit or chiller that cools it down to 40 degrees. The moisture in the gas condenses and is pulled out with a separator. The gas is then reheated and a coalescing filter pulls out any oil. The gas in most cases then goes straight to micro-turbines or generators that produce electricity.

“In some localities, any electricity generated in that way is required to be purchased by the people who maintain the electrical grid,” Fresch said. In addition to the sustainability

benefits of reduced carbon pollution, “there are also financial benefits to doing this. They are basically taking what was once a waste gas and turning something tangible, usable and saleable.”

The amount of recoverable gas depends on the size of the landfill, and when the landfill closes, its lifecycle stage. “Early in the process, it doesn’t produce that much,” he said, but a much more significant production occurs soon thereafter. “Typically, years two through eight maximize the amount of gas available,” he said, “but after year eight it starts to fall off.”

The filters used can get to be as much as 5’8” or more tall and 3 feet wide, with a 10-year filter life. “So much material packed into space allows movement of gas,” Fresch said. “The gas flow is slowed by the filter’s design, which maximizes contact with the filter media.”

Advantages of Pneumatech Biogas Systems

“Several packagers use some of the components that we use,” Fresch said. “Pneumatech considers itself to have an advantage by having done this and from being known in the industry for a long time, offering efficient units featuring innovations developed over a period of time.” Interested in enhancing your company’s energy savings and improved sustainability? Go ahead and install those energy saving light bulbs. And when you’re done, take a closer look at your compressed air programs — where you may find even greater savings and impact on the environment. **BP**

**CORRECTION: This is the corrected version of an earlier article which was mistakenly published prior to receiving corrections noted by Pneumatech.*

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THE EVOLUTION OF BIOMASS COMPRESSORS

By Robert A. Sturdy, CLS,
Sturdy Corporation



Volatile Organic Compounds

► When the Environmental Protection Agency was formed, in 1970, it used its congressional mandate to issue all sorts of regulations regarding the discharge of contaminants into the land, water and air of this country. Over the years, air pollution has been one of the key areas where the Agency has put in place stringent requirements to control the emission of VOCs or Volatile Organic Compounds. Today the mandates of this government agency require extensive steps be taken to curtail their release by all operators of tank farms, chemical plants, refineries, fermentation plants and landfill operations. As a result of these regulations the biomass utilization industry was born.

Since VOCs are gases, the only way to provide control and movement to process it is to use compressors. In most instances, the collection and initial transport can be done with blowers or other dynamic displacement



Tescorp Mattei Gas Vane System.

compressors, because the pressure ratios required are low (typically under 1 BAR). But the EPA mandates call for not just collection but process of the gas into a harmless form. For most gaseous pollutants, higher pressure ratios and thus positive displacement compressors were required.

Vapor Recovery Units Are Introduced

These new types of compressor applications were referred to as VRU's or Vapor Recovery Units. When the challenge came to the compressor industry, the first response was to put forth those compressor designs that were currently working in similar applications. This meant large bore distance piece reciprocating compressors were the selection of choice. But large cylinders were required because the higher volume gas flows were at low pressure and this meant big displacement cylinders were necessary to handle the gas. Not only did these compressors require very expensive castings but they also needed a large number of valves per cylinder. Valves, which due to the corrosive nature of the gas stream, were often very expensive to replace.

Just as the industrial air compressor market had shifted away from large reciprocating compressors to rotary designs, the VRU building companies also went in that direction. Hy-Bon Engineering of Midland, Texas pioneered the development of rotary gas compressors and developed their own line of rotary vane units designed with the capability to use both grey iron or stainless steel castings. Others like Harley Industries of Tulsa used the existing Allis Chalmers Ro-Flow vanes for their gas compressor units.

With the emergence of the flooded rotary screw compressor as the industrial air standard, compressor manufacturers



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THE EVOLUTION OF BIOMASS COMPRESSORS



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such as Sullair entered the gas market by creating their own dedicated Process and Gas Compressor Division, based in Houston, Texas. This group was followed by independent packagers of Le-Roi, Mycom and Gardner Denver gas screws as they sought opportunities in the growing field of Vapor Recovery.

Elevated Discharge Pressure Requirements Arrive

While the EPA demanded Pollution Control, there was still a high cost attached to flaring or disposing of the VOC gases. That was until the Oil Embargo of the 1980's brought on a new economic reality concerning the cost of energy. Now all of a sudden a million Btu of waste gas had a real cash equivalent value. What was waste gas could now be used as a fuel source for boilers to produce steam. At about the same time, small natural gas fired turbines from solar and others started to see use as power providers for generators and pumps. These cogeneration applications created a cost recovery opportunity for the VRU operators to help defray the expense of the mandated pollution control requirements.

Gas turbines required higher gas supply pressure from the compressors delivering their fuel gas, and this imposed a new set of requirements on the VRU compressor engineers. With the VRU compressing the fuel gas to pressures from 10 to 15 BAR, the small turbines were able to combust the gas cleaner and more efficiently. But, this elevated discharge pressure requirement created a whole new level of complexity for the VRU gas compressor designers and a subsequent shift in gas compressor evolution.



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THE EVOLUTION OF BIOMASS COMPRESSORS

Gas Compressor Selection and Design

In gas compressor selection, the variables of pressure ratio and capacity are still major factors in the correct sizing of the unit. But, what also has to be taken into consideration is the varying composition of the gas stream. This is the critical factor in determining the selection of the type of compressor and the temperature of operation. In most biomass applications, Methane (CH_4) is the basic constituent along with other heavier hydrocarbons (C_2 , C_3 , C_4 +). It is in a mixture of other gaseous elements such as water vapor (H_2O) and various other gases like Nitrogen (N_2), Carbon Dioxide (CO_2), Hydrogen Sulfide (H_2S) and Hydrogen Chloride (HCL). All of these make up the Bio-gas cocktail that must be compressed to harvest the gas energy through combustion.

A basic rule in gas compressor design requires that the Heat of Compression generated must always exceed the dew point temperature of any gas component in the gas stream at final pressure. This means that the temperature of the compressed gas stream must always be kept higher than the dew point for any gaseous component in the gas stream. Just as an air compressor will condense water from the humidity in the compressed air if the system runs too cool. The compressed gas stream can drop out liquids, as well, if the pressure dew point temperature of any component is not exceeded. Here again, the percent of these various gas constituents makes a difference, with higher concentrations precipitating more diluting liquids into the compressor. And the production of acids in the compressor will affect performance eventually destroying it.



Two-Stage Rotary Vane Vapor Recovery Unit.



Vapor Recovery Unit System Feeding Flare.

Compressor Oils Designed for Corrosive Service

With the demand for gas at higher discharge pressures, the flooded rotary screw compressor became the design of choice as the single stage rotary vanes requiring once thru lubrication could not handle the higher pressures without using a second stage of compression. Here again costs for additional liquid scrubbers and inter-stage cooling added significant cost to the package system. Because rotary screws used their oil system as a direct contact coolant in addition to providing bearing lubrication and sealing between the rotors and stator, they were able to do the extra ratios of compression in a single stage. Since the compressor lubricant is the life-blood of the screw compressor, its' integrity must be maintained. To address this issue, significant advances have been made by specialty blenders, such as Summit Industrial Products of Tyler, Texas, which have led to the development of a family of custom blended compressor oils designed to resist hydrocarbon dilution and are fortified with inhibitors specifically for this corrosive service.

Flow control for VRU compressors has always been a problem. While smaller units operate on start / stop controls, Sullair, Gardner Denver and others also used their designs for slide valves and turn valve controls to actuate internal bypasses within the gas screw compressor stators — thereby achieving a mass flow control to regulate the process, and also allow for continuous operation. These control mechanisms added capacity and flexibility. Today many systems are now using variable speed drives to provide a smooth flow of fuel gas to the turbine power plants.

The problem with rotary screw compressors occurs when the exterior ambient temperature

drops and the fluctuations in gas composition of the biomass will vary from the design envelope. When this happens the potential for liquid drop-out occurs. The heavier hydrocarbons and water are particularly susceptible to drop-out in these colder conditions and will thin the compressor oil. Dilution of the compressor lubricant affects the viscosity of the oil, and with a loss in viscosity the screw's bearings make direct metal contact and subsequent failure. In screws this normally occurs on the highest loaded bearing — the male rotor thrust bearing since it is designed to absorb the axial thrust of the rotor.

Rotary Vane Compressors

Tescorp of Tulsa, Oklahoma, one of the leading innovators in VRU design and fabrication, has for years advocated the use of rotary vane compressors, like the Fuller compressor, because of their simpler bearing system and once-through oiling system. Recently they have partnered with Mattei — the Italian air compressor manufacturer. Vince Thomas, President of Tescorp says that the unique design of the Mattei lube management system allows this rotary vane compressor to run with as good as or better performance than a rotary gas screw, while still maintaining temperature regulation of the discharge gas stream. This thermal control eliminates the oil dilution problem, and more importantly, with the right gas compressor oil, provides better reliability than a typical gas screw.

Mattei's gas vane design comes from years of operating experience gained from providing their rotary vane compressors for use as fuel gas compressors on land fill and biomass gas applications in Europe. While lube oil viscosity is important to prevent the effects of dew point liquid dropout diluting the compressor oil,

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THE EVOLUTION OF BIOMASS COMPRESSORS



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the simpler sleeve bearing system used on the Mattei vane compressor only has to contend with radial loads and it does this quite well using the hydrodynamic lubrication of the synthetic oil.

The Impact of New EPA Rules and Regulations

While great strides have been made in VOC recovery and control, this has not deterred the EPA in implementing its actions, as it has continued to tighten the restrictions on hydro carbon emissions. Part of these new requirements directly relates to the storage of oil or other liquids in smaller stock tanks and storage facilities. Under the proposed subchapter of these new regulations, all emission vapors must be captured and processed and this will apply to any tanks that emit down to no more than 6 tons per year of VOC gases. This may seem like a significant amount of hydrocarbon emissions, but it equates in real terms to 438 cubic feet of gas per day. This is equivalent to 0.30 cfm.

Many believe that these new rules for tank emissions will lead to a strong demand for much smaller field vapor recovery compressors. And since these regulations will also apply to industrial holding tanks that emit VOC gases, it will mean that many previously unaffected companies will now be involved in the installing and operating smaller more standardized vapor recovery systems that will use mini-vanes and scroll compressors.

With the gas compressor packaging companies now meeting the requirements to help industry control VOC emissions, the EPA has moved on to issue regulations toward other areas of political concern. The newest focus of their attention seems to be CO₂ emissions and the contribution this compound makes to the creation of so called “Greenhouse” gases

that lead to the perceived threat of “Global Warming”. This EPA focus on recovery and control of CO₂ emissions may provide benefits, since CO₂ has proven itself to be a superior flooding agent which when injected at high pressures will help increase oil production from older fields. This new usage now gives CO₂ gas the economic value needed to help offset the government mandated costs of containment and process. Thus, CO₂ recovered from coal-fired power plants will help produce more oil. **BP**

For more information please contact Robert Sturdy, CLS (STLE-Certified Lubricant Specialist), President, Sturdy Corporation, email: rasturdy@att.net

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Mattei Gas Vane System as a Vapor Recovery Unit.

ENERGY KAIZEN EVENTS

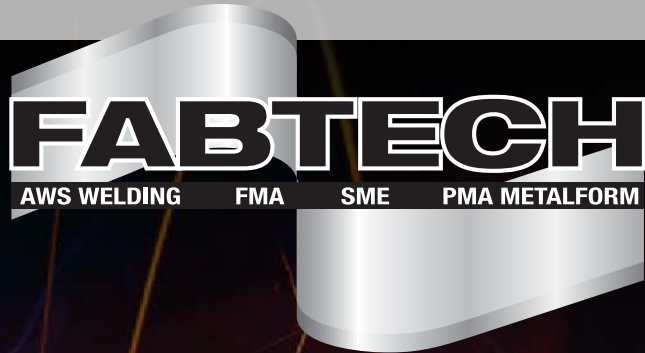
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SHOW REPORT:



By Rod Smith, Compressed Air
Best Practices® Magazine



A CenterLine FlexFast™ Acrobat Welder Using Air over Oil Cylinders for Pneumatic Welding Control.

► FABTECH 2012 was held at the Las Vegas Convention Center in Las Vegas, Nevada, in late November 2012. Show organizers reported that 25,903 attendees walked the more than 450,000 net square feet of floor space. Excited about a record high first day attendance, the atmosphere was very bullish. “If you can take the pulse of the economy by what’s happening in manufacturing, then you have to be optimistic that we are headed for economic growth, said Mark Hoper, FABTECH show co-manager. “A constant theme I heard both on the show floor and at the seminars was that, while challenges and uncertainties remain, most manufacturers believe that their businesses are headed for continued growth in 2013.”

FABTECH is co-sponsored by five industry-leading associations: the American Welding Society (AWS), the Fabricators & Manufacturers Association, International (FMA), the Society of Manufacturing Engineers

(SME), the Precision Metalforming Association (PMA), and the Chemical Coaters Association International (CCAI).

The primary focuses of this show, claiming to be the largest of its kind in North America, are metal forming, fabricating, welding, and finishing. The compressed air industry was well represented at the show displaying all types of air compressors, dryers, controls, and piping systems. Here are the highlights.

Resistance Welding

The Parker booth (www.parker.com) was located in the “Welding Hall” and had a couple of contraptions I didn’t recognize until Parker Pneumatic Product Manager, Stephen Richardson, informed me that they were resistance welding machines. The machines, manufactured by CenterLine, pinch metal together and apply a spot weld. Parker Pneumatics has been working with resistance welding machine manufacturers to reduce their compressed air consumption requirements.

Parker has helped CenterLine review the selection of valves, pressure sensors, cylinders — all contributing to pneumatic weld control. This has led to energy-saving design modifications including going from two “OHMA Air Over Oil” cylinders to one. Other actions have included enabling partial cylinder retraction instead of full retraction. This kind of “pneumatic circuit optimization, as explained to me, not only reduces compressed air consumption, it can increase welding through-put.

Parker also displayed their Hyperchill process water chillers, commonly used in welding, laser and thermal spray applications, along with compressed air treatment products.



Stephen Richardson, Jane Sexton, and Phil Kubrik, from Parker, displayed resistance welding machines with optimized pneumatics using less compressed air (left to right).



Greg Dawson and Robert Allsop, from Nordson, in front of the Spectrum® Powder Feed Center.

SHOW REPORT: FABTECH 2012



The New Graco E-Flo[®] DC Dual Control Electric Circulating Pump.

Finishing Systems

At the Nordson booth (www.nordson.com) we reviewed the Spectrum[®] Powder Feed Center. Designed for fast color change, the unit consumes 45 scfm under normal 100 psi operation but can consume up to a 360 scfm maximum flow rate. Pneumatics play an important role in many aspects of the machine, one being a free-standing air cylinder for smooth travel of up/down lance positioning.

We discussed pressure dewpoint requirements for Nordson powder paint systems. The feedback was that a +38 °F (3 °C) pressure dewpoint is fine to ensure the integrity of the power paint. Nordson personnel, however, said that many system designers go with desiccant air dryers with -40 °F (-40 °C) pressure dewpoints just to be safe. This has long been a good market for heatless desiccant air dryers sporting that 13.7% purge rate! A reliable, and well maintained, refrigerated air dryer can save energy in most of these applications.

The Graco booth (www.graco.com) introduced a new product innovation to an old application for compressed air — pneumatic paint pumps. Traditionally, finishing systems have chosen between pneumatic, hydraulic, and electric pumps. Each technology had its' strengths and weaknesses. The pneumatic pumps were the most responsive to paint pressure demand as pressure sensors could respond quickly to demand variations and quickly activate the pneumatic motor to maintain pressure. This offset the higher operating (kW) costs created by the compressed air supply requirements. The electric pumps simply couldn't respond as quickly to fluctuating demand profiles and are set to maintain constant flows.



Robert Stoeckert, Greg Evanzia, Bob Maurer, Michael Camber and Bob Burns, from Kaeser Compressors, displayed an AirCenter[™] Complete Compressed Air System (left to right).



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SHOW REPORT: FABTECH 2012



Tom Fermann, from Anest Iwata-Air Engineering, displayed their tank-mounted oil-free scroll air compressor.

Graco has introduced the new E-Flo® DC Dual Control Electric Circulating Pumps. Booth personnel explained to me that this new electric pump operates in two different ways — constant pressure rate like a pneumatic motor or constant flow rate like an electric motor. This “Advanced Control Module” allows for the installation of up to two pressure transducers and allows users to “go electric” — with the resulting kW savings.

Air Compressor Technology

Kaeser Compressors (www.kaeser.com) has a special relationship with West Coast Customs (www.westcoastcustoms.com) in California and the finishes on some of the air compressors in the booth reflected this influence! Kaeser’s Marketing Services Manager, Michael Camber, explained that the Aircenter™ and Airtower Systems have long been favorites for finishing installations because of how compact and quiet they are. Integrating a rotary screw air compressor, a dryer, filter, drains, and an air receiver all into one 67 dba package, has made these popular products for the finishing industry.

Anest Iwata (www.anestiwata.com) has long been a North American market leader in the finishing system spray equipment market. Anest Iwata automatic spray guns cover the whole technology range from HVLP guns to air spray full-sized, compact, specialty, and high-performance guns. The North American introduction of their oil-free scroll and oil-less reciprocating air compressors is progressing according to plan, according to North American Sales Manager Tom Fermann. He told me that they are signing up new



Don Joyce, John Medeiros and Roberto Bettin, from MTA, displayed their industrial process chillers.

distributors in the U.S. and Mexico leveraging the strong brand name of Anest Iwata in spray painting applications. The demand for oil-free air compressors is helping make their 20 horsepower oil-less reciprocating and the duplex 10 horsepower (2 x 5 hp) oilfree scroll units their most popular packages that they assemble in Ohio.

Nitrogen Generators, Pneumatics, and Water Chillers

MTA has become a knowledge-leader in process cooling applications (www.mta-usa.com). I learned a lot at their booth as they explained how their chiller designs focus on the benefits of water thermal mass. Their chillers are used extensively in the welding and laser equipment market segments. The TAEvo industrial chillers and heat pumps can be air or water-cooled and come with standard cUL listings and options. One range is specially designed for laser applications and features a non ferrous water circuit and close control temperature regulation via a hot gas by-pass.

Of particular interest, to our readers, may be the MTA Aries tech “Freecooling” chillers. These larger air-cooled chillers offer notable energy savings in industries requiring cold water year round. Using four scroll compressors connected in parallel within two cooling circuits, these units feature a thermal load control system able to better use cold ambient conditions to reduce the kW consumption of the refrigeration compressors and fans. Using R410a refrigerant and with cooling capacities from 162 to 331 kW, MTA has already successfully replaced ammonia chillers in a few installations.



Doug Racine, Bill Tremblay and Daniel Henman, from Ross Controls, displaying their EnergySaver[®] pneumatic valves.



Sergio Gonzalez (left), from IGS Generon, presenting their Pressure Swing Adsorption Nitrogen Generators.

SHOW REPORT: FABTECH 2012



David Connaughton and Francois Blain (left to right), from Parker domnick hunter, displayed their MAXIGAS and MIDIGAS Nitrogen Gas Generators.

Pneumatic valves and cylinders provide the keys to pneumatic automation in industrial processes. I am slowly learning enough “to be dangerous” and appreciate the patience of the pneumatics industry to educate me. I went to the Ross Controls (www.rosscontrols.com) booth and learned that this Michigan-based company has been a market leader in robust, heavy-duty pneumatic valves since 1921. Bill Tremblay, their Global Industry Manager, explained that most factories are adopting “ISO valves” that allow for interchangeability in between valve suppliers with the standardization of dimensions and

other variables. We reviewed the Series W60 EnergySaver[®] valve which is a 5-port, 2-position, ISO sub-base mounted valve that supplies full line pressure to port 4 and reduced pressure at 30 psi (2 bar) to port 2. This provides full cylinder force to move the load, but returns the cylinder with less pressure thus reducing compressed air consumption by up to 30 percent.

IGS Generon (www.igs-global.com) had a booth displaying their Pressure Swing Adsorption (PSA) Nitrogen Generators. Nitrogen is used extensively, as an assist

gas, in laser cutting and welding operations in metal fabrication facilities. Other applications include brazing, annealing, autoclaves and heat treating. The company also offers membrane nitrogen generations systems. They told me they are now in the process of setting up a new distribution network targeting compressed air system suppliers.

I blinked and there was another Parker booth — this time belonging to Parker domnick hunter over in the Finishing and Fabrication hall. Industry veterans David Connaughton and Francois Blain attempted to “make me dangerous” by sharing information about when laser applications do and don’t need nitrogen purge air. Purge air, in this use, means drying and preparing the metal surface so that no moisture is present that can diffuse the laser beam. For laser applications under 3000 watts, they said, one can purge with dry compressed air. For laser applications over 3000 watts, CO₂ starts to interfere with the laser beam so nitrogen is required for purging. So, I learned something! Parker has done very well with their MAXIGAS and MIDIGAS nitrogen generators due to their modular space-saving and low energy-cost (they use less compressed air) designs.

FABTECH 2013 will be held on November 18-21 at McCormick Place in Chicago, IL. Additional information on FABTECH 2012 can be found at www.fabtechexpo.com. **BP**

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HOW TO BECOME A COMPRESSED AIR AUDITOR

By Ron Marshall with Steve Briscoe
for the Compressed Air Challenge[®]



► How does one become a top notch compressed air auditor? There is very little in the way of formal schooling available to help interested persons become competent in the art of assessing compressed air systems or recommending improvement measures. As we will read in the following interview, having an excellent attitude a good aptitude, applying continuous learning techniques, using the Compressed Air Challenge's excellent training seminars and materials, and seeking out mentorship opportunities have allowed one compressed air auditor to progress from a "dumb kid" parts clerk to the Vice-President of Business Development for Industrial Air Centers. The following is an interview of Steve Briscoe:

Marshall: What makes Compressed Air so interesting?

Briscoe: I find that this question is one of the hardest questions I have to answer. It is the dreaded question asked at any gathering, where you are meeting someone new and you get into conversation with the insurance guy, "So what do you do for a living?". I find myself trying to find new and inventive ways to make compressed air interesting to someone that has most likely never stepped inside of a manufacturing plant, or that someone who's knowledge of compressed air is limited to inserting a quarter into the box marked "AIR" at the local gas station.



Steve Briscoe, VP Business Development, Industrial Air Centers.



"The majority of the savings are typically found on the demand side, and once that has been addressed, then the focus should turn to the supply side of the compressed air system."

— Steve Briscoe, Vice-President of Business Development for Industrial Air Centers

HOW TO BECOME A COMPRESSED AIR AUDITOR

Fundamentals of Compressed Air Systems WE (web-edition)



Learn the Basics of Compressed Air Auditing

Join Compressed Air Challenge for the next session of *Fundamentals of Compressed Air Systems WE* (web-edition) coming in the Spring of 2013. Led by our experienced instructors, this web-based version of the popular Fundamentals of Compressed Air Systems training uses an interactive format that enables the instructor to diagram examples, give pop quizzes and answer student questions in real time. Participation is limited to 25 students. Please visit www.compressedairchallenge.org, to access online registration and for more information about the training.

If you have additional questions about the new web-based training or other CAC[®] training opportunities, please contact the CAC[®] at info@compressedairchallenge.org.

The line by Billy Crystal in the movie *City Slickers* comes to mind where he said “I sell air” on parent career day. Now of course he was referring to selling advertising on the radio, but it was made out to be just as exciting as compressed air is to the average person. Speaking of kids, I’m positive my own really don’t know what it is that I do, and when asked, they lose interest in less time than a rotary screw will run backwards. I also have to give credit to my wife for the effort she puts into doing her best pretending she is really interested in the exciting things I came across during my last plant walkthrough.

So, what makes compressed air so interesting is better asked what makes it so interesting to me? I would much rather give you a little background before trying to attempt to answer that one.

Marshall: In that case, tell me, how did you get started?

Briscoe: I graduated Mechanical Engineering Technology in Edmonton Alberta Canada and always saw myself going into a technical field in some way, but really didn’t know what I wanted to do. My first job out of school was in the metal building industry, where I used my skills to estimate and draft drawings of buildings and installation details for installation crews. After a few years of the same old thing, I realized that it was not what I wanted to do.

A friend introduced me to a guy in the compressed air business, and he told me about the exciting line of work that he was in. He was much better at making compressed air interesting than I seem to be able to, because I was drawn to the industry from day one, of course, I was just a dumb kid then and didn’t know what I was getting into. Anything at this

point was better than staring at a drafting board. I applied, and while interviewing, I bumped into a friend that I had graduated with that worked there. This made my desire to work here even stronger, especially after hearing about how he got into the industry and some of the businesses he was able to visit. He was promoted to sales, and there was a position in parts that opened up. After two interviews, I was in and on my way.

As the rookie, I was given a thirty minute flash training, a ringing phone and a set of parts manuals two rows high and about five feet long. Who knew this could be so complicated? I thought we were talking about air compressors here? What on earth do you need a dryer for? What is dewpoint? Wow, there are a lot of different kinds of filters! I quickly learned to be resourceful in finding the answers I needed and not to constantly ask the Senior Technician, simple annoying questions without first looking for myself; a lesson that I carry and put into practice to this day. Within a month, I must have read every training or operation manual the place had to offer. Within a few months, I wasn’t getting razed anymore and had earned my place among my fellow compressor guys.

Marshall: You are a fellow Canadian, what made you move to the United States?

Briscoe: Love, as usual; and an interesting job opportunity. I met my wife from Florida in 1998, and she came to visit me in Edmonton. After she spent three months in Canada wearing literally a snowsuit and toque during mid-summer, it was very evident that I had to move south or this girl would freeze to death in the harsh Canadian winters. Wanting to

stay in the industry, I applied at a compressor manufacturer and my resume ended up on a Regional Manager's desk. After a phone interview, painstaking hours of immigration forms, attorney bills and saying bye to my previous life, I was on my way to work at a distributor in Indianapolis.

Marshall: Who was your main influence?

Briscoe: The Regional Manager was instrumental in developing my knowledge, having good mentors is key to learning the compressed air business. By nature, I like to voice my opinions, anyone will tell you that. He would train me on how systems work, and I would not let a subject drop until I fully understood it, sometimes taking hours and an entire white board of calculations and drawings before I finally agreed with what he was saying, or much less often, proving that my thinking was right. 14 years later, to this day, we still have "constructive discussions"; this valuable exercise is what keeps us on our game and up to date.

Marshall: How did you find out about auditing and when did you start performing audits?

Briscoe: The Regional Manager was the one that encouraged me to get into auditing,

he saw it as the next logical step. In 2000, I attended the Fundamentals of Compressed Air Systems as well as the Advanced Management of Compressed Air Systems programs in Chicago put on by the Compressed Air Challenge (CAC). This is where I met Frank Moskowitz, one of the top CAC instructors, and realized I really did not know much about compressed air systems and the possibilities that auditing could bring. I was now a man on a mission to be an auditor. I was introduced to Dave Booth, another CAC instructor, who had agreed to help get me and my company get into compressed air auditing. I happily volunteered to be the one to take on this new challenge. We acquired the equipment, received some great training, and soon I was doing my first simple audits. I started testing my skills on equipment being serviced in our shop or asking our good customers if I could practice on their equipment. It was tough back then because air auditing was still a relatively new concept. I met up with Frank again in 2004 when I traveled to Sacramento California to earn my AIRMaster+ Qualified Specialist designation.

Marshall: Tell us about your first successful audit.

Briscoe: There were many small to medium sized audits that I would consider successful, each a stepping stone to the next, learning

new and better ways to calculate and present the information in an understandable format. However, I would consider my first successful audits to be where I was contracted to audit two facilities at a jet engine manufacturer where their facilities stretched across a square mile each. I had to crate up and ship all of the equipment to site and each facility took a full four days to set up the equipment and do my walkthrough. Quite an involved process compared to what I was accustomed to. Each system consisted of large centrifugal compressors with either flooded rotary screw or multi-step reciprocating compressors, all manually controlled from a central powerhouse, and then distributed to the various plants through a network of above and underground piping.

This is also where I learned the difference in overall plant mentality between the smaller plants I was used to dealing with versus the large facilities. The overall perception on the production floor was that the facility was so large, that small changes didn't make that much of a difference, therefore it was not worth exploring ways to improve because there were much bigger fish to fry. The focus was on the powerhouse and how to generate compressed air more efficiently, even though there was so much obvious opportunity in other areas. This does tend to be one of the hardest things to convey to a management team, even to this day. The majority of the savings are typically found



“To this date, I have performed close to 500 audits and I still run across things I have not seen before, which makes every day a learning experience.”

— Steve Briscoe, Vice-President of Business Development for Industrial Air Centers

HOW TO BECOME A COMPRESSED AIR AUDITOR

Best Practices for Compressed Air Systems Second Edition



This 325 page manual begins with the considerations for analyzing existing systems or designing new ones, and continues through the compressor supply to the auxiliary equipment and distribution system to the end uses. Learn more about air quality, air dryers and the maintenance aspects of compressed air systems. Learn how to use measurements to audit your own system, calculate the cost of compressed air and even how to interpret utility electric bills. Best practice recommendations for selection, installation, maintenance and operation of all the equipment and components within the compressed air system are in bold font and are easily selected from each section. *Coming Soon — BPM with SI units*

on the demand side, and once that has been addressed, then the focus should turn to the supply side of the compressed air system.

Marshall: What kinds of things did you learn the hard way?

Briscoe: 1. You can get just as dirty installing compressed air auditing equipment as you do servicing a compressor, if you are working in a foundry. Don't wear your good jeans otherwise your significant other will cuss your very existence because "your" load just ruined the next load of "delicates" in the washing machine.

2. The only viable place to measure flow in a compressed air line is typically in the most inconvenient place 40 feet up in the air where you have to be an acrobat for the local circus to reach them.

3. Don't take anyone's word for what a pipe is without first tracing it down yourself. At one facility, a maintenance guy and I found a drop at the far end of the plant with a quick connect

that was a different style than what would work with my equipment. After closing the isolation valve and removing the fitting I noticed that there was a bunch of condensate built-up in the line. I drained that into a 5 gallon pail, cracked open the isolation valve and managed to fill up an additional three 5 gallon pails — it was never ending. Thinking I was the hero of the day for getting rid of all of this moisture, I found the Maintenance Manager from the plant and told him what I had found only to hear him say that there was no compressed air in that area of the plant. I had just managed to drain 20 gallons out of their cutting tool lubricant system. Needless to say, they were not too happy about it, especially with the maintenance guy that was with me. From that day forward, every line is traced, right back to a known compressed air line, no matter what.

Marshall: Have you ever been stumped?

Briscoe: Of course, I'll be the first to tell you that I am not the smartest guy in the world. I audited this one facility because they did

not feel they had adequate capacity for their demands and they were looking to size a new compressor or find ways to reduce their demands. I logged kW on the compressor, pressure directly after the water separator, pressure before the pre-filter, pressure after all of the contaminant removal, and various pressures across the plant. During my walkthrough, all of the piping appeared to be adequately sized, and all of the dryers and filters were oversized. My audit showed almost zero pressure drop from the discharge of the compressor to the far end of the plant, exactly what I was expecting to see. But pressure was dropping far below their desired level, and the compressor never reached full load condition. I requested a second site visit and found something I had missed on the first visit because it was outside. When the client had previously installed the compressor's remote cooler, they had taken the 2 inch compressor discharge air line down to $\frac{3}{4}$ inch to connect to the cooler on the other side of the wall, increasing it back to 2 inch before coming back into the building. The compressor could not push the air through the reduced pipe size without a massive pressure drop! Once that was addressed, the compressor could handle the loads of the facility at only 75% loaded. As further icing on the cake we did find some additional opportunities to reduce their demand through lowering their pressure and fixing some leaks.

Marshall: What keeps you in the business, why are you still here?

Briscoe: I'm in the compressed air business because it's what I know and love. Ask anyone who knows me and they will tell you my passion for this industry is almost

ridiculous. I have picked up and moved my family four times to advance up the ladder and I really can't see myself doing anything different. Earlier you asked me what makes compressed air so interesting; the answer is that it is interesting and exciting because it is something that is unique. There are not too many people out there doing what I do for a living, it is nice to know that for the most part, I will not run into someone that does what I do. Therefore, I will always be able to strike up an interesting conversation that has the potential for the other party to learn something new. I am going to continue doing this until someone tells me that I have to stop. I have a desire to know more every day, and never stop learning. To this date, I have performed close to 500 audits and I still run across things I have not seen before, which makes every day a learning experience.

Marshall: Your company has put on quite a few CAC compressed air training sessions, what is the biggest benefit you see?

Briscoe: It is surprising to me that even though the level of attendance is usually from plant management, maintenance management or sometimes even higher up the management chain, the level of knowledge of how much compressed air costs is still unknown. These classes have led to an urgency of making their

compressed air systems more efficient, both on the supply side, but more so on the demand side. We have also seen a dramatic increase in the level at which companies take care of their equipment, knowing now that a simple regulator adjustment can be the difference of 15 percent energy savings, or adding storage under the right scenario reducing energy costs by up to 30 percent. It is nice to have the product neutral CAC instructors providing that 3rd party information for us. Every single Area Manager we have at my company is required to attend both the Fundamentals and Advanced CAC Classes. There is not, in my opinion, a better compressed air training class provided for anyone to attend.

Marshall: Why are most compressed air systems so inefficient in your opinion?

Briscoe: It is rare to find someone that really wants to talk about their compressed air system. Few understand what a dramatic effect it has on the bottom line, especially for those small and medium companies. If there is air, they are able to produce product, which is what tends to matter. Most only pay attention to their air system when something goes wrong with it. It is up to us in the compressed air field to try to show them what they don't want to see.

Marshall: Do you have any words of wisdom for future compressed air auditors?

Briscoe: There isn't a lot of glory with this job unless you strive for personal satisfaction of helping a company solve a problem and become more efficient. You will either love it or hate it from the beginning. Once you have been in the industry, it gets under your skin and you can't get it out. I have seen many try to leave the industry, but then after a couple of years, they get sucked right back in one way or another.

There will always be a need for compressed air auditors, and a greater need for those who really know what they are doing. If you like it, own it and take on as many challenges that you can, even if you think they are a little beyond your comfort zone. Anything can be solved if you just put a little thought into it, and there are always people in the industry that can help, especially in this electronic age. **BP**

Steve Briscoe is the Vice-President of Business Development for Industrial Air Centers. Currently sits as Treasurer on the Compressed Air Challenge Executive Board of Directors and is a qualified US Department of Energy AIRMaster+ Specialist. Email: sbriscoe@iacserv.com; tel: 317-713-5942; www.iacserv.com

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“Retrofitting the 8 case packing machines with 3-position valves reduced our idle cfm from 80 to 15 cfm – on each case packer. With the right air compressor controls allowing the electric motors to turn down, the annual energy savings from one case packer paid for the whole project.”

— Gregory Rhames, Asset Reliability Manager/Site Energy Manager, Verallia Glass, Jan/Feb 2012 Edition of Compressed Air Best Practices®

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RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

HIBON INGERSOLL RAND ANNOUNCES EXPANDED CENTRIFUGAL BLOWER LINE



Hibon Ingersoll Rand today announces the completion of a 5-year product development plan to add three (3) new models to their industry leading multistage centrifugal blower line. The models 475, 575, and 675 will join a long line of other quality MSC blowers and positive displacement lobe blowers already in use worldwide.

“We are very excited to be adding these products,” said Chris Cammer, Industrial Market Manager. “The addition of these blower products to the already extensive Hibon multistage centrifugal product line gives coverage to an extremely wide array of flows and pressures. We will be able to better serve our industrial clients in the Oil and Gas, Power, and Mining markets.”

Hibon’s 25 year centrifugal product development and over 100 years of industrial product history lay the foundation for this advanced product series.

Features of the Hibon Multistage Centrifugal Blower product portfolio include but are not limited to:

- Flows from 1000 to 35000 cfm and pressures up to 18 psi
- Rugged cast iron heads and sections

- Cast aluminum impellers in endless combinations to meet client requirements
- Exclusive cast aluminum bearing housing and splash type oiler for cool operation and years of trouble free bearing performance
- Hundreds of accessories including motors, controls, valves, and filters to provide a complete blower package
- Local representation through our manufacturer’s representative team and worldwide reach through our Ingersoll Rand affiliates
- Certified service shops throughout North America

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Redesigned Kaeser Air Main Charging Valve

Announcing Kaeser’s redesigned Air Main Charging Valve! This uniquely Kaeser product reduces the exposure time of air treatment components to the elevated air velocities that exist while an air system is being pressurized. In many applications, exposure time can be reduced 50% or more.

The AMCV automatically opens and closes to maintain a set minimum pressure in the supply side of the air system and more slowly charge the main distribution piping. The result is extended service life of air treatment components. AMCVs are available in a number of configurations to meet the requirements of various system types, including a high temperature version for use after externally heated dryers.

Visit www.KaeserNews.com/AMCV or call 877-586-2691



RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

Gardner Denver Re-designed EnviroAire Oil-less Compressors



Gardner Denver introduced the newly re-designed 15-37 kW EnviroAire Series oil-less water injected rotary screw compressors. These variable speed machines feature superior noise levels, enhanced performance capabilities and meet ISO8573-1 (2010) Class 0 and Silicon Free certifications. The updated package design incorporates the latest in compressor controls with the innovative GD Pilot TS touch screen controller.

Visit www.GardnerDenverProducts.com

BOGE Introduces Effilence Airends

For the first time in its corporate history, BOGE now produces the centerpiece of its over 30 hp models of screw compressors itself: the innovative BOGE effilence air end will in the future be built at the Großenhain site in Saxony, Germany and brought onto the market with the new generation S-3 series.

Temperature-compensated processes which make for extremely low production tolerances are used in their manufacture. Designed for 40 hp to 150 hp, BOGE effilence is the most efficient air end ever incorporated into BOGE compressors. The result is powerful but quiet compressed air production.



BOGE effilence stands for two quality attributes — efficient compression (efficiency) and quiet operation (silence). Its innovative rotor profile geometry, smooth rolling properties, optimized configuration of performance ranges, low performance losses and high volumetric efficiency are hallmarks of a new level of efficiency.

The new 5:6 screw profile of the rotors (five main rotor teeth and six secondary rotor teeth) makes for low differential pressure between the chambers and so a minimum loss of volume flow. The small radius of the secondary rotor teeth means that the blow hole is kept as small as possible, thus ensuring high air end efficiency. BOGE has reduced the speed of its new air end by 20%, making for a significant reduction in circumferential speeds. The compressed air experts minimize efficiency losses from splashing by optimizing the speed. Due to the reduction in speed, BOGE was able to minimize vibrations in their new compressor air end.

With BOGE effilence, sound insulation starts at the source, resulting in extremely quiet operation. Since the life of the bearing depends not only on its dimensions but also on the total number of revolutions it has notched up, compressed air users will benefit from the long service life of the air end.

Visit www.boge.com/us

New Optisure Remote and Optisure RS Hygrometers

Kahn Instruments announced the newest additions to their Optisure Hygrometer product family: Optisure Remote Hygrometer and Optisure RS Hygrometer.

The Optisure Remote Hygrometer includes an external dewpoint sensor that is cable connected to the electronics controller and has a dewpoint measurement range of -40 °F to +19 °F. The Optisure RS includes an internal sensor and is available with dewpoint measurement ranges of -112 °F to +68 °F or -130 °F to +68 °F.

The Optisure Remote and Optisure RS Optical Hygrometers are variants of the field-proven Optisure Hygrometer, a chilled mirror hygrometer with an internal sensor capable of measuring dewpoint from -76 °F to +104 °F. Like the original Optisure Hygrometer, the Optisure Remote and Optisure RS include the following key features:

- Fundamental, accurate and drift-free measurement
- Industry best dewpoint accuracy of ± 0.18 °F

TECHNOLOGY PICKS

- High resolution, back-lit LCD display
- Data logging to USB or SD card
- NIST calibration traceability
- Frost assurance system
- Easy mirror access

The Optisure Remote and Optisure RS Hygrometers are precision moisture-measuring instruments that can be used for critical process measurement and control applications or as laboratory reference standards for calibration of other devices. Both instruments feature accuracy of ± 0.18 °F and an 85-265 VAC, 47-63 Hz universal power supply. An innovative frost assurance system eliminates any ambiguity in determining ice versus super-cooled water formation on the mirror, resulting in improved measurement capability, faster response time and more confidence in measurements.

Contact Kahn Instruments, Inc.

Phone: (860) 529-8643

E-mail: hygros@kahn.comwww.kahn.com

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A Publication of: **Smith Onandia Communications LLC**
 217 Deer Meadow Drive
 Pittsburgh, PA 15241

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THE MARKETPLACE

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JOBS


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– Gregory Rhames, Asset Reliability
Manager/Site Energy Manager, Verallia
Glass, Jan/Feb 2012 Edition
of Compressed Air Best Practices®

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