The Magazine for ENERGY EFFICIENCY in Compressed Air, Pneumatics, Blower and Vacuum Systems

COMPRESSED AIR BEST PRACTICES

airbestpractices.com

July 2014

System Automation

YOUR 24/7 BACKUP TEAM

Compressors are the heartbeat of your facility, pumping clean, quality air that is vital to your production processes, and regular maintenance significantly increases your system's life expectancy.

Therefore, the health of your compressor system is our #1 priority, and our support continues throughout its lifetime. Whether it's providing genuine parts or a comprehensive service plan, we offer several service options to meet your needs – and give you peace of mind.

www.atlascopco.us – 866-688-9611

Sustainable Productivity

Atlas Copco

“The efficiency and reliability of Hitachi compressors save us time and money.”

The world’s largest spice maker relies on Hitachi Oil-Free Air Compressors to reduce operating costs, maintain production uptime and improve worker utilization.

Oil-free compressors from Hitachi Industrial Equipment are proven more reliable than alternative solutions. Unlike other suppliers, Hitachi designs and manufactures most of the major components of its oil-free air compressors in-house, resulting in greater reliability and more consistent efficiency over the life of the equipment.

Discover how other companies have achieved production uptime objectives and better managed costs with Hitachi Industrial Equipment oil-free compressors.

Visit us at www.hitachi-america.us/oil-free-compressors/

Hitachi’s experience and know-how developing ultra-reliable technologies for critical infrastructure like high speed rail systems and turbine power generators influence the design and production of Hitachi’s super-efficient oil-free air compressors.

Hitachi Industrial Equipment
Hitachi Industrial Equipment Systems Co., Ltd.

HITACHI
Inspire the Next

SUSTAINABLE MANUFACTURING FEATURES

COLUMNS

FROM THE EDITOR | Compressed Air System Automation

Intertape Polymer Group has received the 2014 ENERGY STAR® Partner of the Year Award. We had the opportunity to interview Michael Jones, their Corporate Energy Team Leader, for our lead article this month. Key 2013 accomplishments included reducing energy intensity by 22 percent and absolute energy use by three percent over 2012. They have saved $2 million in energy costs since 2009 and 8 of their 10 plants have met the ENERGY STAR® Challenge for Industry.

"Over the years and many compressed air audits later, one thing has become clear: continuous monitoring is a key factor for efficient compressed air systems." Jan Hoetzel, from SIGA Development, makes this statement in his article titled "Compressed Air Simulation Software". Similarly, the only constant in a compressed air system is change. When new air applications are added - a line is down, air leaks grow or if maintenance is done to repair leaks in the system - the whole system is affected and responds accordingly. System monitoring allows facilities maintenance to see real time effects of changes to the system and respond with appropriate adjustments when necessary.

Don van Ormer, from Air Power USA, agrees with the need for monitoring in his article, "Central Monitoring and Control for Multiple Air Compressors." His system assessment story reviews a plant where annual electric costs for compressed air production were $121,000. The plant was operating Sullair rotary screw compressors, a heated desiccant dryer and a ConservAir flow controller. All the equipment was operating well but the addition of a central controller optimized the use of the air compressors and realized energy savings.

The 2014 AICD Conference was held in June in Orlando and featured a record number of exhibitors. I again had the great job of making the trip and catching up with all the AICD Member air compressor distributors and equipment vendors. It's great to see the continued growth, in both membership and exhibitors, at this truly-independent and brand-neutral conference. I hope you enjoy our AICD SHOW REPORT describing some of the presentations and vendor exhibits.

Ron Marshall, on behalf of the Compressed Air Challenge®, out-did himself this month with an article titled, "Boeing Canada Winnipeg Recognized for Compressed Air Project." This plant was recognized for the best improvement project of 2013 within the Boeing enterprise worldwide. Ron outlines how they used innovative high-pressure storage to reduce the required size of their air compressors and save substantial utility energy and demand charges.

ROD SMITH
Editor, tel: 412-980-9901, rod@airbestpractices.com

INDUSTRY NEWS & SUSTAINABILITY REPORTS

Mattei Holds Spring Training School

Mattei completed the Spring 2014 Revolutionary Sales & Service Training Schools for dealers throughout North America at the Randallstown, Maryland facility. Attendees came from across the United States and Canada for the two and a half day session that featured a balanced combination of instruction in each discipline. From interactive classroom training to "roll up your sleeves" hands-on training, attendees learned about what makes a Mattei "Simply Different" than ordinary rotary screw compressors, and were schooled in basic air compression theory, competitive analysis, and rotary vane compressor service and repair. Attendees also got a first-hand look at the new BLADE Series compressors for the 5 hp to 10 hp range.

About Mattei Compressors Inc.

Among the most energy efficient air and gas compressors in the world, Mattei Compressor customers include collision repair distributors, body shops, industrial air users, onboard transit air applications and natural and methane gas compression. Mattei Compressor, Inc. is located in Baltimore. Maryland and offers a full line of fixed speed and variable speed air compressors, 3 hp thru 250 hp, which are sold through a network of distributors in the U.S., Canada, Mexico, and Central and South America.

Visit www.matteicomp.com

Jay Hedges, Bill Kennedy, and Dale Mays welcomed Mattei Distributors to the Spring Training School

Hitachi America Announces Establishment of Mexico Subsidiary

Hitachi America, Ltd. (HAL) announced that it established Hitachi Industrial Equipment Mexico, SA. de C.V. (HIEMEX) in Irapuato, Mexico on April 25, 2014 jointly with Hitachi Industrial Equipment Systems Co. Ltd. (HIES). HIEMEX will be engaged in the sale and after-sales services of HIES products and will begin operations starting in July.

In recent years, industrial manufacturing in Mexico has grown enormously. In particular, there has been a significant increase in the number of domestic and foreign manufacturers mainly from the automobile industry who have established manufacturing facilities in Mexico. As a result, Japanese companies are also increasing their presence in Mexico and view it as a production hub for the American continent that will continue to grow.

In response to the importance of this market shift, HIEMEX will set up a sales and service office in Irapuato, where many Japanese companies

Profile of HIEMEX

Company Name	Hitachi Industrial Equipment Mexico, SA. de C.V.
Location	Irapuato, Guanajuato, United Mexican States
Address	Avenida Rio Seguro 161, Parque Tecno Industrial Castro del Rio, Tramo Irapuato - Silao km 125, Carretera Panamericana, C.P. 36810 Irapuato, Gto., Mexico
Representative	Yasuyuki Ogino
Business	Sales and servicing of industrial machinery
Employees	7 (Planned)
Capital	32 million Mexican Pesos (Approx. 2.4m USD)
Shareholding	HAL75%, HIES25%

are based, in order to provide customers with faster and more customized services for air compressors and other HIES's products. HAL, along with HIES, will position HIEMEX as a core office in the region, and HIES aims to expand its Mexican business. HAL and HIES will accelerate their Latin American businesses with a view toward expanding into other Latin American countries.

About Hitachi America, Ltd.

Hitachi America, Ltd. headquartered in Tarrytown, New York, a subsidiary of Hitachi, Ltd., and its subsidiary companies offer a broad range of electronics, power and industrial equipment and services, automotive products and consumer electronics with operations throughout the Americas. For more information, visit www.hitachi-america.us. For more information on other Hitachi Group companies in the United States, please visit http://www.hitachi.us/.

About Hitachi Industrial Equipment Systems Co,. Ltd.

Hitachi Industrial Equipment Systems Co,.Ltd. headquarted in Tokyo, Japan, is a subsidiary of Hitachi, Ltd., and is engaged in the manufacturing, sales and services of industrial components and equipment. The company offers various industrial products including Motors, factory automation/control systems, wind/water systems, pneumatic systems, power distribution, environmental systems and labor-saving systems. For more information, visit http://www.hitachi-ies.co.jp/english.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges with our talented team and proven experience in global markets. The company's consolidated revenues for fiscal 2013 (ended March 31, 2014) totaled 9,616 billion yen ($93.4 billion). Hitachi is focusing more than ever on the Social Innovation Business, which includes infrastructure systems, information & telecommunication systems, power systems, construction machinery, high functional materials & components, automotive systems, health care and others. For more information on Hitachi, please visit the company's website at http://www.hitachi.com.

INDUSTRY NEWS & SUSTAINABILITY REPORTS

MANAGEMENT MOVES

- Atlas Copco Compressors has appointed Jerry Geenen Regional Business Line Manager, Vacuum Solutions North America
- Energair Solutions Inc. announced the appointment of Larry Cooke as Eastern Regional Sales Manager

Atlas Copco Compressors Appoints Jerry Geenen as Regional Business Line Manager, Vacuum Solutions North America

Atlas Copco Compressors has appointed Jerry Geenen regional business line manager, vacuum solutions North America.

"Jerry brings nearly 20 years of experience in the fields of high vacuum and rough vacuum as well as knowledge and experience in liquid ring and rotary vane vacuum pumps and systems," said John Brookshire, president, Atlas Copco Compressors LLC. "His experience is directly related to the products that will be associated with our new vacuum solutions group and will serve him as he works to grow the division and business unit in North America."

In his new position, Geenen will be responsible for leveraging sales channels and infrastructure to help Atlas Copco become the industry leader in the rough vacuum segment. In addition to developing direct and indirect sales channels in rough vacuum, Geenen will act as line manager for sales in the U.S. and development manager in Canada and Mexico. He will also provide expertise and guidance to local vacuum groups, and will take an active role in the governance of these groups.

Geenen received his Bachelor of Science in engineering from Purdue University Calumet and worked previously in engineering, package design and sales and marketing management. Prior to joining Atlas Copco, Geenen owned and operated a vacuum pump manufacturing and sales organization that was selected to the Inc. 5000 list of fastest growing companies in the U.S.

Atlas Copco Compressors LLC is part of the Compressor Technique Business Area, and its headquarters are located in Rock Hill, S.C. The company manufactures, markets, and services oil-free and oil-injected stationary air compressors, air treatment equipment, and air management systems, including local manufacturing of select products. The Atlas Copco Group, which celebrated its 140th anniversary in 2013, is among the Top 100 sustainable companies in the world and a member of the Dow Jones World Sustainability Index. Atlas Copco has also been recognized by Forbes, Thomson-Reuters and Newsweek, among others, for its commitment to innovation and sustainability. Atlas Copco Compressors has major sales, manufacturing, production, and distribution facilities located in California, Illinois, Massachusetts, North Carolina, South Carolina, and Texas.

Atlas Copco

www.atlascopco.us

EnergAir Solutions Inc. enhances coverage with an Eastern Regional Sales Manager

Energair Solutions Inc. announced the appointment of Larry Cooke as the new Eastern Regional Sales Manager. Larry will

be based out of his home office in Charlotte, NC and will be responsible for business development and distributor relationships East of Mississippi. "Since EnergAir Solutions, Inc. was founded at the end of 2010, we've been quite successful in setting up several distributors all over the US. In order to keep growing and provide the same service to our existing and new distributors, it was absolutely necessary to create this new position within the company," says Nicolas De Deken, COO at EnergAir Solutions Inc. "Larry has proven to be successful in the compressed air industry before and we believe his extensive experience, drive and enthusiasm will help us to accelerate our growth in the US"

EnergAir Solutions Inc. is the United States subsidiary of CMC NV, the world's leading compressed air and vacuum pump controls company. EnergAir specializes in the design and installation of energy efficient master control systems for compressed air and vacuum installations, typically cutting energy consumption and costs by 30%

"It is a great pleasure to be able to contribute to such an innovative and dynamic company as Energair Solutions Inc. I look forward to working with our distributors and partners to enable them to provide the most unique and unsurpassed energy saving controls available in the compressor industry." says Larry Cooke.

To learn more about Energair's master control solutions and sequencers, please visit www.energair.com or contact Larry Cooke, tel: (704) 622 9404, e-mail: larry.cooke@energair.com

Please send Management Moves announcements to Rod Smith at rod@airbestpractices.com

To read more **Industry News** articles, visit www.airbestpractices.com

Intertape Hot Melt Carton Sealing Tape

Energy Management at Intertape Polymer Group

By Rod Smith, Compressed Air Best Practices® Magazine.

Compressed Air Best Practices® Magazine interviewed Michael Jones, Corporate Energy Team Leader, from Intertape Polymer Group (IPG).

➤ Congratulations on being named a 2014 ENERGY STAR Partner of the Year by the U.S. Environmental Protection Agency! Why was this award received?

Intertape Polymer Group (IPG) is a manufacturer of tapes, films, woven fabrics, and complementary packaging systems for industrial and consumer use. The company operates 10 production plants and employs approximately 1,800 people. IPG has developed a robust energy management

Mike Jones, Doug Nalette, ENERGY STAR representative, and David Bennett from Intertape Polymer Group.

program by using ENERGY STAR energy management tools and actively participating in the ENERGY STAR partnership. IPG is receiving ENERGY STAR recognition for the growth of its energy program and leadership as a medium-sized manufacturer. Key 2013 accomplishments include:

- Reducing absolute energy use by nearly three percent over 2012. IPG's energy program has reduced energy intensity by 22 percent and saved the company nearly $2 million on energy costs since launching in 2009.
- Meeting EPA's ENERGY STAR Challenge for Industry at 8 of its 10 manufacturing plants, with an average energy intensity reduction of 19 percent. The reductions have cut CO2 emissions at IPG's plants by 26,000 metric tons in two years.
- Helping EPA partner with a local utility to pilot a training approach that will help small and medium-sized manufacturers establish effective energy management programs.
- Establishing a local energy manager network in Danville, Virginia, to advance energy efficiency at local companies and to promote ENERGY STAR tools and resources.

How has the ENERGY STAR Program assisted your efforts?

We joined as an industrial partner in 2009. The first tool we used was the ENERGY STAR Guidelines for Energy Management. This guide lays out, step-by-step, the format for developing an energy management program. It starts with making a commitment (from the top-down), assessing where you are, setting goals, making and implementing a plan, evaluating results, and so on. We used this plan as it was laid out.

Another tool important to our program is the Energy Management Program Assessment matrix. This matrix looks at your energy management program, at a high level, and grades you against the steps laid out in the Guidelines. The matrix is very effective because it allows you to track how your energy management program is progressing and being implemented.

Another tool that Intertape used is the Facility Assessment Matrix. This has been very important to our program. It's designed for the plants; we required each plant to complete this matrix. We developed an Excel spreadsheet, with a grading criteria for each plant, to use to report according to the matrix. This became our scorecard. We have an annual Energy Summit where we bring each Energy Coordinator in to review the scorecard. It's a red/yellow/green scorecard allowing us to quickly see where we need to improve across the board and what certain plants need help with. This is one of the most important

ENERGY MANAGEMENT AT INTERTAPE POLYMER GROUP

tools we've used to improve. We track them year after year to see if a plant continues to improve.

Those are the most important tools. We've also used networking meetings held each month, the posters, and the ENERGY STAR Challenge for Industry. If you show a reduction in energy intensity, you get recognized for it. Several plants have achieved this and it gives a great boost for the energy program at the plant and corporate level.

How has a formal energy management changed things?

Before ENERGY STAR, we were a bunch of engineers getting together and talking about projects we'd done to save energy. We needed something to take us to the next level. We believe ENERGY STAR has done that. The thing I like about it is the tools are easy to use and they focus on building a culture around energy efficiency. It focuses on delivering higher-level tools.

Every time a plant wins an ENERGY STAR Challenge for Industry, we do a press release and our CEO will recognize the plant and the individuals involved in a quarterly video.

The networking opportunities are tremendous. ENERGY STAR holds an annual conference which we attend every year and where we meet many energy professionals willing to freely share information. We heard about the Energy Treasure Hunts while talking to energy managers at this conference. We are now conducting Energy Treasure Hunts to find new low or no-cost energy conservation projects. We just got done conducting an Energy Treasure Hunt identifying a lot of compressed air opportunities at our Danville, Virginia facility.

I guess you know the compressed air system at the Danville plant pretty well!?

I better. In addition to my energy management responsibilities, I'm also the Manager of Engineering in the Danville plant. If a plant uses a lot of compressed air, it's a great treasure hunt opportunity. We use a lot of compressed air to move raw materials. In our Treasure Hunt, we found significant volumes of compressed air were being used, by operators, to move our lightweight plastic materials (we call it fluff in the plant) that's gotten hung up on some fabric or ductwork. We have a lot of static in the environment and it can cause materials to get hung up or cling to equipment.

The fix here might be static elimination or it might be modifying equipment to widen the flow area, with a bigger conveyor or pipe, to reduce ways our lightweight plastic materials can get hung up on things — and eliminate the need for compressed air to do it.

How is energy management structured at IPG?

Our CEO is interested in energy management and highly involved. Our Senior Vice President of Operations, Doug Nalette manages all manufacturing and directly supports the Energy Program. We have David Bennett, who is the Director of Operations, and he is the Sponsor

of the Corporate Energy Team. I am the Corporate Energy Team Leader.

Each plant has an Energy Coordinator who is part of the corporate energy team. We have monthly meetings and an annual energy summit. Each plant has a energy team where they work on projects for the plant. The operations managers have weekly conference calls, and I participate once a month to provide updates on the energy team. Energy Coordinators are typically plant engineers, electrical engineers or maintenance managers. We target people who can get things done in a plant. We need people who can run and manage several projects and a team working on them. They must be pretty capable technical people. It helps, for example, if they have the resources available to fix compressed air leaks! It also helps if they have the resources to call up a vendor to ask for an audit.

Intertape StretchFlex Stretch Film

ENERGY MANAGEMENT AT INTERTAPE POLYMER GROUP

> "Last year, we estimate our compressed air leak team saved 35 horsepower in air compressor power in the Danville plant."
>
> — Michael Jones, Corporate Energy Team Leader, Intertape Polymer Group

How does IPG communicate the results of the energy management program?

We have a report each plant completes each month. The report format takes the energy bill and it automatically calculates energy intensity. This means how much the plant produced per kWh. We use, for example, BTU's per square meter of tape. We also make stretch film so we have to convert pounds to square meters.

At the Danville facility, we've just implemented an energy monitoring system with a dashboard and our electric, gas, and water meters are tied into this. It will allow us to see where everything goes on a real-time basis. We hope to roll this out to each plant. We think each plant has a good feel for where energy goes but we think this will help us get a specific number.

What kind of work have you done optimizing compressed air systems in your plants?

No plant is the same, but the average tape plant has plastic extruder motors and electric heated dyes as the largest energy consumers. Other consumers are chilled water (20%), compressed air (3%) and lighting (1%).

As a company, we do focus on compressed air energy consumption. It's an area that can get out of hand if you don't keep an eye on it. We've installed a couple of demand expanders (with storage tanks) to try to minimize the variation in compressed air volumes sent to the factory floor. This has allowed us to reduce plant pressure in the plant. We used to run 120 psig and now we run in the low 90's.

We've had compressed air studies done in several plants where companies like Lewis Systems conducted an air audit and made recommendations, including changing piping and putting in some variable speed drive rotary screw air compressors. We've seen energy reductions result from these studies.

We've done several compressed air leak treasure hunts where we have a team identifying leaks and a team right behind them fixing the leaks. In the past, we had done compressed air leak audits identifying a ton

of leaks — and then the person fixing them couldn't find the leaks. Identifying and fixing leaks simultaneously works well. Now we pretty much schedule these treasure hunts when we have a period in the summer and winter when we have a shutdown. We have a team ready to go with an ultrasonic meter and a red tag system where you put a special tag on the leak and document it. The list is given to the team working behind them, they fix it, and then remove the tag.

Last year, we estimate our compressed air leak team saved 35 horsepower in air compressor power in the Danville plant, and other plants do the same thing. Each plant has ultrasonic equipment for finding compressed air leaks.

How did you get involved with the energy management program at Intertape?

As the years have gone by, my role has shifted towards the energy management program as it has grown. I've been with the company eight years.

We started the program with two plants and as time went by we got more people and plants involved. We started small and tried to share best practices and it's really grown. ENERGY STAR has shown us how world class energy management gets done. My role has expanded as the program expands.

What kind of energy management work do you do with the chillers?

We work quite a lot on the required maintenance on chillers. We use a contractor for the normal preventative maintenance. We look at chiller set-points and try to maximize them for energy efficiency. If you can increase the set-point a couple of degrees, it can make a big difference. At our Danville plant, we have a capacity of 5,000 tons of cooling managed by over fifteen chillers.

What are some next-steps for your program?

We have a Sustainability Team that I sit on, as the energy management program falls under this umbrella at IPG. As we move more towards focusing on Sustainability, the energy program will work more closely with this.

The next steps for our program are to continue to improve using ENERGY STAR tools and the matrix in areas where we might have gaps or need improvement. We can broaden the scope of communications to involve marketing and sales and branch it out even more across the corporation. I see it moving into a bigger focus on sustainability, not just energy, by focusing on recycling and improving the environment as a whole. We will widen the net by moving from the industrial plants into our warehousing and office buildings facilities.

Thank you for your insights and congratulations for Intertape being named a 2014 ENERGY STAR® Partner of the Year. BP

For more information on the Intertape Polymer Group visit www.intertapepolymer.com or for more information on how to become an ENERGY STAR Partner visit www.energystar.gov/about/join-energy-star

To read similar ***Energy Manager Profiles*** visit www.airbestpractices.com/energy-manager

THE COMPRESSED AIR SYSTEM ASSESSMENT

Compressed Air System Simulation Software

By Jan Hoetzel, SIGA Development

➤ Introduction

Over the years, the word has spread to management that compressed air is expensive. Management of compressed air may provide rewarding payback opportunities. Unfortunately, there is no one size fits all solution.

Most of us understand each individual has a unique DNA combination. Compressed air is very similar, each compressed air system should be uniquely designed so the system performs in harmony. Properly managing the compressed air system requires an investigative audit to understand the nuances of the system and identify the most effective solution(s) for efficiency. Not investigating the system, before selecting improvements, would be like consenting to surgery without having an exam. Yet, this frequently occurs in businesses operating compressed air systems.

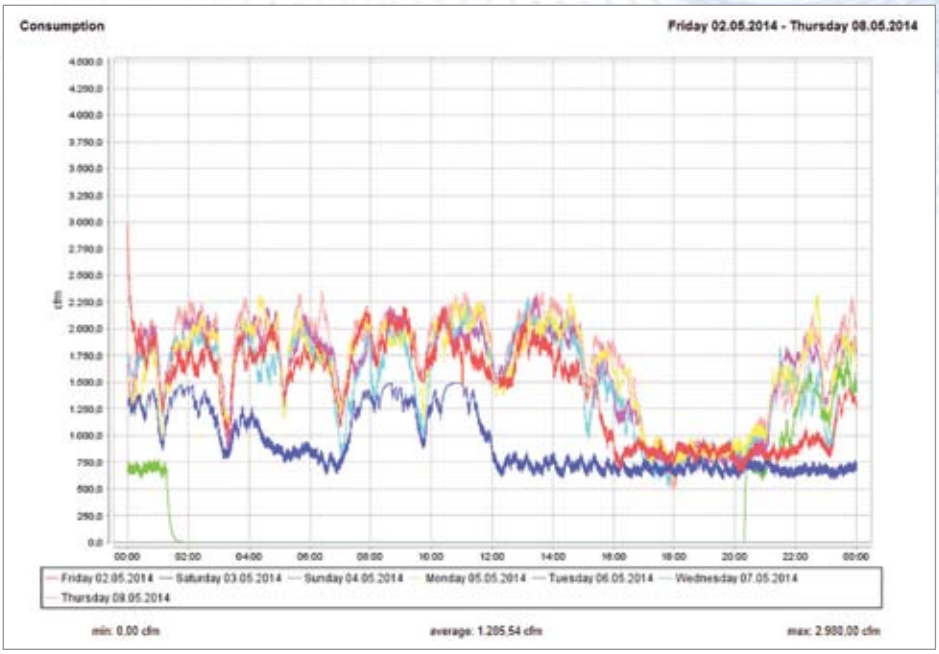
Independent audits may be costly but audit expenses may be recoverable. Several utility companies provide incentives for management of compressed air. This may include the cost of the compressed air audit, in some cases 100%, if certain parameters are met.

Continuous Monitoring of Constant Change

Over the years and many compressed air audits later, one thing has become clear: continuous monitoring is a **key factor** for efficient compressed air systems. Similarly, the only constant in a compressed air system is change. When new air applications are added, a line is down, air leaks grow or if maintenance is done to repair leaks in the system, the whole

system is affected and responds accordingly. Due to the nature of compressed air systems, improvements may be quickly lost shortly after implementation and go unnoticed. System monitoring allows operators and facilities maintenance to see real time effects of changes to the system and respond with appropriate adjustments when necessary.

A continuous monitoring system is a very useful tool to understand the effect of any implemented improvement measures. Monitoring allows a step by step check to gauge the effectiveness of an improvement, taking guesswork out of the equation and giving accurate, unbiased feedback. Cost effective monitoring solutions are available for any size of compressed air system and they are easily installed. We continuously observe companies recording positive effects and resulting positive behavior changes which go hand in hand with monitoring and the resulting continuous real-time feedback of the compressed air system. Response is much quicker which results in efficiency. Efficiency translates to real dollars on your bottom line.



Graph 1. Seven day compressed air demand

System Simulations Assure Sustainable Investment

Each system should be individually designed. The air compressor should not be selected from a page in a catalog without simulating the response of the compressor within the system. The best compressor for the system should be based on unbiased simulations detailing how the system will respond for the functions which need to be performed. The air compressor should complement the compressed air system and work in harmony. Today it is entirely possible to purchase a compressor to complement your compressed air system based on facts, not guess work.

THE COMPRESSED AIR SYSTEM ASSESSMENT | Compressed Air System Simulation Software

COMPRESSOR DATA AND ENERGY CALCULATION								BASELINE	
system rated capacity		21.1 kW/(100 cfm)		0.09$/kWh			load costs	81.6%	
efficiency		0.35 kWh/100 cf		psi			unload cost	18.4%	
costs		0.32 $/1,000 cf		psi			total costs	$4,101.07	
		CYCLES		TOTAL KWH				TOTAL COSTS$	
#	COMPRESSOR	MOTOR	LOAD	LOAD	UNLOAD	TOTAL	KPI	LOAD	UNLOAD	TOTAL
1	Recip	-	-	-	-	-		-	-	-
2	Recip	2	4	54	16	70	21.7	4.88	1.44	6.32
3	Nameplate 225 kW	36	5,834	15,259	6,276	21,535	24.4	1,373.32	564.80	1,938.12
4	Nameplate 225 kW	18	2,450	21,883	2,080	23,963	18.8	1,969.43	187.20	2,156.63
	sum total	**56**	**8,288**	**37,196**	**8,372**	**45,567**	**21.1**	**3,347.62**	**753.44**	**4,101.07**

Compressor system simulation software is available using the data of a monitoring system to create scenarios with a variety of types and sizes of compressors. This helps companies make informed decisions as to which set up would be the best fit for the system. A Compressed Air System Simulation provides energy and performance data. As energy accounts for about 80% of the operating cost of a compressed air system, it is the key to understanding the effect of the compressor on the overall system key performance index kW/100 cfm.

Your company may be offered an expensive variable speed compressor when in actuality, it doesn't add the value anticipated, especially for the additional costs. The specific efficiency performance may fall short of the efficiency from a proper sized load/unload compressor.

> "Today it is entirely possible to purchase a compressor to complement your compressed air system based on facts, not guess work."
>
> — Jan Hoetzel, SIGA Development

The following scenarios outline three different options/simulations and demonstrate the importance of selecting the best solution for your system, rather than trying to make the system accommodate the solution.

The compressed air data included in the graphs has been taken from an actual monitoring system and imported to the Simulation Software. System parameters have been evaluated to run the simulation. The performance data for the added compressors are taken from the CAGI data sheets which are accessible on their website (http://www.cagi.org/). The data has been adjusted to a lower pressure demand.

A Simulation Scenario

The client has two 225 kW rotary screw compressor and two 115 kW reciprocating compressors. One of the 115 kW compressors is broken and the other is strictly used as back up. The following is the one week view to address the demand profiles on weekdays and weekends.

The demand graph shows the compressed air demand over 24 hour period. Each color represents one day. The green line represents Sunday, when the system is down from 1:20 AM to 8:20 PM. The graph provides information of the leak /min air demand rate of 750 cfm. It is worth noting the maximum demand and demand fluctuation during breaks and off shifts.

System optimization

The task is to automate the system, provide continuous web-based monitoring, system alerts and replace the reciprocation compressors.

The simulations allow us to peer into the future. Three options with different compressor sizes are simulated and the results of the simulations are described below. Simulations produce graphical presentations which help visualize what is happening in the system easier to see. For the sake of space, only a few graphs have been provided.

THE COMPRESSED AIR SYSTEM ASSESSMENT | Compressed Air System Simulation Software

> "The only constant in a compressed air system is change, companies who manage the change find they are managing their bottom line more effectively."
>
> — Jan Hoetzel, SIGA Development

The compressors are fighting each other at times. The green is load and the yellow is unload.

The compressors run on a very tight pressure range and are cycling in average every 65 seconds during the 7 days, a total of 8,288 times. The overall unload share is 18.4 %.

By simulating adding a master controller and open pressure band with the two existing 225 kW compressors, a 56% reduction of load cycles and an annualized energy savings of over 100,000 kWh results, with a system key performance index of 20.0 kW/100 cfm, the unload share 14.0%.

Simulating the result of adding one 140 kW compressor to the two 225 kW compressor system [Option 1] results in a reduction of the unload share from 14.0% to 12.2% and the load cycles will be reduce to 3,625. The system key performance index is 19.2 kW/100 cfm.

Results of simulating adding a 140 kW and a 93 kW load/unload compressor to the two 225 kW compressors [Option 2] the key performance index is 17.8 kW/100 cfm.

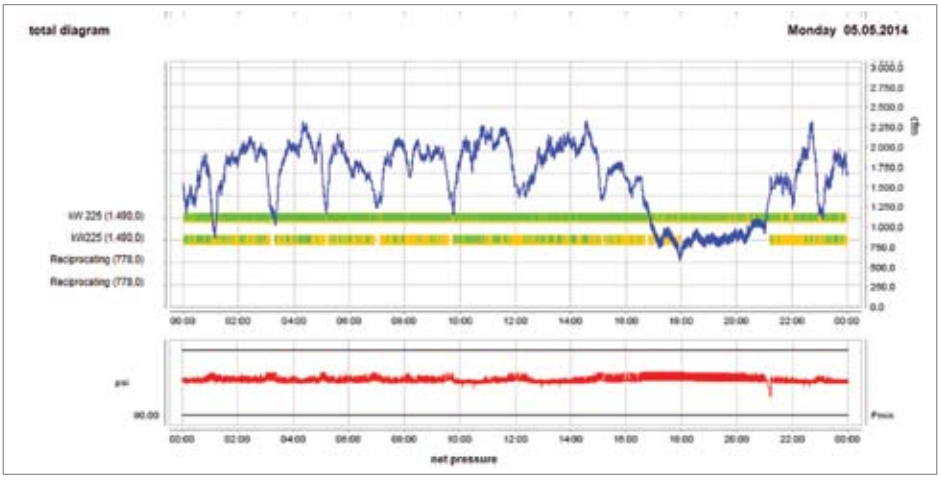
The overall load cycles with 1,627 cycles are moderate; knowing that the smallest compressor with the lowest unload kW is doing the more than 50% of the load cycling.

Simulation of adding a 140 kW load/unload and a 185 kW VSD compressor to the existing two 225 kW compressors [Option 3], the VSD compressor having a capacity of 357 to 1387 cfm and a 851 cfm load/unload compressor to the system. Load cycles and motor starts are way down, however the key performance index is at 18.0 kW/100 cfm and therefore is not as favorable as [Option 2].

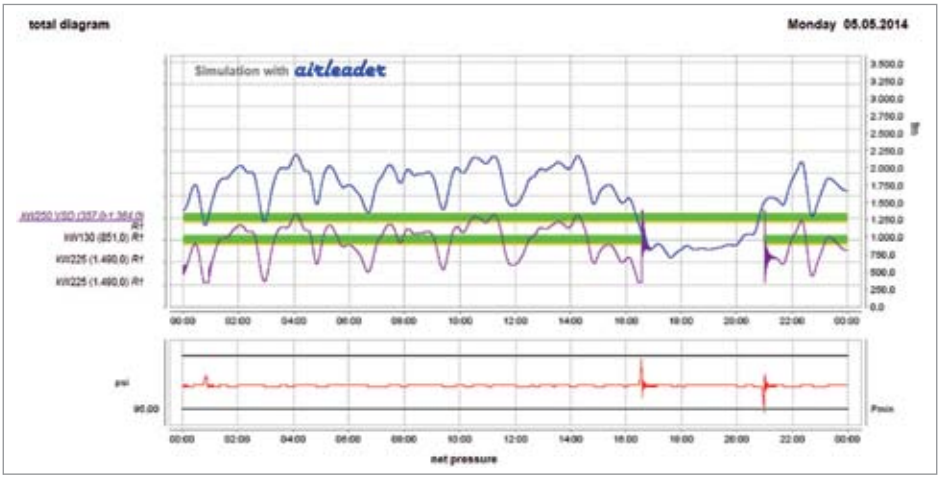
LIFETIME COST COMPARISON OF SIMULATED OPTION

#	SYSTEM OPTIONS	CYCLES		TOTAL KWH			KPI	TOTAL COSTS $			LIFETIME (10 YEARS) TOTAL $ *)		
		MOTOR	LOAD	LOAD	UNLOAD	TOTAL		LOAD	UNLOAD	TOTAL	GROSS SAVINGS	INVEST	NET SAVINGS
1	Baseline	2,922	432,456	1,940,824	436,813	2,377,637	21.1	174,674	39,313	213,987	-	-	-
2	Controller	2,087	189,147	1,942,504	315,315	2,257,819	20.0	174,825	28,378	203,204	107,836	30,000	77,836
3	Option 1	14,610	115,576	1,916,592	265,380	2,181,972	19.2	172,493	23,884	196,377	176,098	100,000	76,098
4	Option 2	18,367	84,895	1,878,058	135,143	2,013,201	17.8	169,025	12,163	181,188	327,992	170,000	157,992
5	Option 3	991	991	2,029,851	2,771	2,032,621	18.0	182,687	249	182,936	310,514	300,000	10,514

*Simple comparison, no interest or energy cost increase is considered



Graph 2. Seven day baseline air demand: Status quo



Visualization of trim and base-load compressor performance

In Graph 3 the performance is visualized. The VSD is trimming the air demand continuously using the 851 cfm compressor as the base load. Only doing the off shift between 4:30 PM and 9PM the 851 cfm compressor is turned off and the VSD handles the complete load. The two existing 225 kW compressors for back-up.

Lifetime Cost Comparison

Following a simulation, a summary table provides an overview of the annualized data for the baseline, adding a master controller and three compressor options. This overview illustrates the importance of compressed air system simulation. In the current discussion, while Option 3 with the VSD Compressor shows

weftec® 2014

the water quality event™

87th Annual Water Environment Federation Technical Exhibition and Conference
New Orleans Morial Convention Center | New Orleans, Louisiana USA
Conference: September 27 – October 1, 2014 | **Exhibition:** September 29 – October 1, 2014

Where the Greatest Minds in Water Meet

WEFTEC is the premier water quality event of choice for thousands of professionals looking for water quality solutions and the latest innovation.

Experience what WEFTEC has to offer.

- Highest value – WEFTEC is priced lower than any other water quality show of its kind
- Highest-quality, most-comprehensive educational content, featuring: more than 115 sessions, 31 workshops, 8 facility tours, mobile sessions, and exhibitor showcases
- Largest water quality exhibition in the world, with nearly 1,000 exhibiting companies
- Specialized pavilions in the exhibition, including: Stormwater Pavilion, Innovation Pavilion and more than six Country Pavilions
- A show within a show – Stormwater Congress, open to all WEFTEC attendees

Make THE Water Quality Event YOUR Water Quality Event!

Registration Now Open. "Best Rate" deadline is July 15th. **www.WEFTEC.org**

THE COMPRESSED AIR SYSTEM ASSESSMENT | Compressed Air System Simulation Software

the fewest load cycles/motor start, it is not the most energy efficient solution. Option 2 with two smaller compressors provides the most energy savings. In this case the annual savings is approximately 19,410 kW or $1,746 at an energy rate of 9 cents above the savings of VSD solution. This results in a total savings of 364,224 kW compared to the base line.

Taking into account the higher investment for the VSD compressors Option 3 becomes even less attractive. Over 10 years option 2 shows a substantial saving, whereas the savings resulting from option 3 are nearly used in entirety to pay for the much higher capital investment of the VSD. This statement is not a generalization. This statement is true for the evaluated system.

In times when energy efficiency is in the focus of compressed air system it is very helpful to do **lifetime cost models and simulate system performances** as shown above in order to make the best investment decision. Energy is the cost driver for compressed air systems and today's simulation software allows a fact base calculation based on actual data. The days of calculating a couple of profiles (weekday peak demand, weekday off shift demand and weekend demand) belong in the history books.

As described in this example the demand swings during lunch breaks requiring a system which can response quickly and efficient to the demand changes to provide best system efficiency. System efficiency adds dollars to your bottom line.

In summary, air systems should be designed to maintain efficiency irrespective of the air demand and should incorporate design features and controls so the system can operate efficiently at any air demand. The only constant in a compressed air system is change, companies who manage the change find they are managing their bottom line more effectively. BP

For more information please contact Jan Hoetzel, SIGA Development, tel: 616-828-1024, email: jan.hoetzel@siga-greentec.com, www.airleader.us

To read similar ***System Assessment*** articles, visit www.airbestpractices.com/system-assessments/compressor-controls

THE COMPRESSED AIR SYSTEM ASSESSMENT

Central Monitoring and Control for Multiple Air Compressors

By Don van Ormer, Air Power USA

➤ Introduction

This is a food processing plant where processes and standards are controlled by FDA to AIB standards. Annual plant electric costs for compressed air production, as operating today, are $116,765 per year. If the electric costs of $3,323 associated with operating ancillary equipment such as dryers are included, the total electric costs for operating the air system are $120,088 per year. These estimates are based upon a blended electric rate of $0.085/kWh.

This compressed air system assessment provided recommendations to reduce compressed air flow consumption and capture waste heat in the air compressors. Based on the air system operating 6,240 hours per year, the group of projects recommended could reduce these energy costs by an estimated $59,002. In addition, the projects will increase productivity and reduce maintenance issues.

Estimated costs for completing the recommended projects total $68,800. This figure represents a simple payback period of 13.7 months. Due to article length restrictions, we will focus on the recommended compressed air management and flow control system.

> "The two most effective ways to run air compressors are at 'Full Load' and 'Off.'"
>
> — Don van Ormer, Air Power USA

The Existing Compressed Air System

The production system operates 6,240 hours per year. The load profile or air demand of this system is relatively stable during all shifts. plant air is produced by three Sullair lubricant-cooled, rotary screw compressors — one 150 hp, and two 75 hp. There is also a 150 hp compressor out-of-service for repairs. Weekend air is supplied by three, 5-hp tank-mounted units in on-line/off-line.

After the air-cooled aftercooler the compressed air goes to a water-cooled aftercooler (which operates only during hot weather) and then through a ConservAIR controller which holds the stored pressure at about 105 psig and the system pressure at a stable 92 psig (nominal). The 92 psig dry air goes to all the main plant air production areas. The observed flows in the flow meter readout after the ConservAIR ran from 550 scfm to 960 scfm.

Rotary Screw Air Compressor Capacity Controls (Lubricant-cooled)

The two most effective ways to run air compressors are at "Full Load" and "Off."

Capacity controls are methods of restricting the output air flow delivered to the system while the unit is running. This is always a compromise and is never as efficient as full load on a specific power (cfm/hp) basis.

The two most common control methods used for rotary screw compressors are modulation and on-line/off-line. Modulation is relatively efficient at higher loads, but less efficient at lower loads.

On-line/off-line controls are very efficient for loads below 60% when properly applied with adequate effective storage to create enough time for blow down. There are several other control types — e.g., "variable displacement" (75% to 100% load) and "variable speed drive" (25% to 75% load), — that have very efficient turn down when applied correctly.

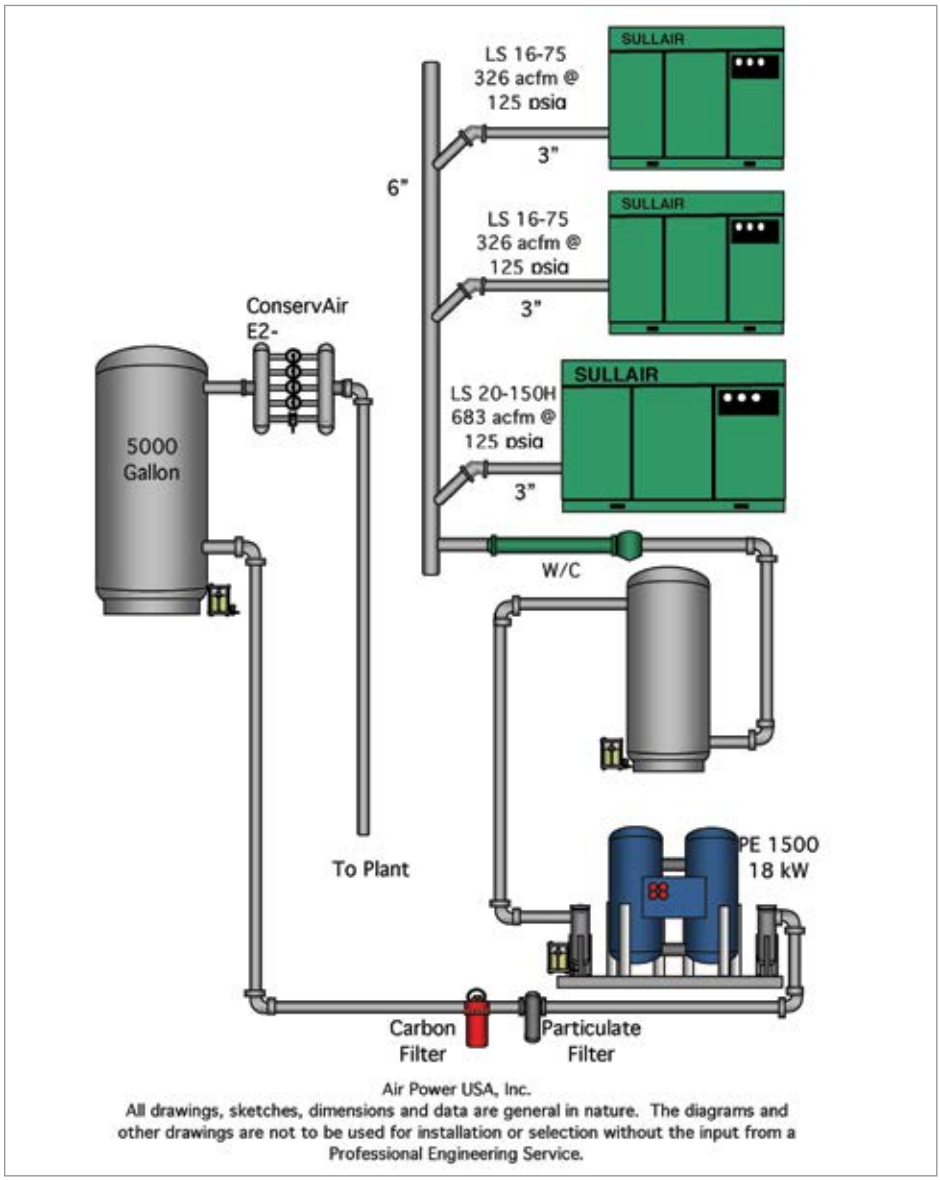
These controls must be installed correctly to operate efficiently. Piping and storage should be available close to the unit with no measurable pressure loss at full load to allow the signal to closely match the air requirements.

THE COMPRESSED AIR SYSTEM ASSESSMENT | Central Monitoring and Control for Multiple Air Compressors

The current system has on-line/off-line controls with relatively fast blow down and proper storage. The control systems appear to be running well.

Central Monitoring and Air Management Control System

A compressed air system central monitoring and control for multiple units can offer significant energy savings and productivity improvement. Often, the installation of these systems on PC hardware and appropriate software will allow the company's personnel to effectively control, monitor, operate, and sequence the compressed air system from any PC on the computer network. The facility's monitoring system should be able to monitor and record system flow and pressure and interface with the local on-board unit control system as it stands or modified. These systems provide information and trending data to maximize system efficiency, reduce maintenance costs, and minimize unscheduled downtime. They can be set to alert personnel via a text or email of a compressor warning, alarm, or shut down condition to ensure prompt attention to an emergency situation.



Proposed System Schematic

This type of monitoring software typically analyzes the sensed operating condition and brings the compressor on- or off-line, as required, to best handle the demand. They should *not* operate on a fixed sequence cycle. This ensures that only one unit runs at part load and all others are at full load or off.

Despite its usefulness, a central air management system is not able to do anything that could not be accomplished by plant personnel if trained staff were available 24 hours a day, 7 days a week, 365 days a year and dedicated to responding immediately to any situational change. However, this manpower is not often readily available.

The monitoring function is not a direct energy issue but does help the plant retain the efficiencies the facility's air system program has obtained. A well-applied monitoring system can become an integral part of a full central compressed air management control system.

Recommended Project (A)

Add a central compressed air management system with trended monitoring to control the multiple compressor operation. This air management system should be capable of keeping all units at full load and one

> "A central management system will automatically turn the dryer off at the start of the weekend and automatically turn it back on at the end of the weekend."
>
> — Don van Ormer, Air Power USA

unit at part load with all other machines off 85% of the time. It should also control the Pneumatech PE1500 external heat dryer with dew point demand and shut it off on weekends and back on for weekday operation.

Projected Results of Project A:

Current weekday operation: There is always one 75 hp on at full idle since most, if not all the time, one 150 hp and one 75 hp plus the surge tank support are all that is required. The measured idle kW of the 75 hp is about 30 kW at 80% utilization. This would average out to 24 kW for 6,240 hours at .085 kWh = $12,730 /year.

Weekend Operation: Because the air dryer has not been able to shut off properly and conveniently at the end of a 4-hour or more cycle it is left on with the valve to the plant closed. Apparently transient water vapor migrates back to the dryer bed triggering the dryer cycle and using 100 scfm or more purge air which keeps one 75 hp unit drawing at 35% flow and 49% power (68 kW x .49 = 33.32 kW).

A central management system will automatically turn the dryer off at the start of the weekend and automatically turn it back on at the end of the weekend.

Net savings (33.3 kW x .085 kWh x 2,520 hours/year)	$7,133
Total annual electric energy savings	$19,863 /yr

Recommended Project (A-1)

Reconfigure header and connections. Change 4" header to 6" and 90° crossing tee entry to directional angle entry. Savings are included in Project A.

Reviewing the performance curves of the metering data, one could see that even at a high load the system could not keep the 150 hp constant and the net result is random units going on and off at no load. The problem cause is turbulence-driven back-pressure. It may be possible to set the controls different to offset this effect but the turbulence issue would still be there. The 3" crossing tees into the 4" header appear to possibly be very borderline

THE COMPRESSED AIR SYSTEM ASSESSMENT | Central Monitoring and Control for Multiple Air Compressors

acceptable if all three compressors can fully load in with "short cycling or "backing down".

Artificial Demand Background

The air system will be most efficient if it uses the lowest possible flow and the lowest effective pressure. Therefore, pressure regulators can be used to create effective use of the air receiver capacity and maintain a stable air flow in the system at the lowest effective pressure. This avoids pressure spikes that can create increased flow to all unregulated air uses with no increase in productivity. It is not reasonable for the current system float to vary by more than 2-3 psig. The current system pressure float apparently is 91 psig to 91 psig.

Artificial demand is air demand generated by excessive pressure or system overdrive that does not enhance productivity or quality. Other benefits of a "controlled system" include:

1. Production should find a constant, steady pressure conducive to stabilizing demand and increased productivity. A steady, fixed pressure may also increase the quality of production runs by fixing the repeatability standards.
2. Once the system is stabilized and the flow and pressure are controlled, plant personnel can experiment to find the lowest effective pressure, which will optimize flow demand.
3. Properly sized demand-side control receivers and controllers may often carry a peak demand event over its operating time span without turning on or loading another compressor. Storage to cover certain identifiable larger demand "events" should be sized by calculation to cover the additional flow. Once sized, the decision will be whether to install the required storage in the compressor room or near the process.

Effect of Lower Pressure on Unregulated Flow

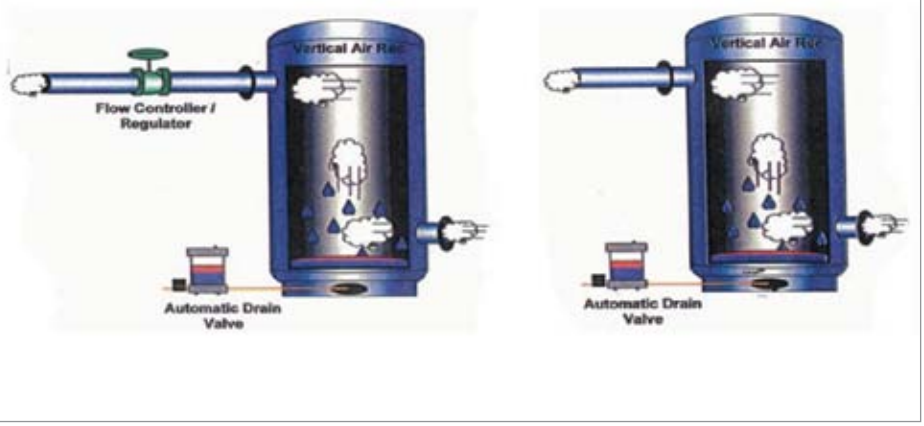
A plant's level of unregulated flow of 500 cfm at 100 psig pressure will automatically, and

> "Compressed air system central monitoring and control for multiple units can offer significant energy savings and productivity improvement."
>
> — Don van Ormer, Air Power USA

approximately reduced as shown below for alternative pressure levels. This reduction is known as eliminating artificial demand or system overdrive. Sample savings include:

- Pressure reduction to 95 psig saves 25 cfm or 5 hp
- Pressure reduction to 90 psig saves 50 cfm or 10 hp
- Pressure reduction to 85 psig saves 75 cfm or 15 hp

	COMP PSIG	SYSTEM ENTRY PSIG	AUTO FIXED DEMAND CFM
Cut-in	90	90	910
Run	100	100	1,000
Cut-out	110	110	1,094
Cut-in	90	90	910
Run	100	90	910
Cut-out	110	90	910



Full networking control systems and variable speed drive controls will also deliver a steady pressure to any system whose demand does not exceed the supply — this performance is not storage dependent.

The plant already has an effective intermediate control installed with a 5,000 gallon tank of stored dry air. The tank has a single line entry instead of going through it as usually recommended. It does not appear to be an issue at this time and no action recommended at this time.

Conclusion

Compressed air system central monitoring and control for multiple units can offer significant energy savings and productivity improvement. In some cases when combined with storage tanks and flow controllers, a compressed air system can be significantly improved. BP

For more information contact Don van Ormer, Air Power USA, tel: 740-862-4112, email: don@airpowerusainc.com, www.airpowerusainc.com

To read more ***Technology*** articles, visit www.airbestpractices.com/technology/compressor-controls

Association of Independent Compressor Distributors (AICD) Membership Meeting & Exhibition 2014

By Rod Smith, Compressed Air Best Practices® Magazine

The 2014 edition of the AICD was held June 1-3 at the Rosen Shingle Creek Resort in Orlando, Florida. This venue always exceeds my expectations in that they somehow are able to maintain high quality service and accommodations — in a resort this size.

The "new AICD" needs large resorts now, like the Rosen Shingle Creek, as this event keeps growing in their second year of welcoming air compressor distributors and vendors — from any brand. Walking the show alongside the traditionally Quincy distributors, were Mattei, BOGE, Palatek, Ingersoll Rand and Gardner Denver (to name a few compressor brands) distributors. How can that be — I didn't even see any fights or at least arm wrestling matches?!

AICD President, Patrick Lorenz of Rogers Machinery said, "With 50+ attending AICD member companies sending multiple delegates each, our 71 exhibitors have reported strong booth traffic — one said they ran out of business cards!" Lorenz further commented, "The strong speaker program, including presentations on CAGI developments, today's economic environment, and safety best practices, provided value to both AICD member companies and the exhibitors."

This was the 29th Annual AICD meeting and I was so glad to see how strong the conference and exhibition has become. This new chapter, opening up the conference to all brands has really taken it to a new level. I recommend all compressor distributors consider joining.

Yet, bittersweet was Cheryl Kiker announcing her retirement — after so many years of quarterbacking, organizing, — basically running the AICD as directed by the Board of Directors. She's always distinguished herself and the AICD by planning the most professionally run, organized, and effective while enjoyable conferences I've attended in my career. Of course she's organized the transition perfectly by training Kasey Gould to

> "With 50+ attending AICD member companies sending multiple delegates each, our 71 exhibitors have reported strong booth traffic — one said they ran out of business cards!"
>
> — Patrick Lorenz, AICD President

take the reigns going forward. The AICD appropriately honored Cheryl with a plaque at the banquet dinner.

The Conference

The speaker line-up is vendor-neutral and structured to help air compressor sales and service companies improve their businesses. The content is also very applicable to exhibitor personnel and all sessions are open to all conference participants. I was not able to attend all the sessions but will provide some comments on those I did attend.

The first speaker was Dr. Carol Dole, a Professor of Economics at Jacksonville University. Professor Dole's situation summary was quite practical — slow growth ahead. I don't do her justice here but she supported this with tons of graphs and statistics showing the opportunities and challenges facing the U.S. economy — with the positives just outweighing the negatives.

Chris Johnson, from Thomas Associates, provided an excellent session titled, "CAGI — Performance Verification Update." He reviewed CAGI (Compressed Air & Gas Institute) activities in product performance verification, DOE work, and system assessment standards and certification.

Mr. Johnson detailed CAGI's progressive work (compared to other industrial product categories) in self-regulating product performance. This has been exemplified by the CAGI Performance Verification Program for lubricated rotary screw air compressors and refrigerated air dryers. There are 11 air compressor and five (expected to soon be eight) dryer manufacturers participating. The air compressor program covers 5 to 200 horsepower lubricated rotary screw air compressors. They have begun variable speed drive testing and will begin with oil-free rotaries by the end of 2014. The refrigerated dryer program covers 200 to 1000 cfm models. The market response has been excellent as evidenced by the tremendous traffic the CAGI Datasheets Section of www.cagi.org receives.

The U.S. Department of Energy issued notice, in January 2014, of their intent to study including air compressors in the Energy Policy and Conservation Act (EPCA) Part A, Title III where (in terms I understand) they regulate the efficiency of targeted product categories. Mr. Johnson explained CAGI supports the objective of making compressed air systems more efficient and is cooperating with the DOE. It is still in the early

Frank Brookshire, Dean Chew, Curt Greifer, Keith Sportsman, and Hannu Heinonen at the ELGI Compressors booth (left to right).

Allan Hoerner, Jane Sexton, and Daniel Blaszkowiak at the Parker booth next to the new ANTARES hybrid tandem technology (left to right).

Wolfgang Strobelt, Josh Chabot, James Starr (Starr and Company) and Scott Woodward at the BOGE Compressors booth (left to right).

THE 2014 AICD MEMBERSHIP MEETING & EXHIBITION

Rick Walsh (Q-Air California), Jay Hedges, Jimmy Hamilton (Q-Air), Dale Mays, Bill Kennedy, and Jake Erickson (Jemco) at the Mattei Compressors booth (left to right).

Krista McCulley, Michael McCulley (Quality Compressed Air Services), Nitin Shanbhag, Ryan Sylvester (Quality), and Joel Sparnon at the Hitachi America booth (left to right).

Mark Lauterwasser, Ryan Dorant, Nick Herrig, Simon Galloway, Todd Allison, and Tony Hergert at the Nano Purification Solutions booth (left to right).

stages of framework definition with July 2016 identified as a potential effective date. Mr. Johnson said there are wide ranging discussion with issues such as the fact that most system inefficiencies come from compressed air leaks and other non-compressor factors certainly being discussed. Also recognized is the fact our industry is already self-regulating air compressor performance through the aforementioned CAGI Performance Verification Program.

CAGI has also created a Section dedicated to System Assessments. They are developing a certification program for system assessors based on the ASME EA-4 Standard for compressed air system assessments. They are developing a training program with a certification exam with the initial focus being on full system assessments. Mr. Johnson said CAGI would likely collaborate with the Compressed Air Challenge® to deliver the training.

The Exhibition

The 2014 AICD Exhibition set a record with 71 exhibitors! Manufactures of air compressors, compressor automation, air treatment products, piping, chillers, heat exchangers, condensate management and instrumentation all were present to show their latest technologies. The show hours were from 4:00 to 7:00 pm, on two consecutive evenings after the conference sessions. I can only highlight a few in this article — my apologies go out in advance to the many booths and firms not mentioned here due to the space limitations of the article.

HITACHI America has moved into a significantly larger facility in the Charlotte area, U.S. Senior Manager, Nitin Shanbhag, reports they continue to expand. Hitachi America recently announced the opening of a subsidiary in Mexico. ELGI Compressors continues to make noise in the U.S. with their accumulation of veteran compressed air industry professionals. Dean Chew is the latest to join this impressive team. Director of Sales Keith Sportsman said, "ELGI takes us all back to a good place with robust air compressor technical designs. Rotaries are designed, for example, to withstand 115 °F ambient temperatures and airends run at low rotational speeds of 1800 rpm on average."

BOGE Compressors, led by General Manager Scott Woodward, continues to grow in the U.S. and Canada. The Bluekat Series was on display — a machine that allows a lubricated compressor to deliver oil-free air by means of a catalytic converter. MATTEI Compressors is excited about their new BLADE Series belt-drive rotary vane air compressors.

Jay Hedges, Dale Mays and Bill Kennedy continue to grow the market acceptance of rotary vane air compressors.

BEKO showed their new line of DRYPOINT X heatless desiccant air dryers. I saw some of the first ones leaving the plant last month in Atlanta! President Tilo Fruth said this is an exciting "next step" for the company. VP INSTRUMENTS is doing an excellent job highlighting the importance of compressed air flow measurement. This Dutch company has a branch office in Ohio and is really providing technical solutions and answers for the multitude of questions end users have on where and how to insert flow meters. VP Instruments President Pascal van Puten recently reported significant installations in California in both the electronics and the steel industry.

Sullivan-Palatek Compressors grudgingly acknowledged their significant growth over the past few years. Palatek President Steve Van Loan likes to fly under the radar but they are already running out of space in the new expanded facility they moved into over the past couple of years!

Parker had a great island booth consolidating the multiple technologies they offer into one large booth including Airtek, domnick hunter, Zander, Parker Transair piping and Parker nitrogen generators. Parker is launching the new ANTARES hybrid tandem technology — a machine offering dew points ranging from +38 ˚F to -40 ˚F in a convenient, compact package. I'm very interested in this product line, ranging from 100 to 1200 cfm, which allows end users dew point flexibility (and thereby energy savings) in the lower flow ranges.

AIRCOM is making a push in the U.S. Stefano Gaggero reports that sales for this Charlotte-based company continue their steady rise. Another Italian company, FAI FILTRI, was present with a line of filtration products. AIRLEADER, led by Jan Hoetzel, continue to provide compressor automation solutions. They have an interesting focus on compressor simulation — to see the effects of a new air compressor BEFORE it is purchased.

JORC continues their exclusive focus on condensate management. President Eugene White said that business continues strong with both OEM and distribution sales channels. Their non-electric zero air-loss drain is seeing a lot of success as are their oil-water separators. I have always particularly liked their Air-Saver lock-down valves designed to prevent air leaks when the system is down during shut-down periods. C.H. Reed has told me of an installation using 20+ Air-Saver lock-down

Jarrett Lieser (Dakota Fluid Power), Joe Burke, Randy Olson (DFP), Leo Dibello, and Stefano Gaggero at the Aircom booth (left to right).

Steve Van Loan, Austin Wilkins, John O'Conner (Southern Parts) and Greg Verheyen at the Sullivan-Palatek booth (left to right).

Adam Zimmerman, Tilo Fruth, Brian Speed, and Eric Johnson at the BEKO booth (left to right).

THE 2014 AICD MEMBERSHIP MEETING & EXHIBITION

Tom Brennan (Compressed Air Power), Andre Kellner, and Fabio Rosa at the Schulz Compressors booth (left to right).

Fred Cantu and Rene Garza (Burton Compressor), Del Stambach, and Mike Holtvluwer at the Clean Resources booth (left to right).

valves that has saved their client a lot of energy. This big plant had a lot of leaks in the piping and these valves isolated those areas of the plant and only allowed compressed air into them when it was needed.

Nano Purification Solutions continues to grow. Their veteran sales team, led by Nick Herrig and David Peters, is up to six people with one more about to join the team. They showed me their innovative "cartridge-based" breathing air system that is self-cleaning and extends check-valve life.

CLEAN RESOURCES is focusing on oil-water separators and are becoming one of the leaders in North America. General Manager Mike Holtvluwer said both OEM and distributor business continues to grow.

Last but not least, SCHULZ Compressors is making a push as they prepare to launch a new line of rotary screw compressors in North America. This will complement their established line of industrial reciprocating air compressors which they supply from their Atlanta operation.

Conclusion

Once again, the AICD was an excellent event. Again, my apologies to the many companies I photographed and spoke to that do not appear in this article — we simply run out of space. For anyone wanting more information on membership or exhibiting at the AICD, please contact AICD at aicd@aicd.org or visit www.aicd.org. BP

For more ***Industry News*** visit www.airbestpractices.com

"Opening up the conference to all brands has really taken it to a new level. I recommend all compressor distributors consider joining."

— Rod Smith, Compressed Air Best Practices® Magazine

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

COMPRESSED AIR
BEST PRACTICES
airbestpractices.com

Learn How To Save Energy & Improve Productivity In YOUR Industry!

2014 FOCUS INDUSTRIES:

- Beverage Bottling & Packaging
- Grain & Meat Processing
- Pulp & Paper Corrugated
- Chemical, Pharma, Food Bulk Handling
- Energy-Efficiency System Assessments
- Compressed Air System Automation
- Measurement
- Wastewater Treatment
- Food Packaging
- Metal Fabrication & Machining
- Air Compressor Controls

Subscribe at **airbestpractices.com**

BOEING CANADA WINNIPEG RECOGNIZED FOR COMPRESSED AIR PROJECT

By Ron Marshall for the Compressed Air Challenge®

KNOW PRESSURE COMPRESSED AIR CHALLENGE

Boeing Canada Winnipeg (BCW) has been recognized with the best improvement project of 2013 within the Boeing enterprise worldwide. A cross-functional project team including BCW staff, Manitoba Hydro technical support, and design engineers from Alliance Engineering Services, Inc. used innovative high-pressure storage to reduce the required size of their air compressors and save substantial utility energy and demand charges.

BCW is one of the largest aerospace composite manufacturers in Canada. The plant produces nearly 1,000 end-item composite parts and assemblies for Boeing Commercial Airplanes, specifically for the 737, 747, 767, 777 and 787 airplane models.

The Compressed Air Audit

Before the Winnipeg site's recent expansion, a Manitoba Hydro compressed air audit found the site's compressed air system to be inefficient. The system produced compressed air using centrifugal compressors which are excellent base load machines, however, when applied to the flow of the BCW site, proved to be incompatible to the load profile.

When composite parts are manufactured, they must be baked in large pressure vessels called autoclaves. The autoclaves, which are large enough to contain a city bus, must be pressurized with compressed air for this operation. This fill is governed by a recipe which requires the vessel to fill to a required pressure within a certain time. The old system was originally designed to provide 4,500 cfm for autoclave fill operations, but due to reliability issues with the centrifugal compressors, only two of three machines were normally available; reducing the available capacity to 3,000 cfm. Two larger autoclaves purchased in the last five years then raised the required optimal fill rate to 5,500 cfm.

> "The system produced compressed air using centrifugal compressors which are excellent base load machines, however, when applied to the flow of the BCW site, proved to be incompatible to the load profile."
>
> — Ron Marshall, Compressed Air Challenge®

Fundamentals of Compressed Air Systems WE (web-edition)

Learn More About System Optimization

Join Compressed Air Challenge for the next session of ***Fundamentals of Compressed Air Systems WE*** (web-edition) coming soon. 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 fills cause BCW's compressed air flow profile to have high peaks, but low valleys during normal production. The peaks occurred less than 10 percent of the time when two large centrifugals would run fully loaded. The rest of the time the centrifugals would reduce their load and go into blow-off mode, an inefficient way to run compressors. While feeding an average load of about 700 cfm, two large 350 hp compressors ran at 85 percent of their full load power. System specific power, a measure of how much power is consumed while producing a given amount of compressed air, was measured to be about 65 kW per 100 cfm. The new production level would require

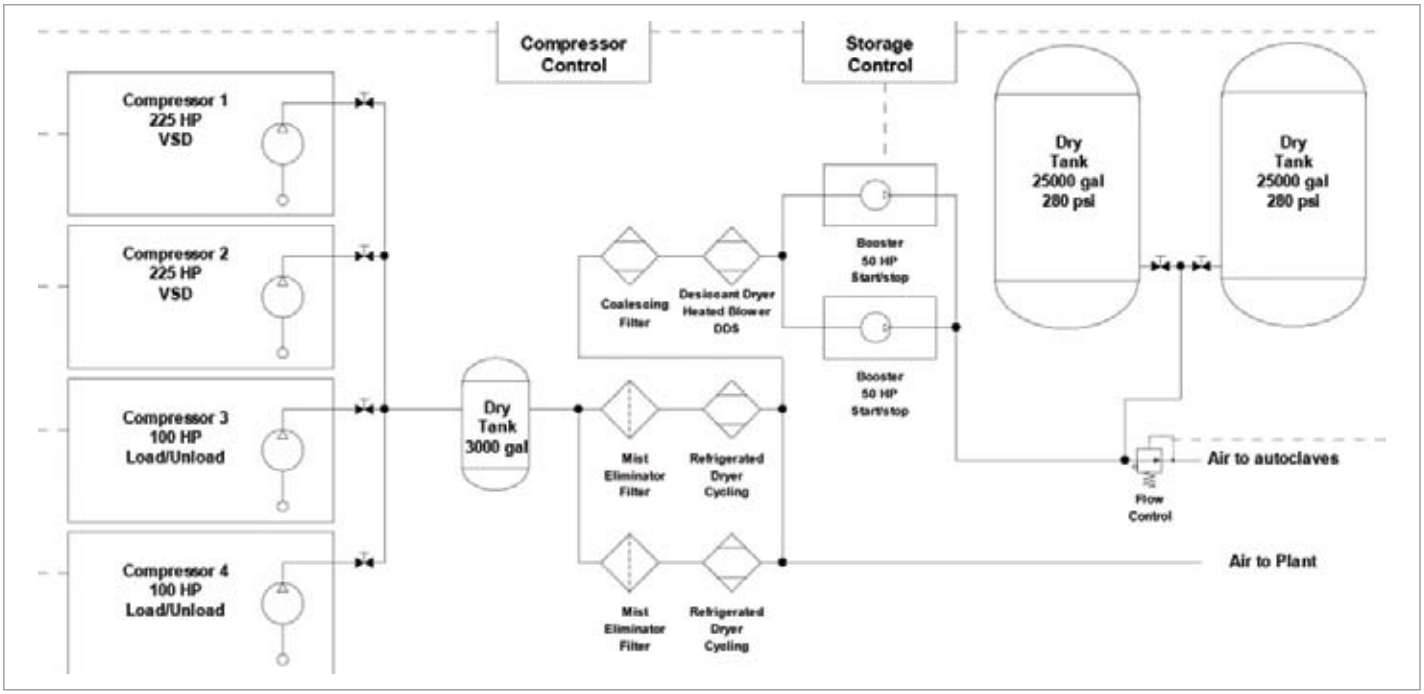


Figure 1: System arrangement uses a high pressure storage

BOEING CANADA WINNIPEG RECOGNIZED FOR COMPRESSED AIR PROJECT

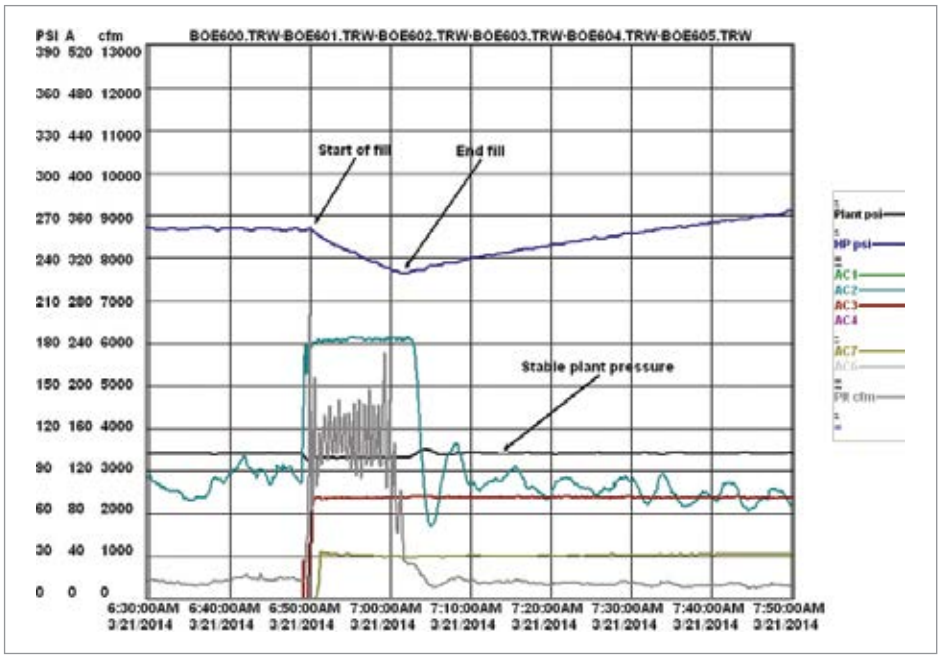


Chart 1: Plant pressure is very stable even with large flows due to autoclave fills

the third centrifugal to be used and a fourth unit to be purchased.

BCW staff tried to turn off one of the units between fill cycles, but still received poor results. The style of centrifugals used at BCW were hard to start. While trying to implement shutdown strategies, the compressors suffered a series of major motor failures. For maximum reliability the units had to remain in modulating mode using blow-off, the least efficient way to run these units.

The New System

The opportunity to completely redesign the way the compressed air was being produced came

Heat from the new air compressors is recovered in the compressor area.

with the pending site expansion. BCW staff started working on the problem and came up with an innovative solutions patterned after a previous project done on their nitrogen system (link to N2 story http://www.airbestpractices.com/system-assessments/air-treatment/n2/nitrogen-system-innovation-boeing). The air compressors and dryers would be relocated to a different area of the plant and a different style of compressors would be used.

The new system uses four rotary screw compressors and two booster compressors to provide enough plant air to cover normal production activities and the new higher autoclave fills. Instead of providing the high fill rate with running compressors, the necessary air is stored at pressures of up to 280 psi in two large 25,000 USG receivers located outside the compressor room. This air is added to storage slowly using a 50 hp high pressure booster compressor and an associated 100 hp 125 psi rated base units. When it's time to fill an autoclave, up to 5,500 cfm of air, the equivalent of 1,375 hp of air compressor capacity, flows from storage. The booster compressor operation is controlled with a Manitoba Hydro designed demand management system that watches the main facility power peak and turns off the boosters if they would add to peak demand charges on the power bill. This system reduces the cost of the stored air by about 25 percent.

The main compressed air system is designed with 100 percent redundancy; that is so half of the compressors can be removed from service with no effect on production capacity. Two 225 hp VSD style screw compressors were installed with two 100 hp base compressors providing inlet air to two 50 hp high pressure boosters. Two cycling air dryers with dual parallel mist eliminator style filters efficiently condition the main plant air. Stored air is dried to -40 ˚C dew point with an air dryer for outdoor storage, even in the winter. Compressor room piping is sized for the complete capacity of all compressor, resulting in minimal piping pressure losses across the complete system.

All compressors are controlled, within a narrow pressure band, by a sophisticated sequencing control system and the accurate regulation of the VSD compressors.

BOEING CANADA WINNIPEG RECOGNIZED FOR COMPRESSED AIR PROJECT

How Boosting The Pressure Can Save Costs

Boosting compressed air up to a higher pressure for storage costs extra energy, but in some cases, doing this helps save other costs. BCW needs a flow of 5,500 cfm of air for 9 minutes in order to quickly fill large autoclaves. They could have purchased enough compressor capacity to provide this fill plus the peak plant production demand — all at the same time. However this also has a power cost penalty because it causes high electrical peaks which result in very low system efficiencies.

Storing the air at low pressure could be possible, but an extremely large storage receiver of 270,000 gallons size would be required.

Storing the air at higher pressure of around 280 psi requires additional energy, but greatly reduces the size of the required storage receiver and the capacity of the required compressors. Having 180 psi of storage differential above the 90 psi fill requirement reduces the size of the storage by a factor of nine, requiring only about 30,000 gallons of storage.

Despite higher energy requirements, the boosters now run less than 15% of the time. This is much more economical than running partially loaded centrifugal compressors all the time to handle the extreme peaks.

BCW is charged for both energy (kWh) and peak demands (kVa) on their energy bill. The demand portion of the bill accounts for about 30 percent of the cost of electricity. The high pressure storage fill is controlled by a demand controller at BCW so that it runs only off peak, eliminating the associated demand charges with about 5% more energy costs.

The new system uses four rotary screw compressors and two booster compressors.

All compressors are controlled, within a narrow pressure band, by a sophisticated sequencing control system and the accurate regulation of the VSD compressors. The system is designed so that usually only one of the four main compressors are running, with the other active for fill duty. If an autoclave fill exceeds the capacity of the two active compressors, a special fill valve adds stored air into the system to maintain stable plant pressures. Additional control valves at each autoclave automatically limit the flow of air into the vessels if the operation causes plant pressure to drop to unacceptable levels.

BCW staff also worked on their leakage and inappropriate end use levels while the new compressed air equipment was being installed. As a result of their efforts the average air flow decreased from the 750 cfm level down to about 425 cfm, saving even more. "The centrifugal compressors provided an adequate flow of very clean source of compressed air but were very expensive to operate both from an energy and maintenance perspective," says Gerry Glor, engineering specialist at BCW. "The oil flooded screw compressors in combination with booster compressors and 50,000 US gallons of high storage allows much greater flexibility in operating the autoclaves, and the system is much less maintenance and energy intensive."

Base case compressed air energy consumption for this facility was estimated at 4,800,000 kWh with peak demand of 970 kVa costing about $330,000 per year in operating costs. The new system consumes around 669,000 kWh with a peak of 285 kVa costing $64,650 per year to operate for an 80 percent reduction in operating costs.

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.

Summary of Improvements

- Installed new compressors and dryers in new location
- Added 50,000 gallons of high pressure storage with fill control
- Implemented demand control for compressors
- Included VSD control in new compressors
- Improved sequencing control of compressors
- Added cycling-style dryers
- Upgraded dew point control of desiccant dryer
- Created low differential filtration
- Installed oversized compressor room piping
- Improved recovery of heat of compression for compressor room heat
- Created low loss condensate drains
- Selected new compressors for low specific power
- Implemented leakage and wastage program BP

To read more ***Air Compressor Technology*** articles, visit www.airbestpractices.com/technology

"The oil flooded screw compressors in combination with booster compressors and 50,000 US gallons of high storage allows much greater flexibility in operating the autoclaves."

— Gerry Glor, Engineering Specialist, Boeing Canada Winnipeg

COMPRESSED AIR
BEST PRACTICES
airbestpractices.com

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

Learn How To Save Energy & Improve Productivity In YOUR Industry!

Subscribe at **airbestpractices.com**

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

Kaeser Announces New Variable Speed Drive Rotary Screw Compressors

Kaeser Compressors, Inc. is proud to announce the new SFC 18S and SFC 22S variable speed drive rotary screw compressors are now available. These units deliver the "built-for-a-lifetime" reliability, simple maintenance, and sustainable energy savings you expect from the Kaeser name.

The SFC 18S has a flow range of 33-119 cfm at 125 psig and is available with pressures up to 217 psig. The SFC 22S has a flow range of 33-141 cfm at 125 psig, with pressures up to 217 psig. Both models feature the latest in Siemens drive technology.

These units feature a new airend specifically designed to optimize performance and efficiency. They also come standard with TEFC premium efficiency motors. These energy efficiency improvements result in a performance advantage over the competition as high as 20%. The enhanced cooling design ensures the overall package is ready for severe operating conditions.

Maintenance accessibility has also been improved. The units' new compact design and two large hinged service doors make it possible to service the unit from one side. The automatic belt tensioning device prolongs belt life and simplifies service, while maintaining optimal drive efficiency. The SFC 18S and 22S are also available with an integrated dryer for premium compressed air quality.

To learn more about the new SFC 18S and SFC 22S, visit www.kaesernews.com/SFC18S_22S. To be connected to your local representative for additional information, please call 877-586-2691.

About Kaeser

Kaeser is a leader in reliable, energy efficient compressed air equipment and system design. We offer a complete line of superior quality industrial air compressors as well as dryers, filters, SmartPipe™, master controls, and other system accessories. Kaeser also offers blowers, vacuum pumps, and portable diesel screw compressors. Our national service network provides installation, rentals, maintenance, repair, and system audits. Kaeser is an ENERGY STAR Partner.

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

New FS-Elliott R1000 Centrifugal Compressor Control

FS-Elliott Co., LLC announced the release of the R1000, the newest addition to the Regulus® control system line. Building on FS-Elliott's long-standing expertise in centrifugal compressor control, the R1000 introduces powerful new features that together enable plant operators to master one of a facility's highest operating expenses — energy costs.

The R1000 features Ambient Compensation Control, a local control mode designed to automatically adjust the compressor set point based on changes in ambient conditions. As a result, the traditionally static surge control line becomes a dynamic entity, allowing the compressor to be safely controlled closer to the true surge line. This innovative control feature reduces waste by maximizing turn-down and minimizing bypass air, ensuring energy savings at off-peak operation. The R1000 takes compressor control one-step further by employing Pressure Band Optimization to avoid unnecessary discharge by optimizing the amount of air produced based on the minimum pressure required to meet system demand.

Integrated Compressor Control adjusts performance by assigning lead and lag machines according to system demand. Automating a lead and lag control process helps eliminate excessive air production, and minimize bypass air, all while reducing energy consumption.

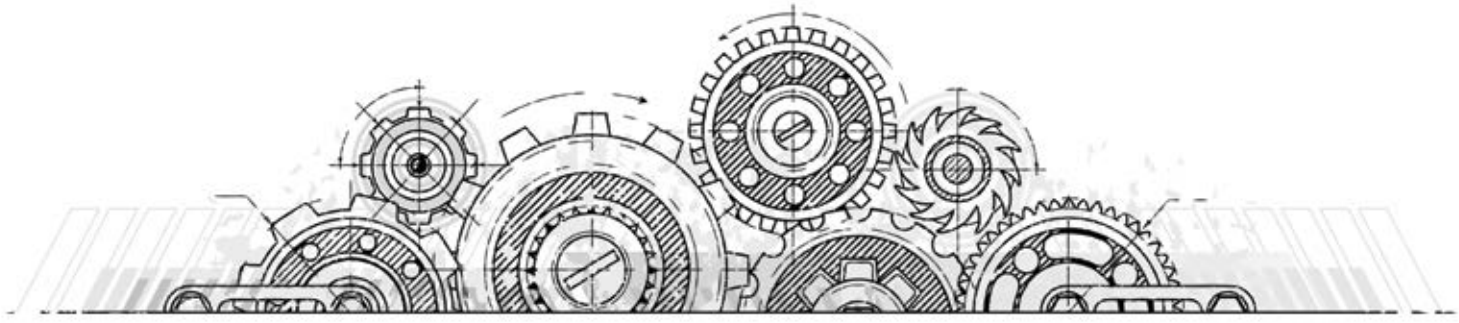
"The R1000 represents a leap forward and sets a new standard for compressor control systems. The vast majority of operators that utilize the advanced feature set of the R1000 will see significant energy savings over traditional control technology," explains Michael Cobak, Manager of Engineering Services.

The R1000 will come standard on FS-Elliott's Polaris+ line of centrifugal compressors and is the first and only control system in the industry to feature a 9-inch, full touchscreen display as standard. "Improving the user experience has always been and will always be the focus of all product developments. We understand our customers need a controller that is easy to operate; the goal of the R1000 is to allow the compressor to do its job without requiring constant monitoring. This sets the R1000 apart from other controllers that are currently on the market," added Cobak.

To learn more about the R1000 control system, visit www.fs-elliott.com.

About FS-Elliott Co., LLC

FS-Elliott Co., LLC, is a leading manufacturer of centrifugal air and gas compressors with sales, service, and manufacturing locations around the world. First introduced to the market over 50 years ago their energy-efficient machines incorporate the latest aerodynamic and control system technologies to ensure optimum performance. For more information, visit www.fs-elliott.com



TECHNOLOGY PICKS

New BOGE O3P to O15P-type Oxygen Generators

The new BOGE oxygen generators let users generate their own inexpensive, tailor-made and dependable supply of oxygen on site, with purity levels reaching 90 to 95 percent. Whether for water treatment, the medical sector, mining, welding or fish farming — the new BOGE oxygen generators can be used wherever oxygen enrichment and thermal processes take place. The advantages of in-house oxygen production are obvious in comparison to oxygen deliveries from external suppliers — users obtain precisely the purity, output and amount of oxygen they need for their processes.

Complete solution for oxygen generation

BOGE offers users an ideally coordinated all-in system for generating oxygen. The new BOGE oxygen generator types O 3 P to O 15 P, and O 3 PE to O 15 PE, are the centrepiece of the overall solution. Individually adapted to the oxygen demand, they achieve purity levels of 90 to 95 percent. As a system provider, BOGE offers an ideally matched complete system comprising a compressor, filter, refrigerant dryer, activated carbon adsorber, compressed air container, oxygen generator and oxygen container. If a compressed air station is already available, generators can easily be connected to the existing network. To produce oxygen, the generators require class 1:4:1 treated compressed air complying with ISO 8573-1 (with an additional activated carbon adsorber). The quantity of compressed air that is needed depends on the oxygen purity required.

Adsorption technology for maximum efficiency and reliability

BOGE generators produce oxygen using the Pressure Swing Adsorption (PSA) process. The basis for this process is two containers filled with zeolite molecular sieves (ZMS), which are flooded in turn with purified compressed air to effect the physical separation of nitrogen and oxygen. The oxygen obtained passes into a special oxygen container, while the nitrogen-enriched air is discharged into the atmosphere in the course of this process. Thanks to their modular design, it is possible to add or retrofit generators on site. This means that up to two expansion banks can be assigned to any master bank. Each bank can hold up to six individual modules, which are very easy to fit. In this way, up to 18 modules provide flexible oxygen generation of between 2.49 and 46.8 Nm3/h. The output can be increased to the extent required by combining additional complete systems.

RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

Up to two further banks can be centrally controlled by the master bank control unit. Standard oxygen generators are fitted with a basic control, and include a display that shows the oxygen purity and allows it to be continuously monitored. By adding a further optional display, it is possible to read off the oxygen flow rate (oxygen in Nm3/h). A premium control can also be added to enable additional sensors such as a pressure transmitter, temperature transmitter, dew point sensor or Ethernet to be attached. Thanks to their high-quality components, BOGE oxygen generators are practically maintenance-free. Their stainless-steel valve housing, wear-free zirconium oxide sensor and zeolite molecular sieve ensure trouble-free operation and reliable oxygen quality, with minimum service costs.

About BOGE Compressors

BOGE America is the United States of America Daughter Company of BOGE KOMPRESSOREN Otto Boge GmbH & Co. KG based in Bielefeld, Germany. BOGE manufactures a comprehensive range of oil lubricated and oil free screw and piston compressors used by all sectors of industry to supply compressed air for a wide range of manufacturing processes. It also supplies a complementary range of filters, dryers and condensate management equipment. The product is sold and serviced through a dedicated network of over 50 distributors in North and South America. Visit www.boge.com/us

FilterSense Dust Collector Pressure Transmitters

The FilterSense Model DP 20T (differential) and SP 20T (static) pressure transmitters feature a non-clogging design for mounting on the dirty side of a fabric filter baghouse or cartridge style dust collector. The 4-20mA transmitters are far more reliable than typical

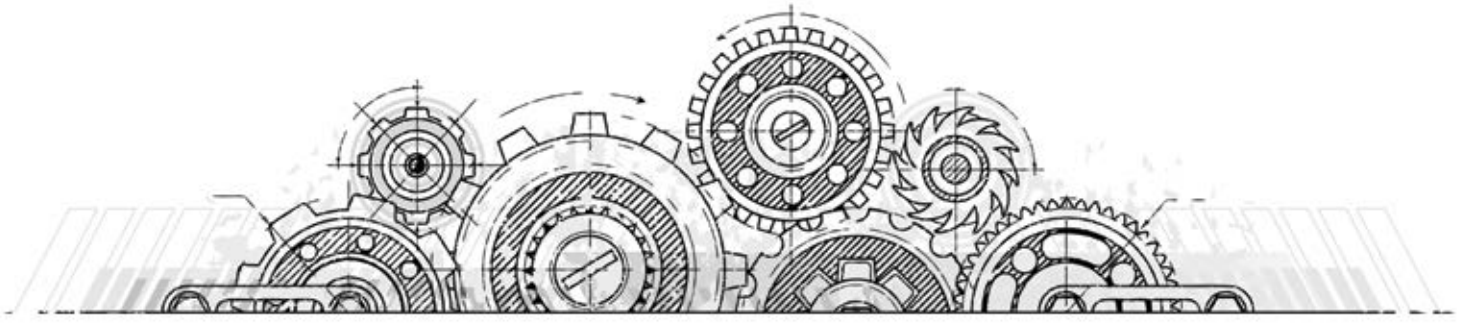
"tube" style electronic and mechanical gauges that easily clog. The transmitters feature a large, flush ceramic diaphragm that is abrasion resistant and resists clogging. Both the differential and static configuration are available in various ranges including 0-10"WC, 0-20"WC and bidirectional -5" to +5"WC. Construction is heavy duty and all stainless steel.

Contact FilterSense: Tel: 978-927-4304, Fax: 978-927-4329, www.filtersense.com

Spectroline Launches UV LED Leak Detection Flashlight

The Spectroline® OPTI-LUX™ 365 is a powerful yet compact leak detection flashlight that provides UV light for optimal fluorescent dye response. It's ideal for all industrial fluid system applications.

The OPTI-LUX 365 works with all oil- and water-based fluorescent dyes: OIL-GLO® 22 (yellow), OIL-GLO® 30 (white), OIL-GLO® 33 (green), OIL-GLO® 40 (bright blue), OIL-GLO® 44 (yellow/green), OIL-GLO® 45 (blue) and OIL-GLO® 50 (red), as well as WATER-GLO® 801 and WATER-GLO® 802 water dyes. It produces a brilliant



TECHNOLOGY PICKS

glow that makes all leaks easier to find, while slashing valuable diagnostic time! The flashlight even works with difficult-to-fluoresce dirty fluids.

The OPTI-LUX 365 is compact, lightweight and more than twice as powerful as most corded, high-intensity UV lamps. "Instant-on" operation enables the flashlight to reach full power immediately, and it provides up to four hours of continuous run-time. The rugged, anodized aluminum lamp body reduces corrosion and stands up to years of heavy use.

The flashlight comes complete with a lanyard, belt holster, two rechargeable batteries, smart charging cradle with AC power cord and UV-absorbing spectacles, all conveniently packaged in a padded carrying case.

For more information about the Spectroline® OPTI-LUX™ 365 (part no. OLX-365) LED leak detection flashlight, call toll-free 1-800-274-8888. Outside the United States and Canada, call 516-333-4840. Website at www.spectroline.com.

COMPRESSED AIR

BEST PRACTICES

airbestpractices.com

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

2014 FOCUS INDUSTRIES!

Beverage Bottling & Packaging • Grain & Meat Processing • Pulp & Paper Corrugated • Chemical, Pharma, Food Bulk Handling • Energy-Efficiency System Assessments
Compressed Air System Automation • Measurement • Wastewater Treatment • Food Packaging • Metal Fabrication & Machining • Air Compressor Controls

Sustainable Energy Savings with Compressed Air Best Practices®

"Compressed air is the #1 kW user across our 35 factories."
– Doug Barndt, Manager Demand-Side Energy & Sustainability, Ball Corporation

Compressed Air Best Practices® is a technical magazine dedicated to discovering **Energy Savings** in compressed air systems — estimated by the U.S. Department of Energy to represent 30% of industrial energy use. Each edition outlines **Best Practice System Assessments** for industrial compressed air users — particularly those **managing energy costs in multi-factory companies.**

"Do your homework, demand excellence, and don't be afraid to say no to the audit. If you want to audit my plant, you should be able to provide some savings incentive beforehand."

– Rodney Dayson, Sustainability & Energy Manager, Archer Daniels Midland BioProducts. Article published in the Jan/Feb 2013 Edition of Compressed Air Best Practices® detailing a compressed air energy-savings audit saving $422,000 annually at ADM.

"Demand Side" and "Supply Side" information on compressed air technologies and system assessments is delivered to readers to help them save energy. For this reason, we feature Best Practice articles on when/how to correctly apply **air compressor, air treatment, measurement and control, pneumatic, blower and vacuum technology.**

Industrial energy managers, utility incentive program managers, and technology/system assessment providers are the three stakeholders in creating energy efficiency projects. Representatives of these readership groups guide our editorial content. The Compressed Air Best Practices® Editorial Advisory Board guides our mission to help create more energy saving projects.

To subscribe visit **airbestpractices.com**

THE MARKETPLACE

JOBS

nano PURIFICATION SOLUTIONS

nano-purification solutions seeks a top customer service representative. Are you the candidate we are looking for?

Do you enjoy performing in a customer-focused environment?

Possess a sense of urgency?

Do you have compressed air or industrial distribution experience?

Experience with MS Office & Quickbooks?

Can you 'adapt, improvise and overcome' to make it happen for our customers?

If you answered yes to these questions, please send your resume to Nick Herrig at nick.herrig@n-psi.com or call our Charlotte, NC office directly at 704-897-2182.

Experience. Customer. Service... n-psi
www.n-psi.com
704-897-2182

The Titus Company

AIR COMPRESSOR TECHNICIAN

The Titus Company is an established compressed air and gas distributor & packager servicing E. Pennsylvania, Delaware & S. New Jersey.

We are looking for air compressor and/or dryer technicians capable of servicing a variety of equipment makes and models. 5 years of previous experience is preferred.

We offer a competitive compensation & benefit package and a company vehicle. Relocation assistance is possible.

Call us at (610) 913-9100 or send résumé to hr@titusco.com.

Employer maintains a drug-free workplace and is an Equal Opportunity Employer.

Job & Product Marketplace Advertising Information

Reach 13,000+ readers of Compressed Air Best Practices® Magazine with Marketplace Ads every month!

Prices are $300.00 per Job Marketplace Ad and $350.00 per Product Marketplace Ad ($300 if 6 or more ads are placed).

Contact Rod Smith at rod@airbestpractices.com to schedule your Marketplace Ads.

Contact Rod Smith for ad rates: **rod@airbestpractices.com, Tel: 412-980-9901**

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

Advertising &: Editorial — Rod Smith, rod@airbestpractices.com, Tel: 412-980-9901

Subscriptions &: Administration — Patricia Smith, patricia@airbestpractices.com, Tel: 412-980-9902

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

Compressed Air Best Practices® is published monthly by Smith Onandia Communications LLC., 217 Deer Meadow Drive, Pittsburgh, PA 15241. Phone 412-980-9902, email patricia@airbestpractices.com. Compressed Air Best Practices® is a trademark of Smith Onandia Communications, LLC. Publisher cannot be held liable for non-delivery due to circumstances beyond its control. No refunds. Standard postage is paid at 100 W. Main Street, Senatobia, MS 38668. POSTMASTER: Send address changes to Compressed Air Best Practices,® 217 Deer Meadow Drive, Pittsburgh, PA 15241. SUBSCRIPTIONS: Qualified reader subscriptions are accepted from compressed air professionals, plant managers, plant engineers, service and maintenance managers, operations managers, auditors, and energy engineers in manufacturing plants and engineering/consulting firms in the U.S. To apply for qualified reader subscriptions, please fill in the reader response cards herein and mail or fax or go to www.airbestpractices.com. To non-qualified subscribers subscriptions are $65 in Canada and $95 for other countries. When available, extra copies of back issues are $4 plus shipping. Contact Patricia Smith for subscription information at Tel: 412-980-9902 or email: patricia@airbestpractices.com. REPRINTS: Reprints are available on a custom basis, contact Patricia Smith for a price quotation at Tel: 412-980-9902 or email: patricia@airbestpractices.com.

THE MARKETPLACE

TECHNOLOGY

2014

WEEC

World Energy Engineering Congress

PRESENTED BY

AEE® The Association of Energy Engineers

HOSTED BY

EATON Powering Business Worldwide

OCTOBER 1-3, 2014

WASHINGTON CONVENTION CENTER

WASHINGTON, DC

FREE Expo Pass

www.energycongress.com/FreeExpoPass

Be a part of 2014's biggest energy event...

The WEEC Expo and Conference explores the complete spectrum of energy, power, building systems, and facilities technologies & services.

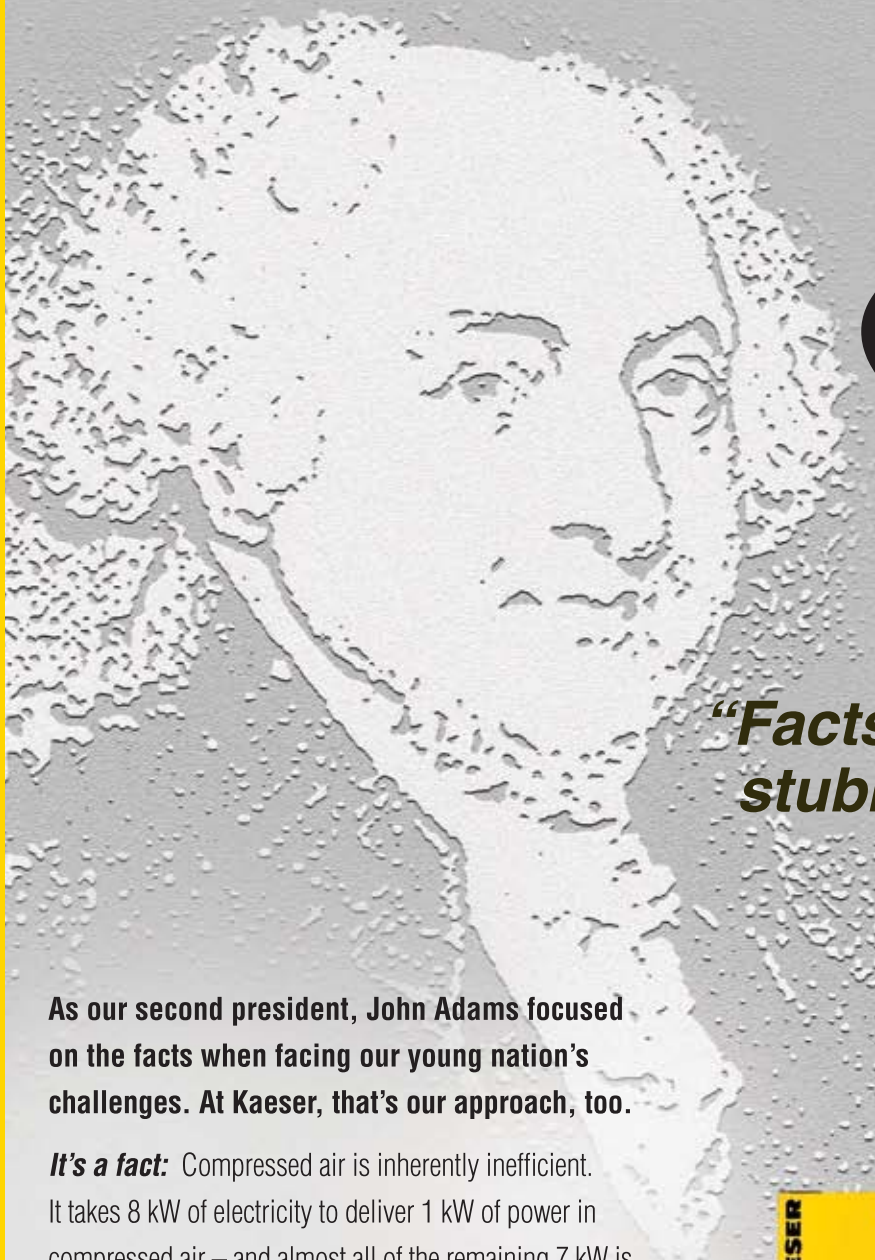
ENERGY EFFICIENCY AND ENERGY MANAGEMENT • RENEWABLE, GREEN AND ALTERNATIVE ENERGY • LIGHTING EFFICIENCY
HVAC SYSTEMS AND CONTROLS • COMBINED HEAT & POWER / COGENERATION / DISTRIBUTED GENERATION • GEOEXCHANGE TECHNOLOGIES
SMART GRID AND ELECTRIC METERING INNOVATIONS • BOILERS AND COMBUSTION CONTROLS • THERMAL STORAGE AND LOAD MANAGEMENT
INTEGRATED BUILDING AUTOMATION & ENERGY MANAGEMENT • SOLAR AND FUEL CELL TECHNOLOGIES
ENERGY SERVICES, ENERGY PROCUREMENT AND PROJECT FINANCING • APPLICATIONS SPECIFIC TO FEDERAL ENERGY MANAGEMENT PROGRAMS

Save $200 on conference registration, coupon code WEEC14PA

www.energycongress.com

KAESER COMPRESSORS

Built for a lifetime.™



Visit us at IMTS 2014 in Booth #N-6693

"Facts are stubborn things."

— John Adams

As our second president, John Adams focused on the facts when facing our young nation's challenges. At Kaeser, that's our approach, too.

It's a fact: Compressed air is inherently inefficient. It takes 8 kW of electricity to deliver 1 kW of power in compressed air – and almost all of the remaining 7 kW is lost as heat. At Kaeser, we design efficient compressors with smarter controls and more effective heat recovery, so you can have more efficient plant air.

Here's another fact: If you operate a compressor, you can't afford to do business without it. Downtime is expensive and disruptive. That's why we build our products for maximum reliability and easy serviceability. So when service is needed, it takes less time.

Learn the facts. They point to Kaeser.

Our 25-125 hp compressors feature **true direct drive** design, a **thermal management** system plus built-in **heat recovery** options for the ultimate in operational efficiency.

Kaeser Compressors, Inc. • 866-516-6888 • kaeser.com/CABP

kaeser.com