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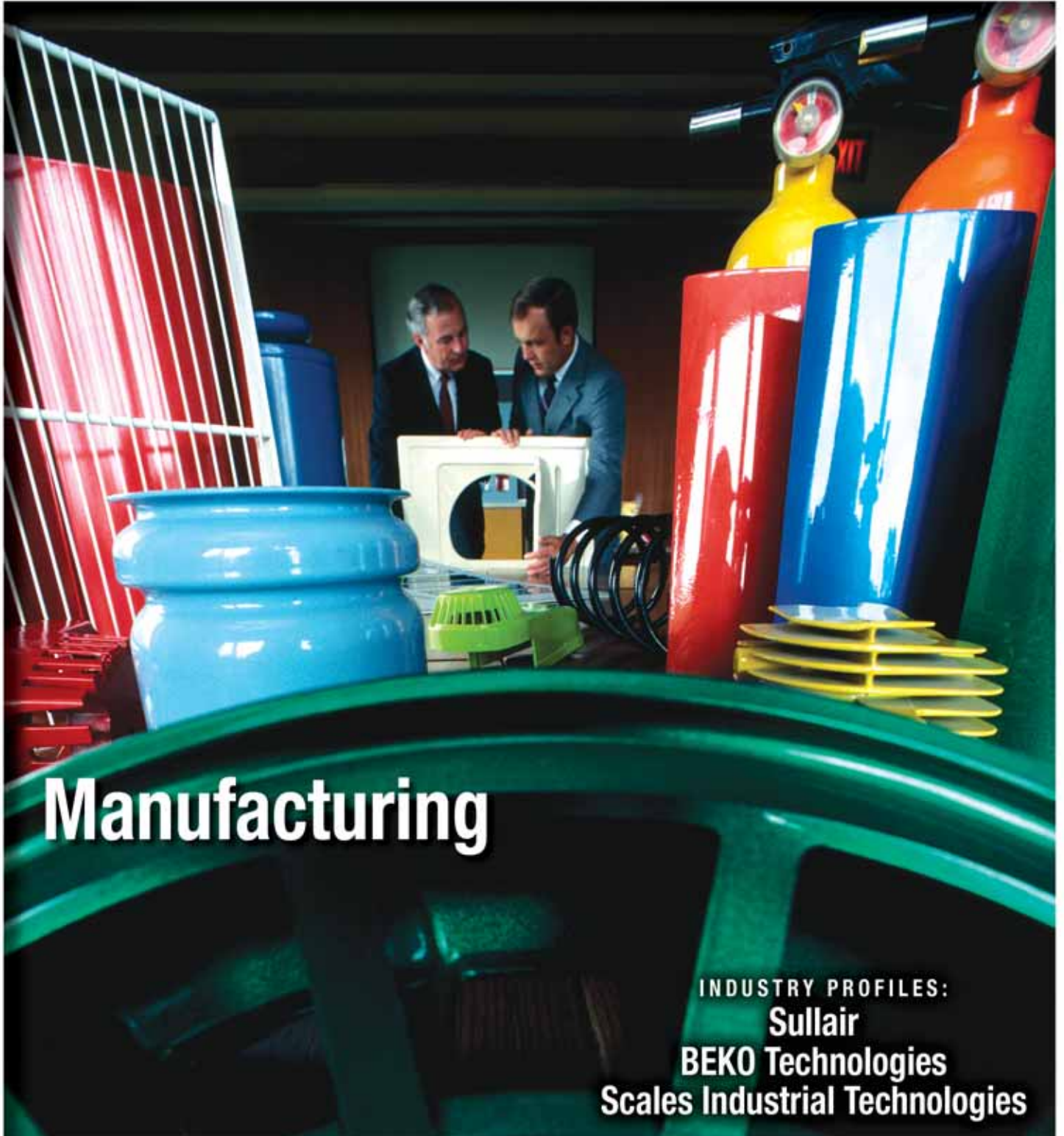
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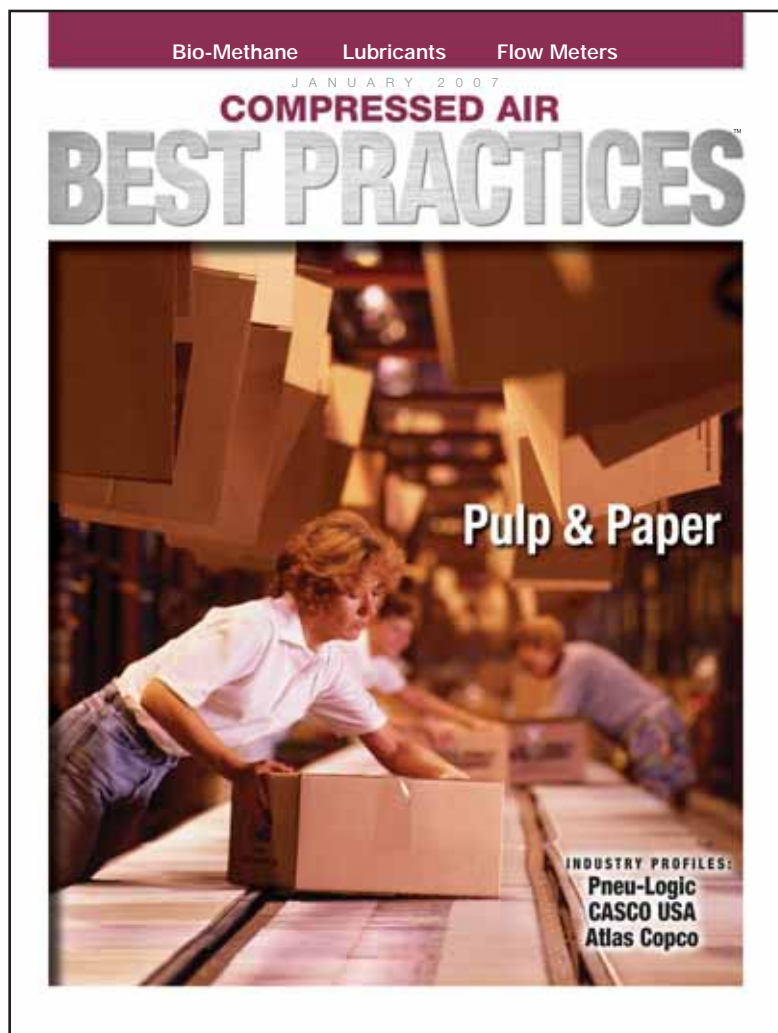
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FROM THE EDITOR

Placing The Customer First

Have you ever worked for a company obsessed with dominating the market they are in? If you are ambitious and haven't met up with one — what are you waiting for? Small and large, private and public, I meet many companies whose employees are passionate about dominating their industry. The only common denominator I have seen in these companies is that ALL employees are obsessed with serving customers.

Some say that only private companies have the passion for organic growth any more. There is nothing like the scenario of an extremely competent owner of a firm leading the charge. The employees are taught the business of business and also the business of life. I had the privilege of working for this type of company and I think I learned just as much about how to live my life as I did about business. Compensation was a minor consideration. Often these businesses create an extended family of highly skilled and loyal professionals, who dominate the business they focus on. We have two such examples in this month's edition, **Scales Industrial Technologies** and **BEKO Technologies**. Mr. Bill Scales, the CEO of Scales Industrial Technologies, shares with us their unique organization chart, which places customers at the top — and management at the bottom. Mr. Berthold Koch, Chairman of BEKO Technologies, demonstrates how a company can grow by designing products that customers are asking for.

Some say that only big public companies have the resources to dominate an industry. Others say that public companies just want to protect their stock prices. There are large corporations who make acquisitions and then make the new divisions more profitable by rationalizing and consolidating plants and product lines. Customers don't usually win. Other corporations make acquisitions and immediately invest in the new division. They invest in things customers can benefit from — expanded product lines, quality systems, expanded sales & marketing, improved lead times, better customer service. In this month's edition, **Sullair Corporation — a division of United Technologies Corporation**, discusses the positive results their "Voice of the Customer" new product development programs have given them.

In order to dominate an industry, countless things are required. Placing the customer first in your organization chart is a good place to start. Actually dedicating your time, energy, and talents, towards taking care of customers will determine your results.

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PROMOTING ENERGY EFFICIENCY IN CEMENT MAKING: THE ENERGY STAR® FOR INDUSTRY PROGRAM

BY ERNST WORRELL AND ERIC MASANET, LAWRENCE BERKELEY NATIONAL LABORATORY

The ENERGY STAR for Industry Program

As U.S. manufacturers face an increasingly competitive global business environment, they seek opportunities to reduce production costs without negatively affecting product yield or quality. Uncertain energy prices in today's marketplace negatively affect predictable earnings, while increasing energy prices are driving up costs and decreasing their value added. Energy efficiency can be an effective strategy to work towards the so-called "triple bottom line" that focuses on the social, economic, and environmental aspects of a business. In short, energy efficiency investment is a sound business strategy in today's manufacturing environment.

ENERGY STAR is a voluntary government program that offers businesses and consumers a broad range of resources on the best in energy efficiency to help save money and protect the environment. The ENERGY STAR for Industry Program works directly with U.S. manufacturers to help them improve competitiveness through improved energy management, increased energy efficiency, and reduced environmental impact. ENERGY STAR's website provides more information on the program and opportunities to participate (see www.energystar.gov).

To date, the ENERGY STAR for Industry program has established eight different Industrial Focuses in partnership with specific energy-intensive industries in the United States. Current and past Industrial Focuses include motor vehicle manufacturing, corn refining, cement manufacturing, breweries, petroleum refining, glass manufacturing, pharmaceutical manufacturing, and food processing. Many of the companies participating in these Industrial Focuses have reported significant cost and energy savings and have gone on to receive recognition as leaders in energy efficiency and environmental performance. The cement industry was one of the first sectors to actively participate in an ENERGY STAR Industrial Focus, and many of today's U.S. cement companies participate in the program.

As part of each Industrial Focus, participating companies have access to energy professionals who offer assistance to plant energy managers and share proven, non-proprietary approaches for improving corporate energy management. An annual Industrial Focus forum is also held, where companies can openly discuss non-confidential issues confronting their energy management programs.

ENERGY STAR also offers each Industrial Focus two key management tools for improving plant-level energy performance: (1) the plant Energy Performance Indicator (EPI), which is a software tool that allows individual plants to benchmark their energy performance against industry peers using data from the U.S. Census Bureau, and (2) the Energy Guide, which discusses a wide variety of energy efficiency opportunities applicable to plants within the focus industry, including information on best practices for compressed air system efficiency.





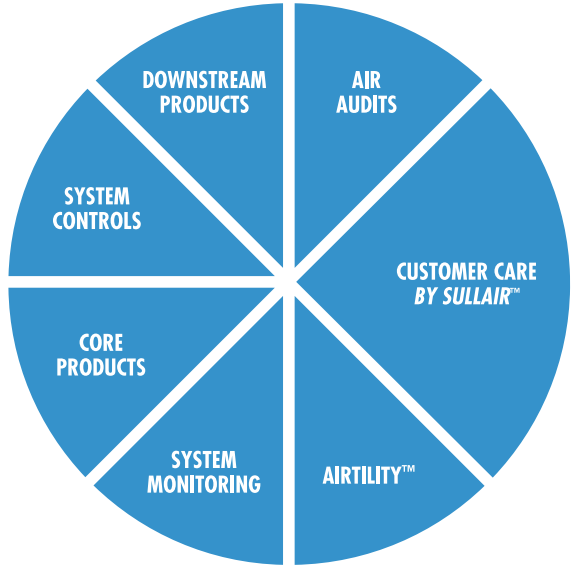
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THE ENERGY STAR® FOR INDUSTRY PROGRAM

Box 1: The Energy Guide for Cement Plants

The Energy Guide, which is titled Energy Efficiency Improvement and Cost Saving Opportunities for the Cement Industry: An ENERGY STAR® Guide for Energy and Plant Managers, was released by the U.S. EPA in 2004. The Energy Guide is designed to reduce information barriers by providing plant and energy managers with a concise source of state-of-the-art information on energy efficiency measures applicable to their plants. The Energy Guide contains detailed information on over 40 energy efficient technologies and energy management practices applicable to the cement plants in the following categories:

- Energy management programs and systems
- Motor systems
- Compressed air systems
- Kilns
- Grinding (both raw materials and finish grinding)
- Product changes (e.g. blending, limestone addition)
- Emerging technologies

The Energy Guides are researched and authored by Lawrence Berkeley National Laboratory (LBNL) in partnership with ENERGY STAR and participating focus companies. The Energy Guides are used by energy managers to identify areas for energy efficiency improvements, to evaluate potential energy improvement options, to develop action plans and checklists for plant-level energy management, and to educate company employees on the importance of and actions for improved energy efficiency.

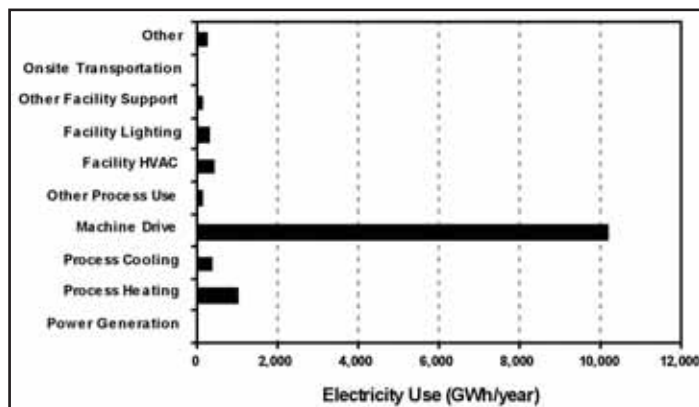
LBNL developed an Energy Guide for the cement industry as part of the ENERGY STAR Industrial Focus on cement making. This Energy Guide contains an overview of industry trends and energy use as well as detailed information on a large number of energy efficient technologies and energy management practices applicable to a cement plant (see Box 1). This article provides a brief summary of information contained in the Energy Guide.

The U.S. Cement Industry

After China and India, the U.S. cement industry is the largest in the world producing 99 Million metric tons (Mt) of cement in 2005. Cement is produced in two steps. First clinker is made by burning a mixture of raw materials (mainly limestone). The clinker is then ground and mixed with other materials (e.g. gypsum, limestone or additives such as fly ash or blast furnace slag) to make cement. The industry is made up of integrated plants that produce clinker and grind it to make finished cement, and cement plants that grind purchased clinker and additives. In the U.S., there are currently no stand-alone clinker plants. There were 115 operating cement plants in the U.S. in 1999, spread across 37 states and Puerto Rico. The top-10 leading companies produced over 80% of the cement in the U.S. Cement companies in the U.S. produced \$8 Billion of cement, while the cement market in the U.S. represents a value of \$10 Billion. The majority of U.S. cement capacity is owned by multinational companies. Production rates per plant vary between 0.5 and 3.1 Mt per year.

Clinker and cement production experienced gradual growth since the 1970s, with prominent dips in the late 1970s and early 1980s (see Fig. 1). Within this slow production increase, the composition of clinker production changed significantly since 1970. Clinker produced with the energy-intensive wet process decreased from a 60% share of total clinker production in 1970 to a 16% share in 2004. Clinker produced with the dry process increased from a 40% share of total clinker production in 1970 to a 78% share in 2004, with the remaining 6% not classified as wet or dry process. Cement production increased from 69 Mt in 1970 to 99 Mt in 2005. Cement production grew more rapidly (1% average per year) than clinker production (0.8% average per year) between 1970 and 2004, due to increased use of additives and increased clinker imports.

Figure 1. Clinker and Cement Production in the United States from 1970 until 2004.



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Energy Use

The cement industry is one of the most energy intensive industries, with energy representing 30–40% of production costs. In 2004, the U.S. cement industry consumed 531 TBtu of primary energy.

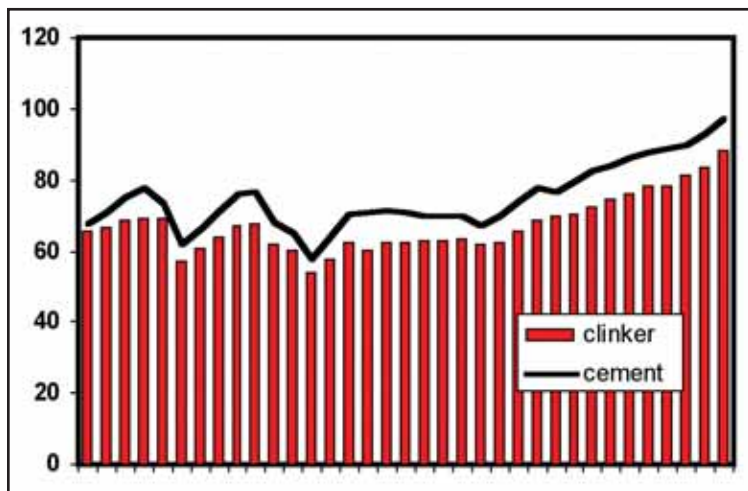
Energy consumption in the U.S. cement industry declined between 1970 and 1999. Primary energy use decreased at an average of 0.3% per year, from 556 TBtu in 1970 to 531 TBtu in 2004, although production increased over that time span. Since the 1980s the use of waste derived fuels is growing in the cement industry. By 2004 over 12% of all fuels were waste derived fuels, e.g. tires, solid and liquid wastes (solvents), which is low compared to some European countries. The trend towards increased use of waste derived fuels will likely increase.

While fuel is the main energy input in the cement making process, electricity use is still considerable. In 2004, the cement industry consumed nearly 14 TWh of electricity (or 11% of total energy inputs, on a final energy basis). Electricity use is a considerable cost exceeding \$617 Million per year. On average the U.S. cement industry consumes 142 kWh/metric ton of cement.

The major end uses of electricity in the industry are summarized in Figure 2. Electricity is mainly used for drives, of which the motors used in grinding processes and kiln drives are the key energy uses. Combined all drives consume about 80% of all electricity. Of the drive systems, compressed air is a relatively small end use, estimated at about 6% of the industry’s electricity use, or nearly 850 GWh (equivalent to an estimated cost of over \$40 Million/year, or enough to power 80,000 U.S. households).

Compressed air is used in many parts of the plant for many uses including silo control, on-site transport of raw materials to the kiln, baghouse collector filters, air knives, dedusting and, especially, in wet process clinker plants in the mixing of raw materials to prepare a slurry that is fed to the kiln.

Figure 2. Estimated Breakdown of Electricity Use in the U.S. Cement Industry, 2002



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Best Practices for Compressed Air Systems

Despite the small share in electricity use, compressed air is an area where low-cost but relatively large savings can be found, as evidenced by some of the ENERGY STAR partners. Compressed air is by far the most costly energy carrier in almost any facility. Many opportunities to reduce energy consumption in compressed air systems are not prohibitively expensive; in fact, payback periods for some options (such as improved system maintenance) can be extremely short. Energy savings from compressed air system efficiency improvements can typically range from 20% to 50% of total system electricity consumption. The Energy Guide for cement plants provides detailed information on a number of proven, cost-effective measures for improving the energy efficiency of compressed air systems. A summary of the efficiency measures discussed in the Energy Guide is provided in Table 2.

Information on best practices for compressed air system energy efficiency was compiled by LBNL from a wide variety of sources from various programs (e.g. U.S. Department of Energy, U.S. Environmental Protection Agency), industry, and national and international sources.

Often, plant and energy managers do not have the time, budget, or resources to obtain such detailed information on efficient technologies or improved efficiency practices. This lack of information can be a major barrier to industrial energy efficiency improvement at many U.S. plants. The aim of the Energy Guide is to reduce this information barrier by providing plant and energy managers with a concise source of state-of-the-art information on energy efficiency measures applicable to their plants, while also arming them with enough basic information to understand the potential energy and cost savings associated with each measure.

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Box 2: Compressed air system efficiency at California Portland Cement Company

California Portland Cement Company (CPCC) operates three clinker and cement plants in Arizona and California. The company is an ENERGY STAR partner and was awarded the 2005 and 2006 Partner of the Year award, while two of its plants received the 2006 ENERGY STAR award for their overall energy performance. CPCC launched a strategic corporate-wide energy management system. CPCC realized that large energy savings can be achieved by assessing the compressed air systems. CPCC cut its electricity use by 10% (or 31 GWh/year) as part of the efforts undertaken as part of the ENERGY STAR program. The baghouse pulse jet or plenum pulse dust collectors are a major consumer of compressed air in virtually all cement plants, whereas compressed air is also used at other miscellaneous areas in the plants. In the assessments CPCC identified the following opportunities for reducing energy use for compressed air:

- Shut down of the compressed air system and dust collector system when the mills are not in use
- Leak reduction, which at one plant alone saved over \$30,000 year for a single leak
- Shut-off of auxiliaries running idle (for which the total power use was estimated at 0.5 MWe at a single plant)
- Reduction of air pressure from 85 psi to 65 psi
- Reduction of inappropriate use of compressed air (e.g. dedusting of the work floor)
- Use of NEMA Premium efficiency motors, whenever a motor is replaced
- Replacement of V-belts by cog belts
- Improved maintenance.

Combined the measures saved \$100,000 per year for all three plants operated by California Portland Cement Company, and were realized at low payback periods.

In the discussion of each energy efficiency measure, the Energy Guide typically provides:

- A brief description of the efficiency measure, including any limitations on applicability
- An estimate of typical energy savings associated with the measure
- An estimate of typical cost savings associated with the measure, including the simple payback period associated with any investments
- An industrial case study to illustrate successful application of the measure, when available
- References to publicly-available sources of additional information

Plant and energy managers are encouraged to consult the references and tools recommended in the Energy Guide to facilitate a more in-depth assessment of the applicability of any given energy efficiency measure to their specific plant.

TABLE 2. SUMMARY OF COMPRESSED AIR SYSTEM ENERGY EFFICIENCY MEASURES INCLUDED IN THE ENERGY GUIDE FOR CEMENT PLANTS

System upgrades and improvements	Improved load management
Improved maintenance	Pressure drop minimization
System monitoring	Inlet air temperature reduction
Leak reduction	System controls
Turning off unnecessary compressed air	Properly sized pipe diameters
Modification of system in lieu	Heat recovery of increased pressure
Replacement of compressed air by other sources	

Additional Information

For additional information on the ENERGY STAR for Industry Program, please visit: <http://www.energystar.gov/industry>. For information Energy Guide for Cement Making, please contact: Ernst Worrell, Lawrence Berkeley National Laboratory, Email: eworrellt@lbl.gov.

End Notes

Energy Efficiency Improvement and Cost Saving Opportunities for the Cement Industry: An ENERGY STAR® Guide for Energy and Plant Managers. By Ernst Worrell and Christina Gallitsky. Lawrence Berkeley National Laboratory, Berkeley, California. LBNL-54306. 2004. The report can be found at: http://www.energystar.gov/index.cfm?c=in_focus.bus_cement_manuf_focus

Based on data provided by the United States Geological Survey's Mineral yearbooks (multiple years).

Estimated using energy consumption data from the U.S. DOE Manufacturing Consumption of Energy, 2002 and 1994 data tables, and electricity end use breakdown data for motors from U.S. DOE (1998), United States Industrial Motor Systems Market Opportunities Assessment, Office of Industrial Technologies, Washington, D.C.

Efficiency Partnership (2004). *Industrial Product Guide — Manufacturing and Processing Equipment: Motors.* Flex Your Power, San Francisco, California.

Managing Dust Collectors in Cement Production

BY HANK VAN ORMER

Cement production facilities have a significant number of dust collectors. Many have continuing problems with short bag life and low-pressure problems at the further points from the central air system. They often run on timers. When they try to run on demand control, they often get extreme short cycling, which causes even more bag problems. Most have gauges at the entry, on at least half of the dust collectors, and the compressed air feed lines are always the same size as the connector opening. This article reviews where these problems come from and provides some troubleshooting ideas.

Proper operation of dust collectors is critical to minimizing cost and maximizing system effectiveness. There are many sizes and most, if not all, use a pulse of compressed air controlled by a timer. The timers are generally set by the operators to what they believe is appropriate for proper cake removal and bag life.

In a dust collection system, the dust is collected on the bag or fingers and when the cake of dust is of appropriate thickness and structure — a pulse or pulses of compressed air is used to hit or shock the bag and knock the cake off.

When the cake is removed correctly from the dust collector, the system removes dust from its assigned environment and has a normal bag life. When the cake is not removed effectively, the dust collector does not remove dust effectively from its assigned environment and the bag life can be significantly shortened.

Dust collection system designs specify the air inlet pressure to the manifold and pulse valves necessary for effective dust removal. The pulse valve sends a given volume or weight of air to the bag at a predetermined velocity to strike and clear the cake. The actual amount or weight of air is dependent upon the pulse nozzle being fed compressed air at a pre-determined and steady pressure.

The dust collector must receive the correct pressure (or close to it) and a steady repeatable pressure level for each pulse, particularly if timers are used to control the pulses. The operator may experiment to find the “right timing sequence” at a desired feed pressure. But if this pressure varies, then performance may not be satisfactory.

MANAGING DUST COLLECTORS IN CEMENT PRODUCTION

Short bag life usually comes from the pulsers hitting the bag when the cake is not ready to flake off or the cake has gone too long between pulsing and grown too thick and heavy to clean effectively. This causes not only short bag life but very poor performance. There are usually several basic causes for this:

- Incorrect timer settings for the operating conditions. The actual requirement for the optimum timer setting may well change as various product runs change or even seasonally. These settings have to be set carefully to begin with and monitored regularly.
- Lack of sufficient storage or compressed air supply near the inlet manifold to supply the required pulse air without collapsing the inlet pressure. With too low an inlet pressure, the mass weight of the air pulse is too low, which then becomes ineffective in removing the cake.
- Too small a feed line to the dust collector entry will have the same effect as lack of air supply.
- Too small or an incorrect regulator, which is unable to handle the required "Rate of Flow" required by the dust collectors.

All of these are installations or system situations that cause restricted air flow. They occur because, prior to the installation or prior to some operational change, the proper "rate of flow" was not identified for the dust collection action. Feed line sizing, regulator sizing, and air supply all require an identified "rate of flow." You cannot use "average flow rate."

Rate of Flow

"Flow rate" is the average flow of compressed air in cubic feet per minute either required by a process or delivered to the system. "Rate of flow" is the actual rate of flow of compressed air demand in cubic feet per minute. Even relatively small air demands in cubic feet can have a very high "rate of flow", if they occur over a very short time period. Dust collectors have this characteristic.

Sequence controllers can have a very significant impact on the required "rate of flow." For example, pictured here is a dust collector system, which has six pulsing valves that use 3.5 cu ft over ½ second for each pulse.

Setting the Standards in 100% Oil-Less Technology for Critical Processes

 **CompAir**
Engineered to Save

CompAir, a world leader in air compression technology, continues to expand its world class line of compressed air equipment by introducing the DH oil-less compressor with benefits that include:

- **Most Efficient in Class** - isothermal Compression, Tip Sealing and Standard VFD Drive guarantees the greatest energy savings available.
- **Fewest Components** equals the lowest cost of ownership.
- **The Maximum Speed** is 3600 RPM, which translates into long equipment life.
- **Environmentally Sound** - NO OIL whatsoever and a low sound enclosure ensure low environmental impact.
- **Lowest Cost of Maintenance** is guaranteed through no oil and the fewest components.
- **Non-Ferrous Compressed Air Path** eliminates contaminants and helps to ensure compliance.

Visit our website:
www.CompAirUSA.com/videos/DHOilLessCompressor.wmv
to follow the "CompAir Road Show" for tour dates and to view the Oil-Less video for even more details.

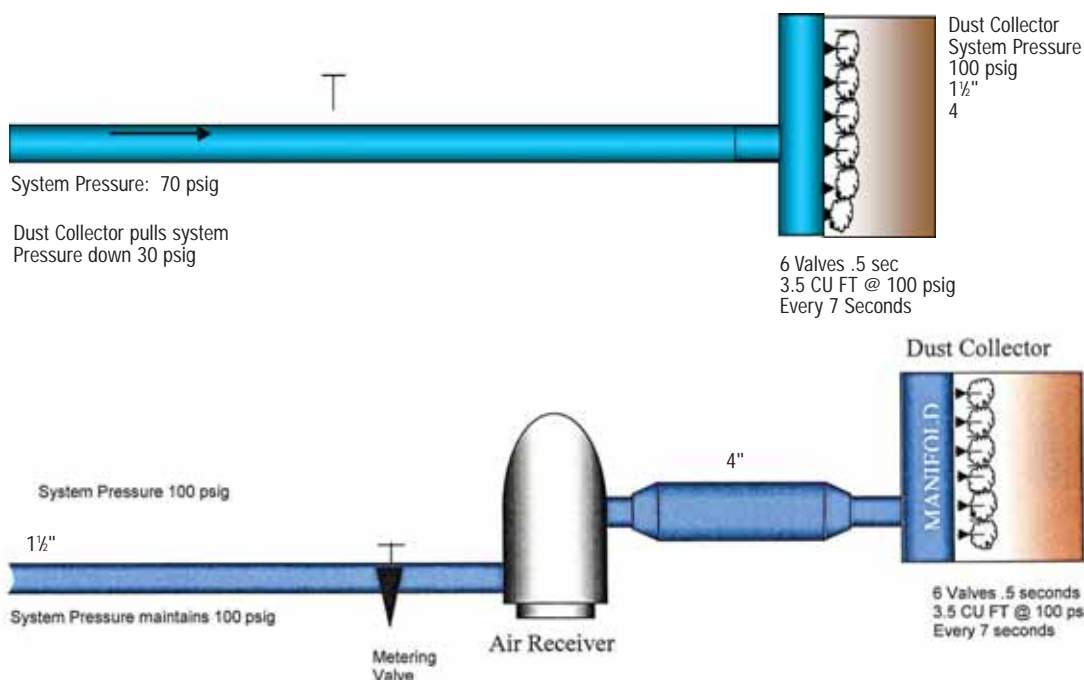


Best in Class

DH-Series

Oil-Less Rotary Screw Compressors

 **CompAir** 211 E. Russell Rd., Sidney OH 45365 PH: 937-498-2500 FX: 937-498-2270 E-mail: info@compairusa.com



Typical Sizing (Each Valve Uses 3.5 scfm/pulse — 6 Valves on Collector)

Rate of Flow & Sizing with One Valve Hitting Every 7 Seconds

Rate of Flow =
 $(1) \times (3.5) = 3.5 \times 60 \div .5 = 420 \text{ scfm}$

The line size recommendation from the air supply to the dust collector = 90 psig line pressure = 2" to 2"

- A 2" feed line will handle the 420 cfm flow at 90 psig line pressure with a velocity of 43 fps, which is about as high as it should go
- A 3" feed line will handle the 420 cfm flow at 90 psig with a velocity of about 19 fps — very conservative
- A 2" line would have a pressure loss of about 1 psid every 100' @ 420 scfm flow, which may be acceptable depending on feed line design and length
- A 3" line would have pressure loss of less than .10 psid per 100' @ 420 scfm flow, which should be very acceptable

Rate of Flow & Sizing with Six Valves Hitting Every 7 Seconds

Rate of Flow =
 $(6) \times (3.5) \times 60 \div .5 = 2,520 \text{ scfm}$

The line size recommendation from the air supply to the dust collector – 90 psig line pressure = 4" to 6"

- A 5" feed line will handle the 2,520 cfm flow at 90 psig line pressure with a velocity of about 43 fps
- A 6" feed line will handle the 2,520 cfm flow at 90 psig line pressure with a velocity of about 30 fps, which is conservative in this application
- A 2" line at 2,520 cfm would have a minimum pressure loss of 30–50 psid, depending on timing and turbulence. This would be completely unacceptable
- A 4" line would have a pressure loss of about 1.1 to 1.2 psid per 100' @ 90 psig and combined with moderate velocity should be acceptable depending on the length and design of the feed line
- A 6" line would have a minimum pressure loss of .15 to .20 @ 90 psig with very low velocities and should be acceptable with "normal" installations

MANAGING DUST COLLECTORS IN CEMENT PRODUCTION

Problem: "Flow" / "Rate of Flow"

The impact of these two different "rates of flow" would show similar differences in regulator sizing, etc., if they are used on the feed line flow. The high flow velocities entering the manifold and controls for the pulse valves will create extra pressure loss through the balance affecting the performance of the pulse cleaner. The same sort of effect would show up in air receiver sizing to minimize system and feed line pressure drop if that is a question.

We recommend that every feed line has a quality pressure gauge installed near the dust collector entry. Observe the pressure gauge, which the pulser hits — if the pressure drop is too high (over 10–20 psig), start looking for the cause. Get the specification on the dust collector (cfm per pulse, feed line pressure time per pulse, cycle time between pulses, etc). Calculate the rate of flow, check line size and storage. If additional storage is required, this can be calculated by the following formula:

For example, 2,520 cfm rate of flow @ .5 seconds flow with 4 psig allowable pressure loss.

Size Air Receiver: $T_{min} = \frac{V}{CFM} (P_2 - P_1) (14.5)$
 Net Rate of Flow 2,520 cfm
 P1 – Rest Pressure 100 psig
 P2 – Allowable Drop 96 psig (4 psig)
 $T_{sec} = \frac{V (4) (60)}{.5 \text{ sec } (2,520)(14.4)} = .5 \text{ sec} = \frac{240 V}{36,540}$
 $240 V = 18,270 V = 76 \text{ cu ft} \times 7.48 = 570 \text{ gal or more}$

Refill Rate of Flow:
 Time allowed – 6 seconds
 $21 \text{ cu ft} \times 60 \text{ seconds} \div 6 \text{ seconds} = 210 \text{ cfm rate of flow}$

Effect on Header: Negligible
 We have used storage to convert a high rate of flow to a low rate of flow and eliminate system pressure collapse

Summary: When we audit cement plants and operations with significant dust collecting, it is very rare when we find anyone in operations that is aware of what the dust collectors operating specifications are and how or why the pipe sizes (etc.) were selected. When you get the facts and go "by the book", an amazing thing happens. They work like they are supposed to.

Once you are sure the installation is correct, we always suggest running from a demand-side controller, which senses the filter condition and only lifts the bag at the right time. There are some excellent electronic control systems available, which can be very economical. This will usually improve bag life and reduce air usage.

Mr. Hank Van Ormer is a leading compressed air systems consultant who has implemented over 1200 air improvement projects. He can be contacted at (740) 862-4112, email: hankvanormer@aol.com, and www.airpowerusainc.com

Compressed Air Best Practices

JOB MARKET ADVERTISING RATES

MAGAZINE ADS

For smaller classified-type ads use the following rates per column inch:

1x per year: \$94.00*
per column inch

3x per year: \$90.00*
(i.e., this is a 10 col. inch, reversed ad)

12x per year: \$84.00*
*reversed ads = 1.5x normal price

Add \$50.00 to post the job opening on www.airbestpractices.com when you purchase an ad in the magazine

Contact Patricia Smith for 4 color full page, 1/2 page and 1/3 page ad rates

ONLINE ONLY ADS

Each job posting is up on the site for 60 days. Postings can be purchased in bulk quantities per the rates below. The customer has twelve months to put the postings on the site. After twelve months, any unused postings will be charged at the minimum quantity.

Small Qty.	Price Per Posting	Bulk Qty.	Price Per Posting
1	\$250	5-9	\$185
2	230	10-24	170
3	210	25-49	150
4	195	50+	135

**patricia@airbestpractices.com,
tel: 251-510-2598**

SULLAIR: RESPONDING TO THE VOICE OF THE CUSTOMER

Compressed Air Best Practices interviewed the following executives at Sullair Corporation

Elizabeth McMahon, Director of Marketing

Robert Lauson, Manager of Operations, Construction Products

Rick Stasyshan, Vice President and General Manager, Industrial Products

Jeff Elmore, Manager, Engineering Product Development & Air System Management



Sullair Global Headquarters in Michigan City, Indiana

COMPRESSED AIR BEST PRACTICES: Good afternoon! Wasn't Sullair a pioneer in introducing rotary screw compressors to the U.S. market?

Absolutely. In mid-July of 1965, Sullair Corporation introduced rotary screw air compressors in the U.S. We had just finished celebrating our forty-year anniversary. In 1965, Sullair was one of just a few companies working with this innovative technology. Our first products were 25 horsepower and 50 horsepower compressors for industrial users and 185 cfm and 750 cfm portable units. The 185 cfm portable was known as a “two-tool compressor” while the 750 cfm portable was often used to power air drills doing rock excavation.

Industry was using piston and vane air compressors, which had routine maintenance and overhaul issues. Plant engineers were asking for ways to reduce the costs associated with maintaining their air compressors. Rotary screw technology offered a solution. The airtight design of rotary screw compressors was able to offer plant engineers consistent performance and reduced maintenance costs. Sullair invested significant marketing resources to educate industry and build awareness of the availability of this new technology. In the 1970's we were extremely active with product demonstrations at trade shows and at end user sites. For these reasons, the market transitioned to rotary screw technology rather quickly.

SULLAIR

Company Profile



Sullair rotary screw air end

How is the big launch of the 3700 Series Rotary Screw Compressor progressing?

The new family of Sullair 15 to 60 horsepower rotary screw air compressors is being received very well. We again invested significant resources into understanding what the market is looking for. The new designs address three key market drivers:

1. Maximize Energy Efficiency

- Low kW consumption was achieved through new air end designs. The fifty horsepower unit is rated at 37 kW.
- Minimal pressure drop through the unit, was achieved with innovative packaging designs

2. Provide Environmental, Health & Safety Features

- Sound attenuation — the 50 horsepower unit has a very low 68 dBA rating
- Bio-friendly lubricants. The standard lubricant, Sullube, is considered biodegradable.
- Clean design — oil containment pans and SAE o-rings on flanges to ensure leak-free operation

3. Reduced Maintenance

- For ease of installation, the product fits through normal doorways and can be transported on a hand pallet.
- Long-life lubricants reduce maintenance costs and time

Can you describe your Voice of the Customer process?

Sullair has a long history of listening to the customer. We started hearing about the need to reduce energy costs years ago and responded with the then-new designs of two-stage compressors and spiral-valve controllers. Sullair was offering spiral-valve control for plant systems experiencing fluctuating demand before variable frequency drives became popular.

Sullair currently deploys a phase-gate design process called PASSPORT. This process requires customer feedback to move through “gates” in the design process. In this manner, the outcome is sure to meet the market drivers of our customers. Extensive work is done with distributors and with end users to gather this feedback before and during the design process. We conduct workshops and visit end user customers to gather this information throughout the process. The PASSPORT design process is used successfully throughout United Technologies Corporation.



Sullair 3700 Series Rotary Screw Compressor

What benefits does being a part of United Technologies Corporation bring Sullair?

United Technology Corporations is a global technology corporation with a long history of pioneering innovations. The major operating divisions are global leaders in their fields. The divisions include Carrier, Hamilton Sundstrand, Otis, Pratt & Whitney, Sikorsky, UTC Fire & Security and UTC Power. Sullair is one of three industrial businesses operating within Hamilton Sundstrand (Sullair, Milton Roy, and Sundyne). UTC has a “quality-first” philosophy embodied in its extensive capabilities in quality control, process improvement, new product development, and worldwide competitiveness. These “best practices” are brought to Sullair and help enrich our capabilities.

SULLAIR

Company Profile

Is that what the ACE program is all about?

Correct. UTC is committed to Achieving Competitive Excellence (ACE). ACE is our proprietary operating system to ensure world-class quality in our products and processes. With its relentless focus on increasing efficiency and reducing waste, ACE is integral to the company's performance model. Facilities worldwide are using the operating system to improve quality and customer satisfaction while lowering cost. ACE is built on three main elements:

1. A philosophy based on the teaching of the late Yuzuru Ito, the company's advisor on quality methodologies. This is institutionalized in Ito University, a weeklong training session run continuously at each business unit.
2. A system that helps the organization identify and solve problems, improve processes and assist with strategic thinking.
3. The competence, commitment and involvement of the entire organization.

ACE is implemented on the micro level, with employees who are trained and empowered to employ the standard processes across Sullair. Through a rigorous, data-driven process assessed by internal auditors, employees and their organizations progress through the qualifying, bronze, silver and gold levels of ACE.



SUBSCRIBE NOW!

COMPRESSED AIR BEST PRACTICES

COMING EDITIONS!

IDEAL GIFT FOR EMPLOYEES

IDEAL FOR:

INDUSTRY:

Plant Engineers, Plant Managers & Maintenance Managers

MANUFACTURERS:

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COMPRESSOR DISTRIBUTORS:

Every Branch Location

Rates: 12-month Subscription

Number of Subscriptions	1-10	11-19	20-49	50+
U.S.	\$55.00	\$50.00	\$45.00	\$40.00
Canada	\$65.00	\$60.00	\$55.00	\$50.00
International	\$95.00	\$90.00	\$85.00	\$80.00

3 WAYS TO SUBSCRIBE:

- 1.) Call Patricia Smith at 251-510-2598 and use your VISA/Mastercard.
- 2.) Email us at patricia@airbestpractices.com and mail your check.
- 3.) Mail your information and check to:
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161 Clubhouse Circle
Fairhope, AL 36532

Checks should be made out to "Smith Onandia Communications, LLC"
Questions, call Patricia Smith: 251-510-2598.

*Information required:

First Name: _____

Last Name: _____

Company Name: _____

Street: _____ City: _____

State (Province): _____ Zip Code: _____

Country: _____ email: _____

Phone: _____ Fax: _____

Where does Sullair have its operating facilities?

We operate four major facilities around the world. Our headquarters and U.S. operating facility is here in Michigan City, Indiana. In Europe we operate out of Mont Brison, France. We have a facility in Australia and another in China.

Wasn't Sullair one of the first western air compressor companies to enter China?

Yes. Twelve years ago when China opened its borders to western companies, Sullair was one of the first to enter the Chinese market and begin manufacturing rotary screw air compressors. The venture has been very positive for Sullair. It represents the Sullair philosophy of having a presence in major markets by producing products locally, which meet the specific needs of that geography.

Please describe the Sullair AirMetrixSM compressed air systems approach.

Sullair Corporation is organized into four operating units: industrial, construction, OEM/units, and Customer Care by Sullair[™]. Our primary strategy, for industrial, is the "systems approach" to compressed air which we call AirMetrix. The objective, quite simply, is to help end reduce costs while increasing performance. There are seven (7) components to the AirMetrix systems approach.

1. **Air audits:** AirMetrix offers three levels of audits to better understand the air system — walkthrough's, system assessments, and full audits.
2. **Downstream products:** select the appropriate demand-side products such as piping and air receivers for the system
3. **System controls:** utilize flow controllers and "Air Traffic Control" techniques to ensure air pressure stability and eliminate pressure swings
4. **Core products:** select the appropriate supply-side products such as air compressors and air dryers for the system
5. **System monitoring:** manage the compressed air system with remote monitoring internet-based tools like eConnect[™], which can send data to plant engineers and/or service providers.
6. **AirTility[™]:** outsource compressed air as a utility. Pay for only the air you use. Eliminate maintenance costs. Reduce capital requirements for the compressed air system.
7. **Customer Care by Sullair[™]:** a single source for compressor fluids, parts and system accessories

Thank you, Sullair, for your insights.

For more information please contact Ms. Judi Seal, Market Specialist, Sullair, Tel: 219-861-5089, email: judi.seal@sullair.com, or visit www.sullair.com

“We again invested significant resources into understanding what the market is looking for.”



Corporate Headquarters in Long Island

COMPANY PROFILE

EXCEEDING *Expectations*

Compressed Air Best Practices interviewed members of the upper management team of Scales Industrial Technologies, including Bill Scales (CEO), Manny Cafiero (GM of NY; Corporate CFO), Peter Scales (VP), Niff Ambrosino (GM, NJ & PA.), and Paul Shaw (GM, CT & MA.).

COMPRESSED AIR BEST PRACTICES: When and how was Scales Industrial Technologies started?

The company was founded in 1966 with the opening of a small repair shop by brothers, Bill and Peter Scales. Their focus was to provide the best and fastest service in the industry. That focus continues today with all the people that drive it and is one of the major reasons for our continued success. Now, 40 years later with 180 employees, what once was Scales Air Compressor Corporation has evolved into Scales Industrial Technologies, Inc. which has become Employee Owned through an Employee Stock Ownership Plan (ESOP) to ensure the legacy started in 1966 carries forward.



What is the scope and structure of Scales Industrial Technologies today?

Today the company serves the Northeast and mid-Atlantic region with over 180 employees dedicated to providing customers with top-quality, energy-efficient compressed air, vacuum, medical air and process cooling systems. Parts and service are provided for all systems and capabilities include major remanufacturing of, and repairs to, process gas compressors. We operate six service centers, which provide our customers with local service and support. Each service center operates as a virtually independent small business, sharing their knowledge and expertise with the others — with the support and resources of a large organization. This provides the local markets with the agility and focus of a local service operation... and the benefits from the support of a larger company behind it.

Please describe your organizational structure involving “service” employees.

The Scales organization chart, for the past thirty years, has placed customers at the top of the organization. Customers truly determine the services and products offered by Scales Industrial Technologies. Our people make it happen, not just the service technicians and sales engineers that our customers recognize, but internal customer service, parts and sales people, warehouse and shipping personnel, the applications engineers, service administration, shop machinists and mechanics, administrative assistants, and financial services people. These are the people that run our company; these are the people charged with exceeding our customer’s expectations.

The crystal-clear role of the supervisors, managers, general managers and the CEO is to support one another and everyone else in the company to service the customer. Managers are trained to focus their efforts on this most important factor for continued success. Management’s success is determined by its ability to provide our people with the tools, resources, processes and work environment required to excel. Only when this occurs can our company out-perform the market in service and meet our goal of exceeding our customer’s expectations.

How does Scales exceed customer expectations?

You don’t do it with fancy promises, glossy brochures or fancy buildings. We exceed customer expectations by keeping our customers’ best interests as our top priority and working in a fast and professional manner. The non-glamorous, day-to-day interactions with customers on deliveries, technical service, and application engineering are what determine our ability to exceed customer expectations. Fast and highest-quality work, no matter what the task is, will earn the loyalty of customers. We employ 75 service technicians across our branches and they are the ones whose performance every day must exceed customer expectations.

How do your service branches benefit from being part of a larger corporation?

While all service branches are self-sufficient, we do have product and service specialists within the corporation who can support the branches on highly complex projects. For example, we have experts in temperature control, process cooling, process gas compressors, centrifugal compressors, and hospital systems. The corporation also provides legal and financial expertise for the complex contracts requested by some of our customers. Common support services such as human resources, payroll, inventory management, IT, and finance are also managed at the Carle Place, NY location. This allows all Scales branches to focus on servicing our customers and exceeding their expectations.

Organization Chart ©



Bill Scales, CEO of Scales Industrial Technologies

SIX SCALES SERVICE LOCATIONS

1. Carle Place, New York
2. Meriden, Connecticut
3. Worcester, Massachusetts
4. West Paterson, New Jersey
5. Hackensack, New Jersey
6. Sharon Hill, Pennsylvania

SCALES

Company Profile



Smart Sequencer System

Strong financial management is critical to ensure the proper support of our “service” employees. Our facilities encompass over 100,000 square feet and our warehouses carry approximately three million dollars in finished goods and spare parts inventories.

Corporate also invests in R&D. For example, our engineers developed an innovation, called the Smart Sequencer System. It received awards for its ability to reduce energy costs by continuously monitoring systems and automatically selecting the most energy efficient combination of air compressors to run. It was an innovation that eliminated the need for multiple control systems as it could control any combination and type of air compressors as well as all building operating systems.

What kind of customers does your company have?

We serve all types of facilities with a very strong focus on manufacturing plants, hospitals, utilities, pharmaceutical companies, and temperature control (HVAC systems in buildings). We also have established national accounts who ask us to assist them with their compressed air systems and energy efficiency needs in their facilities across the country.

What are your national accounts looking for?

They count on Scales Industrial Technologies to optimize their compressed air systems. Reliable performance, at the lowest energy cost, is what we implement nationwide. Every situation is different. The common thread is that our customers know that we are looking out for their

best interests. Sometimes they need our expertise to repair a complex air compressor system problem, another time it may be a process cooling system problem. We built one system for a company that was looking to control their process water temperature to within ½° C. Often, with the current energy crunch, they are looking for our expertise in energy efficiency and an energy assessment of their systems.

Has that led Scales towards offering more technologies?

We often become a process consultant to our customers. We have had instances, for example, where due to potential process improvements, we recommended using water, instead of compressed air, for an application. That led to our customers asking us to get directly involved with process cooling technologies. Another example was where a customer was using compressed air for blowing scrap, parts ejection and conveying product. We switched them from high pressure compressed air to low pressure air supplied by blowers. We were able to shut off more than 150 horsepower in air compressors while adding a minimal amount of blower horsepower. To accomplish this we had to design the nozzles and knives “in-house” as many of these applications cannot be done with off-the-shelf products. This is an example of how our customers can and should “run” and direct our business.

How has energy awareness and auditing changed your business?

Scales Industrial Technologies has been analyzing systems to minimize energy costs for our customers for over thirty years. We did our first audit in 1973, after the first oil embargo, for a major national account. Bill Scales was teaching compressed air system efficiency seminars in the early 1970's and he published many technical papers. We are very pleased, for the benefit of U.S. industry,

to see the increased awareness of the high energy costs associated with compressed air. As a company, we have done everything we can to assist the Department of Energy sponsored Compressed Air Challenge (CAC) with their educational campaigns.

How do end users sort through all these “energy survey” offers?

We focus on turning off air compressors-period! We advise customers to seek consultants who strive to do the same. What is best for the customer normally does not involve purchasing an air compressor or supply side equipment. Many energy surveys concentrate on the supply side to lead towards the purchase of air compressors. Scales assessments

focus on the demand side; looking for repairs, improvements, and process changes that can reduce consumption and eliminate the need for additional equipment. Once we have a good understanding of the demand side requirements, we examine the supply side and then recommend measures the customer can take to reduce their energy costs which, in many cases, include turning compressors off. Scales Industrial Technologies is an Allied Partner of the Department of Energy and our techniques truly reflect this.

Many call Bill Scales the driving force behind the DOE’s Compressed Air Challenge (CAC). How is the CAC doing?

We were called upon to assist with the creation of the CAC and enthusiastically responded. Aimee McKane and others at the CAC have done a great job in calling upon the entire compressed air industry to join in the effort to educate the market on energy-saving opportunities. Scales Industrial Technologies has supported the CAC, whenever possible, by sponsoring workshops and writing training materials. Five of our managers are certified CAC Instructors, three are CAC Advanced Management Instructors and we continue to emphasize education for our employees and customers.



Scales New Jersey Service Facility

SCALES

Company Profile



Scales Philadelphia Service Facility



Scales Connecticut Service Facility

The CAC has been very successful in helping train compressed air industry and energy professionals to understand air systems and recommend more energy-efficient solutions. It has also raised awareness of the savings opportunities with end users and has developed training programs to help them get results. In addition to their training seminars the CAC also provides many fact sheets, case studies and a comprehensive 350 page manual; "Best Practices for Compressed Air Systems" which was co-authored by Bill Scales and David McCulloch. Our hope is that this will help lower production costs, reduce downtime, and make American products more competitive, which will keep manufacturing in the United States.

How can distributors and compressor manufacturers work together better?

Another of the strengths of our company is that we maintain excellent relationships with our vendors, some spanning many years; a few were established during the origin of our company. We recognize the critical role our suppliers play in providing high quality products and how that can impact our service and customers. Our vendors recognize that distributors are a conduit for the opinions of the end user and we always encourage them to take the time to visit and listen. We consider our vendors as strategic partners and essential to our future success.

What does the future hold for Scales Industrial Technologies?

Going back to our organizational structure, our customers will guide our future. We will be there as a consultant and service provider, expand our offerings, and grow in the direction which allows Scales the opportunity to exceed expectations.

Thank you for your insights.

For more information please contact:
Bill Scales, CEO, Scales Industrial Technologies,
tel: 516-248-9096 or visit www.scalesindtech.com

U.S. Department of Energy
ALLIED PARTNER

IT'S TIME FOR ZERO AIR-LOSS

BEKO TECHNOLOGIES

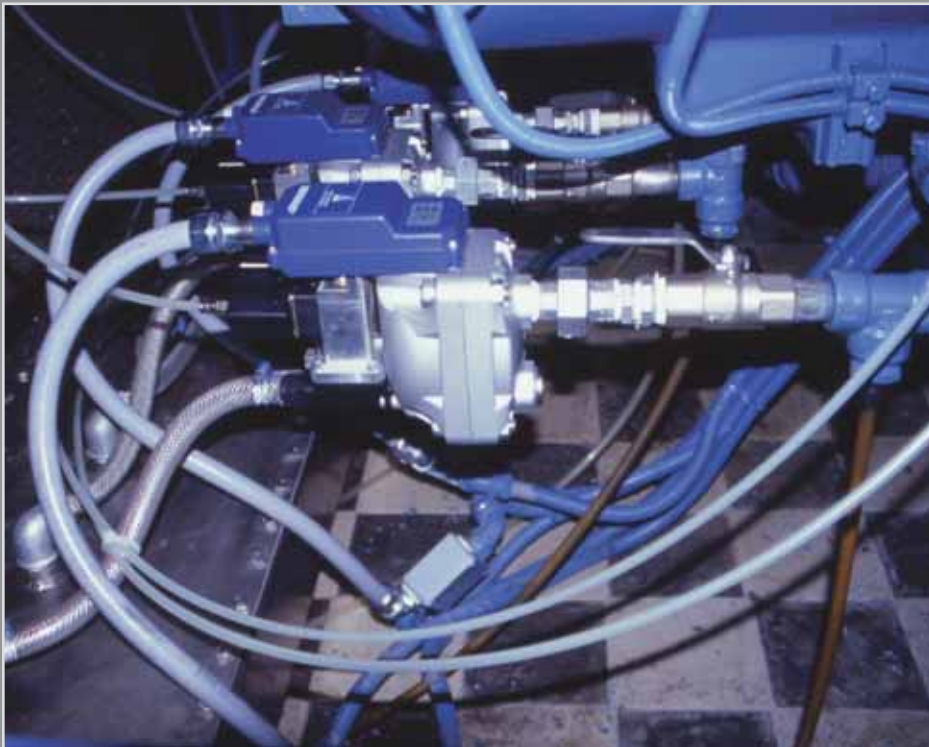
Compressed Air Best Practices interviewed Manfred Lehner (Managing Director), Tilo Fruth (General Sales Manager) and John Hays (Operations Manager) of BEKO Technologies

COMPANY PROFILE

COMPRESSED AIR BEST PRACTICES: WHAT IS THE HOTTEST TOPIC OF CONVERSATION THAT YOU HEAR FROM THE MARKET?

Without a doubt, it is energy savings. Air compressors — or rather the energy they consume — represent a significant portion of the industrial energy bill in the United States and in every other major economy in the world. Currently, in the U.S. alone, compressed air systems account for \$1.5 billion per year in energy costs. We have also seen an increase of 10%, on the average price of electricity, in the industrial sector in U.S.. Rates have risen from 5.35 cents per kilowatt-hour in 2005 to 5.94 cents in 2006. Conservative estimates conclude that 15% to 25% of the energy used could be saved. The potential positive impact on company profits as well as on the environment is enormous.

At BEKO we have always taken energy conservation very seriously. This is despite the fact that, until recently, energy consumption and the related costs were often overlooked. The absolute heart of our company is the BEKOMAT® zero air-loss, electronic level-controlled condensate drain. Condensate drain designs have historically used compressed air to discharge liquids from the air lines. The BEKOMAT® is designed to discharge the liquid without using any compressed air. The innovative design uses a patented liquid sensor with two sensing points, inside the drain, which tell the drain valve when to open (to discharge liquid) and close (before any air is lost).



One million BEKOMAT® zero air-loss drains installed worldwide

BEKO TECHNOLOGIES

Company Profile

Timed solenoid-valve drains are a traditional drain design, for example, which use compressed air to discharge liquids. A $\frac{3}{32}$ " timed solenoid-valve wastes \$630 of compressed air per year and a $\frac{7}{16}$ " timed solenoid-valve can waste \$5,040 per year. Other drain "solutions" have included pneumatic ball-valves (costing \$1,182 per year) and $\frac{1}{2}$ " manual ball-valves cracked open $\frac{1}{8}$ " (costing \$3,590 per year) in wasted air. The worst-case scenario is a V-notch valve with a 'v' opening of $\frac{3}{8}$ " (costing \$31,980 per year) in lost compressed air. (These costs assume 100 psig, an orifice coefficient of 0.65, and a cost of \$0.41 per 1,000 cubic feet of compressed air.)

End users have been recognizing this opportunity to save energy. In 2005, we passed the historic milestone of the 1,000,000th BEKOMAT® sold. The return on investment in the vast majority of installations is realized within 90 days and is guaranteed to not exceed six months — except in the rarest of cases.

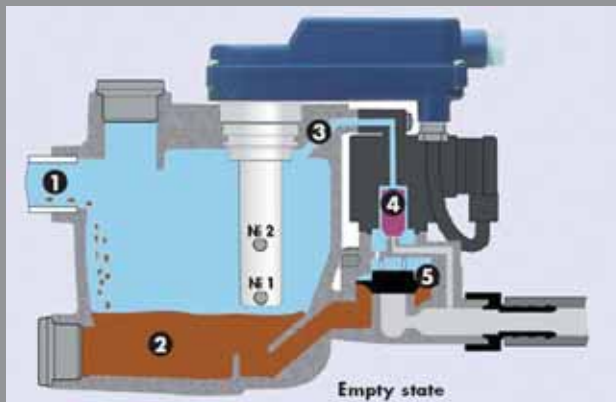
[We see BEKO continues its growth. Please give us a short history and how large is BEKO now?](#)

BEKO Technologies GmbH was founded in 1982 by Mr. Berthold Koch, hence the name BEKO from the first two letters of his first and last name respectively. Mr. Koch pioneered new technologies for the compressed air business, beginning with the BEKOMAT® drain. Mr. Koch continues to actively manage and lead the organization today. BEKO Technologies now operates three manufacturing facilities and thirteen branch offices around the world. BEKO has grown to employ two hundred and thirty highly skilled employees around the world and is headquartered in Neuss, Germany.

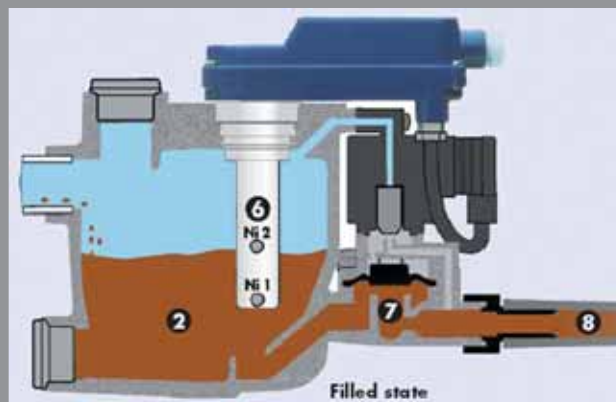
The U.S. subsidiary, BEKO Technologies Corporation, has been operating in the United States since 1990. BEKO Technologies serves the United States, Canada, and Mexico markets. The company is currently expanding its sales responsibilities into Central and South America.

Functional Description of the BEKOMAT® Condensate Drain

Empty state: Condensate trickles through the inlet opening (1) and collects in the reservoir (2). The diaphragm valve is closed, since the pilot supply line and the solenoid valve (4) ensure pressure compensation above the valve diaphragm (5). The larger surface area above the diaphragm results in a high closing force so that the valve seat is tight and leak proof.



Filled state: When the reservoir (2) has filled with condensate and the capacitive level sensor (6) signals at the maximum point, the solenoid valve is energized and the area above the valve diaphragm is vented. The valve diaphragm lifts off the valve seat (7) and the pressure in the housing forces the condensate into the discharge pipe (8).



The BEKOMAT® electronic system now calculates the discharge rate down to the minimum point and uses this figure to determine the exact valve opening period required. The valve will again be fully closed and leak proof before any compressed air can escape. Should the condensate discharge fail to function properly (i.e. blocked discharge pipe or faulty diaphragm), the device will go into alarm mode after 60 seconds. In this case, the red LED flashes and, if desired, the alarm signal can be relayed via a potential-free contact to an input of your choice. While in the alarm mode, the solenoid valve will open every 4 minutes for a period of 7.5 seconds in an attempt to correct itself automatically. This ensures that a filled BEKOMAT® unit in an un-pressurized state will, under pressure, automatically revert to normal operating conditions and thus clear the alarm.

What is fueling this growth?

Naturally there are several factors that have contributed to this growth; one in particular is the expansion of our product offering. We have come a long way from just producing and selling condensate drains. BEKO now offers complete solutions for every aspect of a compressed air distribution network in a plant. From the compressor outlet to the point-of-use, we offer solutions for the drying and filtration of compressed air in addition to our traditional condensate management technology. Many of these technologies are patented and unique to BEKO, thereby providing entrance for BEKO into sales channels that we previously did not have access to. For example, we recently introduced the BEKOKAT® to the market, which is a catalytic conversion system. The product provides oil-free compressed air with a maximum residual oil content of 0.003 parts per million. The installation of a BEKOKAT® unit, immediately downstream of a 20-year old oil-flooded screw compressor, will provide a customer with a virtually oil-free system.

Another new technology fueling our growth is the BEKOBLIZZ®. This system is a deep cooling system designed specifically for blow molding applications. Installed right before the blow molding machine, the BEKOBLIZZ® provides the user with an outlet air temperature of -31° F or -49° F, depending on the application requirements which can be blown directly into the mold. The introduction of dry, deep-cooled compressed air into the mold has proven to reduce cycle times dramatically by shortening part-cooling times, improving overall part quality and consistency, and reducing re-grind. The net result is an improvement to the production output and process.

Aside from our products; the single most important asset of any company and an absolute requirement for growth, are the people working for the company. BEKO has dedicated employees around the world, all of whom have a conviction about the company and its products that is unparalleled. BEKO employees also receive continuous training on our entire product range, which allows us to offer services and technical expertise that are of the same quality and reliability as our products. We recently started a project to establish a worldwide e-learning platform, which is nearing completion, in order to provide this same superior level of product training, education, and awareness to all of our customers. If it were not for our dedicated employees and an ongoing desire to learn, growth would be impossible.

Where are your manufacturing facilities and what do they produce?

The main manufacturing facility is in Neuss, Germany where the vast majority of our compressed air treatment and condensate management products are produced. We also operate a manufacturing facility in Bend, Oregon where we produce our membrane fibers and bundles, the core of our DRYPOINT® M Series of membrane air dryers. Beginning in 2007, the Bend facility will expand its capability to include final packaging of the membranes into housings. At this point, all DRYPOINT® M Series membrane air dryers for the North and South American market will be 100% manufactured in Bend. In addition to these two facilities, we will open a third manufacturing site, early in 2007, in India. The products produced there will be exclusively for the Indian market and not sold elsewhere.

“The potential positive impact on company profits as well as on the environment is enormous.”



BEKO membrane bundles in production in Bend, OR

BEKO TECHNOLOGIES

Company Profile



Mr. Tilo Fruth, General Sales Manager

Where are the thirteen distribution centers?

We have branch offices in France, Great Britain, Italy, Netherlands, Spain, and of course Germany, which make up the European subsidiaries. In Asia we have two locations in China, plus subsidiaries in India, Japan, Taiwan and Thailand. And finally the location here in Mooresville, NC that is responsible for the Americas.

Please describe your North American operations.

We have a office and warehouse in North Carolina, the primary function of which is to serve as a distribution center for our products. All of the financial, marketing, sales and technical support activities are handled out of the Mooresville, NC location. As part of our sales strategy, we have divided the United States into distinct regional sales territories, each with a responsible Regional Manager who lives and works within that region. This area of the business is managed by our General Sales Manager, Mr. Tilo Fruth.

Much of our success has been built on the foundation of our long-term partnerships with various Key Accounts and our excellent network of distributors, which for BEKO means keeping the sales force nearby and readily available to those who matter the most to us, our customers.

In Canada, we have a financial interest in CAG Purification, Inc., located in Oakville, Ontario. We have together created an exclusive, long-term sales partnership for BEKO products in the Canadian market.

Finally, there is BEKO Membrane Technology, which is the manufacturing facility in Bend, OR that was mentioned earlier. BEKO Membrane Technology, or BMT for short, is actually a 100% daughter company of the U.S. entity BEKO Technologies Corp. BMT is strictly a manufacturing facility and is not involved with sales or direct customer support. The decision-making and management of the company, however, is handled completely by local management in Bend with almost zero influence from Mooresville.

Concerning your compressed air dryers, it seems that these are now an important part of the BEKO product portfolio. What are the advantages and applications?

When drying compressed air, one should always keep in mind to dry the air to suit the application, in accordance with quality requirements. Everything else is a waste of time and energy. Refrigeration dryers are suitable for medium and high volume flows requiring a pressure dewpoint between 32 and 51° F. Our DRYPOINT® RA dryers deliver this with the added advantage of a vertical heat exchanger arrangement where the condensate flow is from top to bottom.

Membrane dryers are, the majority of the time, only suitable for the lower volume flows, due to the available sizes. But this is not a disadvantage. Our DRYPOINT® M Series membrane dryers have proven to be the perfect solution for point-of-use drying. This includes the new DRYPOINT® M PLUS Series that has integrated nano pre-filtration built directly into the housing. The fact that we use our CLEAR-POINT® filters and BEKOMAT® condensate drains to equip our dryers goes without saying.

How has condensate management evolved in Europe and in the U.S.?

25 years ago condensate management was non-existent in Europe, the United States and Asia. The industry didn't even know the term "condensate management". BEKO is proud that condensate management actually started with the invention of the original, electronic zero air loss drain, BEKOMAT®, from Berthold Koch and subsequently the oil water separator ÖWAMAT®.

Times have changed and as the industry evolved and progressed, people became aware that condensate management, which is the reliable discharge and treatment of condensate, is probably the most important link of the compressed air chain. Why — because for too many decades it was the weakest link!

In Europe condensate management is more advanced because BEKO started its business in Germany and Europe is basically the "home" market. While the regulations are no more stringent than in the States, they are more strictly enforced. This of course is a consequence of the much higher density of the population and the industry, lack of available land, and the resulting high priority given to "green" industry.



BEKOMAT® Zero Air-Loss Condensate Drains

3 Questions for Mr. Berthold Koch, Chairman of the BEKO Group

Q1: Mr. Koch, next year BEKO will celebrate its 25th anniversary. What is BEKO's position in the market today?



Mr. Berthold Koch, Chairman of the BEKO Group

BK: BEKO stands for customer oriented solutions and high quality products with exceptional benefits. With BEKO, compressed

air users don't have to worry about their air treatment or condensate management any more. But, and that is also very important, they can be sure that BEKO will be a partner at their side for years to come. We have grown strong over the years, and we are independent. There is no joint stock company pulling strings in the background. Each BEKO branch office around the world is a profitable working organization. In short: We are here to stay.

Q2: What is your vision for the company?

BK: That is easy to tell, because actually we have a formulated vision for our worldwide organization. We want to keep our customers and our employees satisfied. We want to improve our products, our service, and our way of doing business continuously. And we want to be the benchmark for our customers and our competition in all target areas. That this vision is linked with revenue and profit targets is self understood.

Q3: Where do you see trends for growth in the U.S. market for BEKO?

BK: Compressed air as a production medium needs quality and operational reliability, while maintaining economic efficiency. That is what makes our products and services necessary for every compressed air application. For an established industrial "power-nation" like the USA, our products and services are becoming even more important. With our new energy-saving air treatment and condensate management products, we will contribute to reduce the overall energy costs in the US.

“When drying compressed air, one should always keep in mind to dry the air to suit the application, in accordance with quality requirements.”

If you look at highly populated metropolitan areas (Atlanta, Boston, Los Angeles, etc.) in the U.S. you see the same strict enforcement of these regulations by the EPA.

And we know this first-hand; several companies in those areas contacted us for help because they received fines or were close to being fined because of environmental pollution. The sad thing is, especially in the more rural, less populated areas where there is a lot of manufacturing and growth going on, the majority of our customers and even potential customers have no idea that we have an easy, reliable, and energy saving solution; which is particularly important in these areas, now more than ever, with the impending increases in energy costs.

[With all your activities in compressed air treatment, is condensate technology still a priority for BEKO?](#)

Condensate management will never lose its important status within our product portfolio. Condensate technology is where we come from and is where our roots are. BEKO remains the number one condensate expert in the world. That is exactly why we work on new products in this area like our new BEKOMAT® 31 and 32 that we just introduced to the market in October. In the first quarter of 2007 we will debut a brand new ÖWAMAT® series of oil/water separators. We are not just repackaging our standard gravity-type separators-these new designs are truly revolutionary! Offering true advancements in condensate management technology keeps BEKO on the cutting-edge and years ahead of the competition in this segment of our business.

[Concerning condensate, do you see different laws governing the disposal of oil in condensate systems?](#)

Quite simply, no we do not. There is a “bottom line” here; it is unlawful to dump, discharge, or dispose of any untreated condensate into the environment regardless of how it was created or disposed of. The EPA is quite clear about this; so much so that Plant Managers, Engineers, Operators, etc. can be held liable, as individuals, with penalties ranging from fines in the tens of thousands of dollars to jail time depending on the severity of the infraction.

Thank you BEKO Technologies for your insights.

For more information or to subscribe to our monthly newsletter please contact: BEKO Technologies, tel: 704-663-6621, email: beko@bekousa.com, or visit our web site at www.bekousa.com

TWO - STAGE

Rotary Screw Air Compressors

BY HARISH SHAH AND MARK PFEIFER

Two-stage (also known as tandem) rotary screw air compressors offer compressed air users, looking for higher efficiency and reliability, an alternative to single-stage air compressors. For compressed air systems with fluctuating demand, two-stage designs can offer optimal energy efficiencies as both a full-load machine or as a “trim” machine.

Two-stage Tandem Design

In a two-stage air compressor, compression work is split equally between two sets of airends. Processing the air through these two airends (or stages) is the fundamental design difference from the traditional single-stage (or one airend) design. For a 100 psig application two-stage designs take the inlet air at 14.5 psia and compress it to 40.75 psia in the inter-stage. The second stage will then compress the air to 114.5 psia (100 psig). Inter-cooling between the stages is achieved by injecting cool oil into the discharge air after the first stage. This air-oil mixture reduces the effective air temperature before compression begins in the second stage. The result of this design is an extremely efficient compression ratio of 2.8 for both stages.

In a traditional single-stage design, ambient air is drawn into the compression chamber at 14.5 psia (allowing for a slight pressure drop due to the inlet filter). The air is then compressed to 100 psig (114.5 psia) in one stage with a single airend set. The compression ratio of a single-stage design is 7.9.



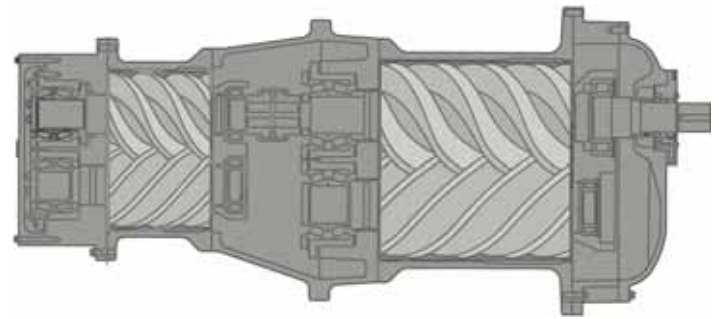
TWO-STAGE ROTARY SCREW AIR COMPRESSORS

Two-stage designs experience lower internal losses (air leakage), than single stage designs. This is due to the reduced pressure differences between discharge pressure and inlet pressure in both stages. The two-stage design sees a gradual pressure progression from 14.5 psia (ambient intake) to 40.75 psia (interstage) to 114.5 psia (outlet discharge). Lower internal losses increase the efficiency of the two-stage design and allow for higher pressure capabilities.

The reduction in pressure differential between inlet pressure and discharge pressure, in two-stage vs single-stage designs, places reduced loads on the discharge bearings in the airends. This reduced load will result in longer bearing life and more infrequent airend replacement/maintenance.

Full-load Operation

Two-stage designs will provide, at full load, 11–13% savings over single-stage air compressor designs. Due to the more efficient compression ratios and reduced internal losses, specific power consumption in terms of kW per 100 cfm is reduced. A typical single stage compressor will consume 18–19 kW per 100 cfm delivered. A two-stage compressor will consume 16–17 kW per 100 cfm delivered (100 psig discharge and 140 F injection temperature).

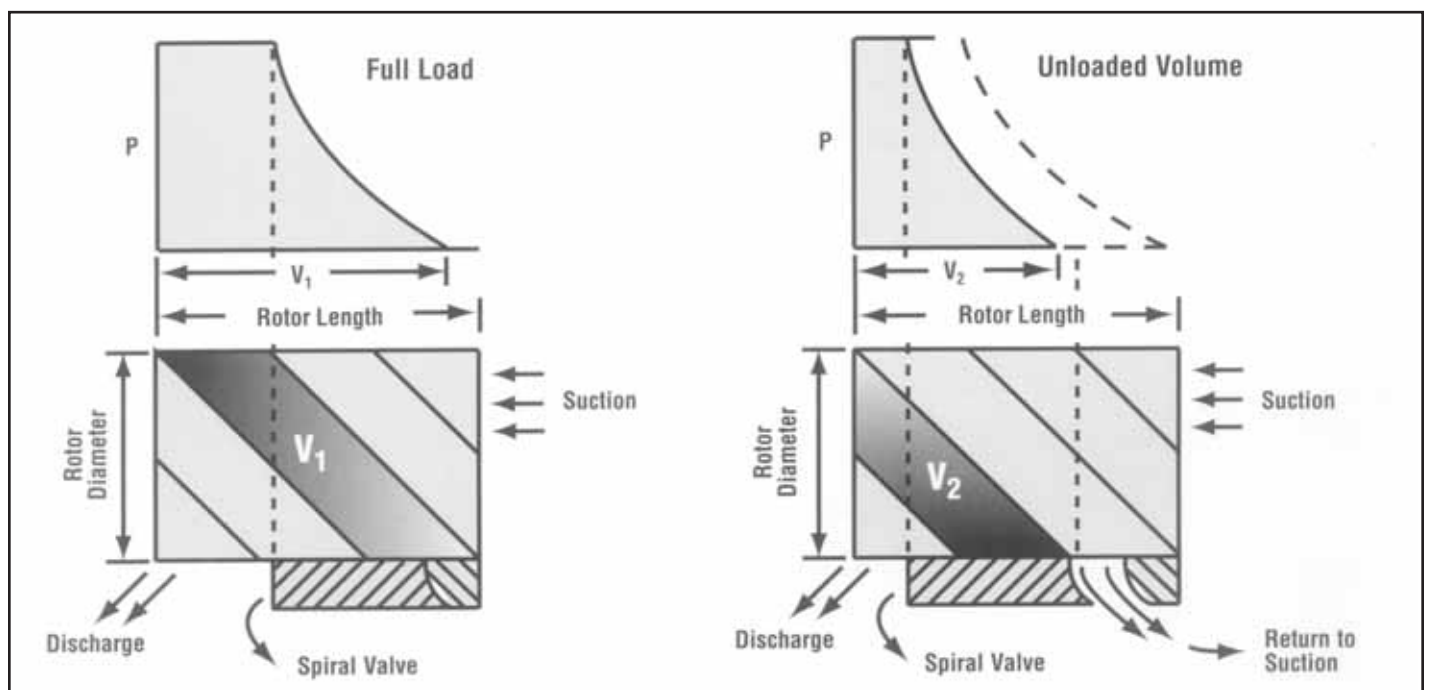


Partial-load Operation

Two-stage designs can be equipped with either Variable Speed Drives (VSD) or with Variable Displacement Controls (Spiral Valve) to further increase efficiencies when the same machine is faced with partial-load operating requirements due to fluctuating demand for compressed air. The advantage is that the same machine provides optimal energy efficiency in both full load and partial load conditions. Choosing between Variable Speed and Variable Displacement controls is a plant-specific decision to be made.

Spiral Valve Variable Displacement Control

The spiral valve activates automatically, when the unit is operating under partial load, and allows the compression of only the required quantity of air. In this manner, the spiral valve increases the efficiency of the compression process at 55–100% loads.



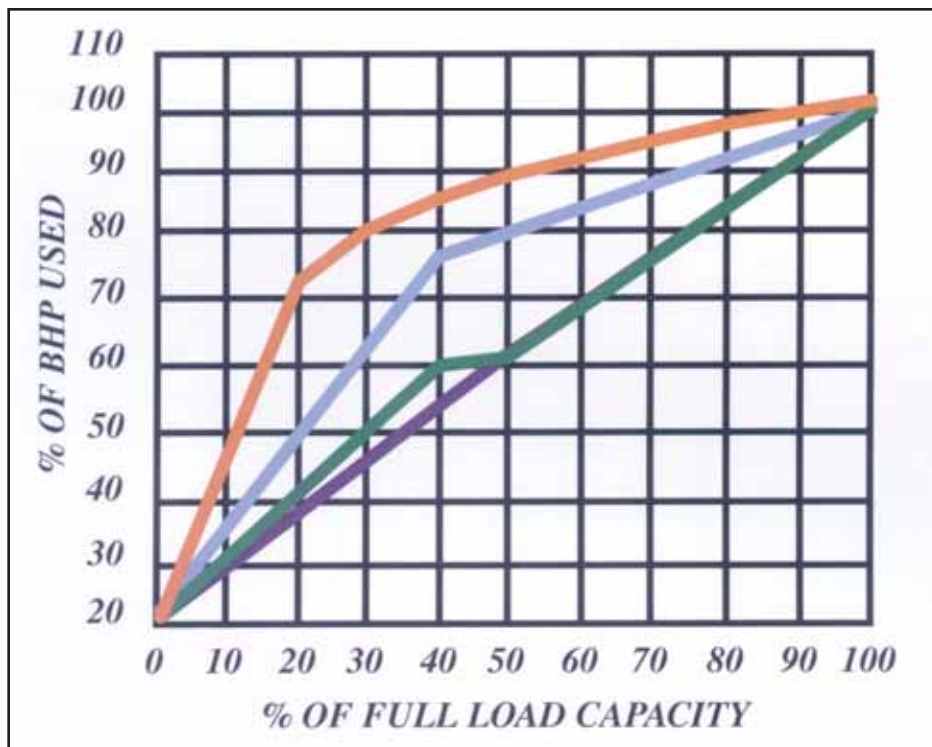
Spiral valve control allows some intake air to return to the compressor inlet. This action effectively reduces the rotor length and energy consumption.

The spiral valve progressively opens bypass ports connecting the compression chamber to the compressor intake in response to rising discharge pressure. As the discharge pressure rises (because more air is being produced than used), the spiral valve turns and opens internal bypass ports, which prevents some intake air from entering the compression chamber and consuming power. The progressive opening of bypass ports has the effect of reducing the length of the rotors after the lobes seal (and thus the displacement of the compressor) without choking the intake. This prevents a vacuum which causes the compression ratio to increase.

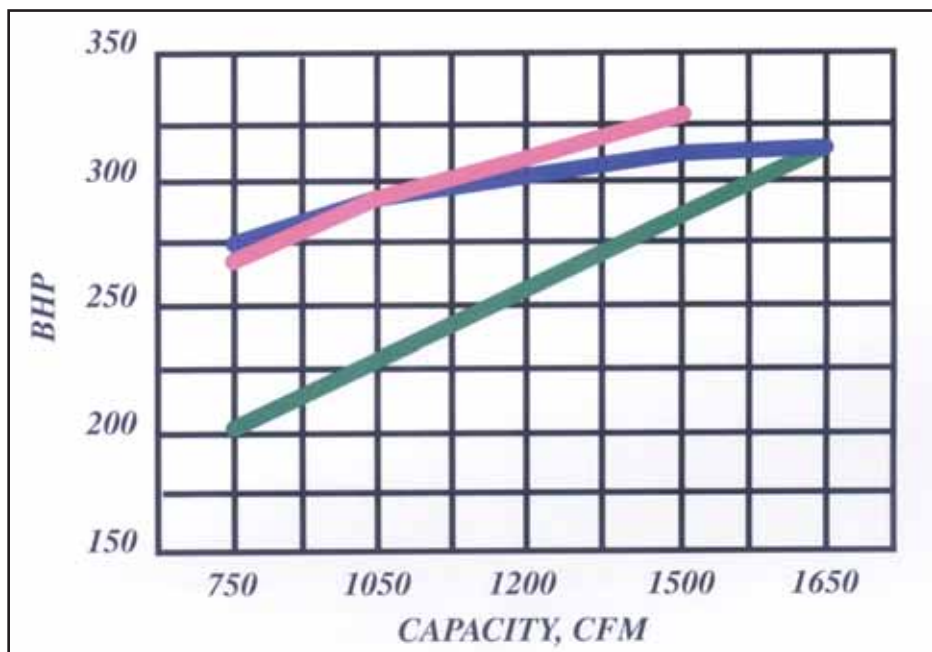
Variable Displacement Energy Savings

A variable displacement control matches compressor displacement to the output need. It provides significant power savings at part-load conditions when compared to compressors using load/no load or modulation controls.

Before a compressor can realize power savings with a load/no load control, the machine must first run into the upper range of modulation which can be as high as a 10 psig band before the machine will unload. This 10 psig unload point will cost a customer 5% of the motor horsepower on average. When the machine unloads it is done through a blow-down valve which takes several seconds to blow the air that is pressurized in the sump to atmosphere. As the demand calls for more compressed air, the machine must now repressurize the sump to provide more system air.



Compressor Control Method Performance Comparison
 RED LINE: Actual Load/No Load Control
 BLUE LINE: Modulation Control
 GREEN LINE: Spiral Valve Control
 PURPLE LINE: Theoretical Load/No Load Control



Power Comparison of 300 horsepower Models
 RED LINE: Single-stage, 300 hp compressor with modulation control
 BLUE LINE: Two-stage, 300 hp compressor with load/no load control
 (based upon 1 gallon per cfm air storage)
 GREEN LINE: Two-stage, 300 hp compressor with spiral valve variable displacement control

TWO-STAGE ROTARY SCREW AIR COMPRESSORS

Modulation controls are one of the most common types of controls used on rotary screw compressors. Modulation control utilizes either an inlet butterfly valve or pneumatic inlet valve. As the plant pressure and capacity is met, the inlet to the compressor starts to close off. This limits the airflow through the rotors housing reducing the amount of air being compressed. The inlet valve modulates its position based on the system requirement.

Two-stage tandem air compressors offer efficiency advantages at both full load and partial load operating conditions. Spiral valve or VSD technology can further optimize the design for partial load conditions.

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Managing a Harsh Environment

The ambient environment for air compressors, at cement plants, can be harsh. Air compressors operate like a giant vacuum pump inhaling ambient air — along with everything entrained in the air. Cement dust is very abrasive and can severely affect the efficiency and longevity of a rotating piece of equipment like an air compressor. Once ingested into the compression chamber of the air compressor, this abrasive dust will wear on components and ultimately cause premature failure.

Compressor manufacturers offer filtration packages to combat harsh ambient conditions. Heavy-duty and high-dust intake filter arrangements are available. These filters will prevent cement dust from entering the compression chamber. The key is to have an effective maintenance program on the filters. Filters that collect dirt and begin to clog cause a change in the atmospheric pressure. This “vacuum effect” can reduce the efficiency of the air compressor.

The ideal solution is, of course, to find a way to provide the air compressor with a steady stream of clean, cool air in a positive pressure environment. If this is impossible, regular maintenance of the filter elements is much less expensive than a 5% reduction in compressor efficiency.

“Reliable compressed air is critical to the operation of dust collectors in our cement plant. We have been very pleased with the consistent quality and quantity of air from our five two-stage air compressors. With good maintenance and preventative practices we continue to save over \$50,000 per year in energy, while deferring the capital expense of airend replacements.”

Plant Manager
Cement Plant in South Dakota

AUTO SURVEILLANCE MODE

Adds Efficiency to Vacuum Applications

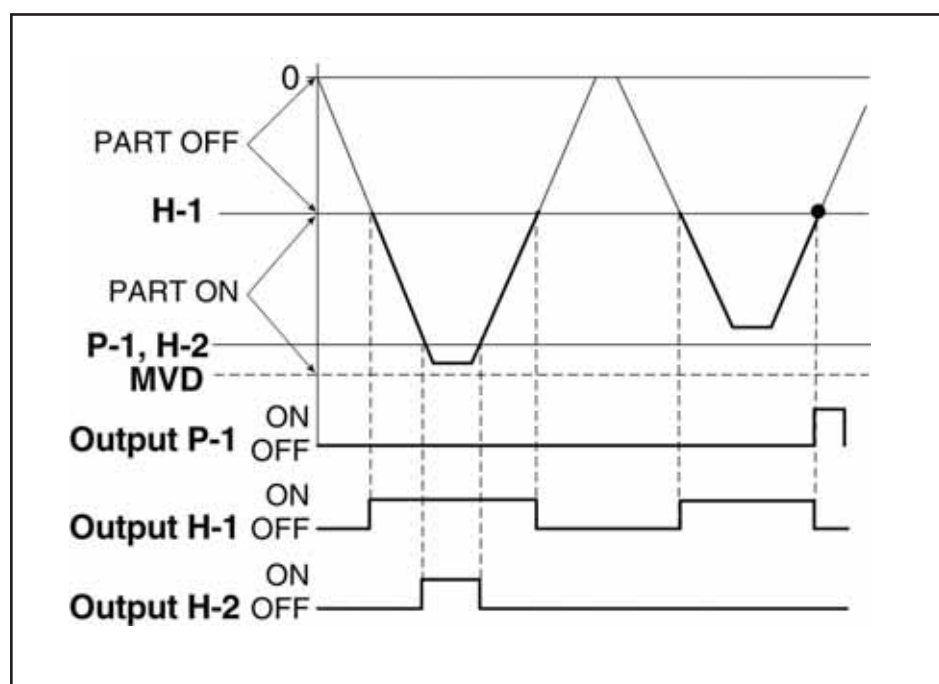
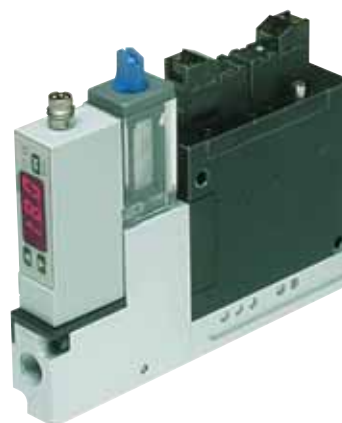
BY BOB BUERKEL

Many manufacturing processes employ vacuum systems for pick and place operations. By adding a pressure sensor with Auto Surveillance features, users can reduce machine cycle time and add preventative maintenance features that help minimize downtime and dropped parts, while increasing throughput of the machine.

General Vacuum Applications

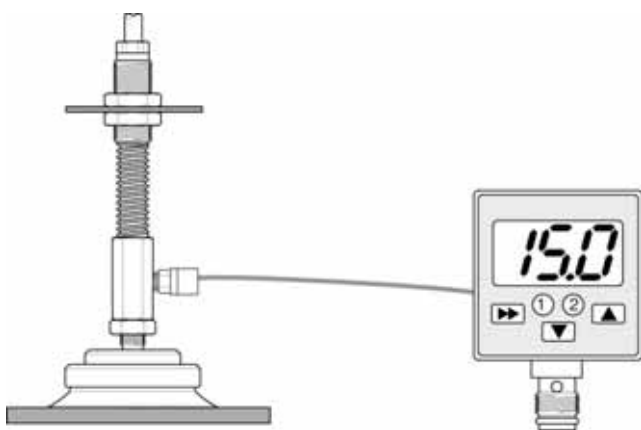
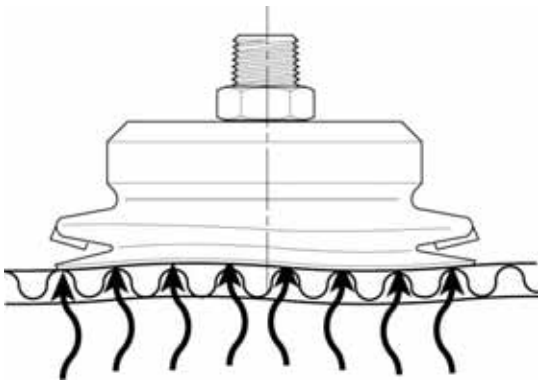
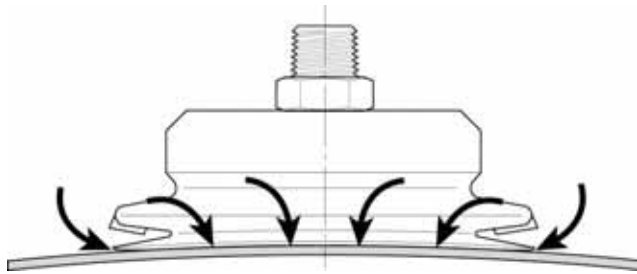
A vacuum system includes all components that are connected to the vacuum generator or vacuum pump. Vacuum generators are designed to reach a Maximum Degree of Vacuum (MDV). This value is obtained given a specific compressed air inlet pressure and flow.

When the vacuum generator is turned on and the cups are off the part, the degree of vacuum created in the system is less than the required application pressure. This is called "Part Off" pressure (See Figure 1). The ideal pressure for vacuum cups to lift and hold parts with a vacuum seal is referred to as "Part On" pressure. This value can be a programmed set point on a pressure sensor (H-1). When the vacuum cups create a seal on the part, the system vacuum pressure increases from "Part Off" pressure to "Part On" pressure. This pressure is an application-specific design level between "Part Off" and MDV.



“Sampling cycles can be increased by programming the pressure sensor to monitor up to 100 cycles.”

AUTO SURVEILLANCE MODE ADDS EFFICIENCY TO VACUUM APPLICATIONS



Pressure sensors typically have a response time of less than 2-milliseconds and incorporate open collector outputs to deliver inputs to the machine PLC for “Part On” signals. Compared with slower mechanical switches, it is this response time that reduces the automation cycle time.

To further improve response times, pressure sensors are available with two independent outputs. Output 1 can be programmed to anticipate “Part On” pressure. Output 2 (H-2) can be programmed to confirm either actual programmed system design level or MDV. When the system pressure has obtained the value of H-1, the degree of vacuum continues to increase. Designers program Output 1 to signal the PLC to start the next automation sequence at H-1. By the time the pneumatic valves and cylinders react in the automation process, the pressure of the vacuum system will have increased to a level at or above actual system design level. By anticipating this pressure, the automation process is started sooner, reducing overall cycle time.

Factors that Reduce MDV

There are a number of factors that can reduce the Maximum Degree of Vacuum in a system. Vacuum generator manufacturers usually designate an optimum supply pressure and flow rate to create MDV. However, most systems never achieve the Maximum Degree of Vacuum as rated by the manufacture because of system inlet pressure and flow restrictions or because of some type of leakage by the cup seal or through the product being held.

For instance, decreasing or increasing the inlet pressure or airflow reduces the Maximum Degree of Vacuum created by the system (See Figure 2). Tubing and fittings that connect the vacuum generator and vacuum system can become loose, creating leak points. MDV can be decreased by vacuum cup seal leakage and/or through the product itself (See Figure 2a)

Cups can wear, tear or harden due to the effects of the working environment. Leakage through the cup seal into the vacuum system decreases the maximum degree of vacuum. In porous-product applications, the product held by the cup causes leakage through the product as well. In general, vacuum applications are not designed to operate at the Maximum Degree of Vacuum because of response-time and safety issues.

The Auto Surveillance Mode and How it Works

A pressure sensor with Auto Surveillance Mode has 2 open collector outputs (See Figure 3). Output 1 is used for “Part On” signal, enabling the machine "logic" to advance to the next step in the process. Output 2 is programmed to the Auto Surveillance Output and monitors the Peak Degree of Vacuum (P-1) in every vacuum cycle.

Users can change the values of H-1 and P-1 with push button programming keys to suit the application’s parameters. P-1 can be automatically set to about 80% of Maximum Degree of Vacuum, which is a value between MDV and the “Part On” level.

Because MDV can change during the life of the vacuum system, setting Output 2 at MDV is not always optimal. Some pressure sensors have additional programming features that change Output 2 of the sensor to an Auto Surveillance Mode. This mode is actually a failure protection indicator. That is, Auto Surveillance Mode monitors the Maximum Degree of Vacuum obtained in each automation cycle and alerts the system if the programmed peak degree of vacuum pressure has been not been obtained, indicating that the system should be checked.

Illustration of a Successful Cycle

The vacuum system is turned on and system pressure achieves “Part Off” pressure. When the vacuum cup array seals on the product, “Part On” pressure (H-1) is reached and Output 1 changes state, enabling machine "logic" to advance to the next step in the process.

Vacuum pressure continues to increase beyond the Peak Degree of Vacuum setting (P-1) and approaches the system’s Maximum Degree of Vacuum. Vacuum is then turned off and the product is detached from the cup array. When vacuum is turned off, degree of vacuum returns to a level below H-1.

In this successful cycle, the critical pressure to be obtained is the Peak Degree of Vacuum (P-1). The Auto Surveillance Mode monitors the process to ensure that the system’s degree of vacuum surpasses “Part On” pressure and exceeds the programmed Peak Degree of Vacuum.

In an unsuccessful cycle, the process is the same as above except that the vacuum pressure does not increase past Peak Pressure (P-1). The automation process continues, however, because “Part On” pressure was obtained. When vacuum is turned off, the degree of vacuum decreases to a level below H-1. Because P-1 was not obtained during the vacuum cycle, the second output of the sensor changes to a passing state for 3 seconds.

Compressed Air Best Practices

JOB MARKET ADVERTISING RATES

MAGAZINE ADS

For smaller classified-type ads use the following rates per column inch:

1x per year: per column inch	\$94.00*
3x per year: (i.e., this is a 10 col. inch, reversed ad)	\$90.00*
12x per year: *reversed ads = 1.5x normal price	\$84.00*

Add \$50.00 to post the job opening on www.airbestpractices.com when you purchase an ad in the magazine

Contact Patricia Smith for 4 color full page, 1/2 page and 1/3 page ad rates

ONLINE ONLY ADS

Each job posting is up on the site for 60 days. Postings can be purchased in bulk quantities per the rates below. The customer has twelve months to put the postings on the site. After twelve months, any unused postings will be charged at the minimum quantity.

Small Qty.	Price Per Posting	Bulk Qty.	Price Per Posting
1	\$250	5-9	\$185
2	230	10-24	170
3	210	25-49	150
4	195	50+	135

**patricia@airbestpractices.com,
tel: 251-510-2598**

AUTO SURVEILLANCE MODE ADDS EFFICIENCY TO VACUUM APPLICATIONS

“In general, vacuum applications are not designed to operate at the Maximum Degree of Vacuum because of response-time and safety issues.”

At this point, the MDV in the system has decreased below the P-1 setting. This signal is a warning to the user that the degree of vacuum in system has been compromised. Auto Surveillance Mode alerts the system operator that maximum degree of vacuum of the system is still above H-1, part present, but it has decreased to an unsafe level and that the system should be checked during the next scheduled downtime for maintenance. As explained earlier, reasons for a not obtaining P-1 can include a change in inlet pressure or inlet flow, loose fittings, deteriorated cup seals, or a change in product porosity.

If left unchecked, a further decrease in degree in vacuum may result in dropped parts, causing an increase in scrape rate and machine down time that reduces throughput of the automation process.

Monitoring every cycle may be too often for some applications. Sampling cycles can be increased by programming the pressure sensor to monitor up to 100 cycles. If P-1 is not obtained in 100 cycles, Output 2 will change to a passing state for 3 Seconds. If P-1 is obtained anytime during the 100 cycles, the pressure sensor resets the cycle count and starts monitoring the next 100 cycles. Extended monitoring allows the user to make sure that the failure to obtain P-1 isn't a fluke and that it is, in fact, a persistent problem.

Benefits of Auto Surveillance Mode

Sensors with the Auto Surveillance Mode reduce the annual cost associated with replacing vacuum cups. Some users change every cup during a routine maintenance cycles based on standard time intervals. Instead of replacing all cups, only the cups that are causing leakage have to be replaced. Auto surveillance provides an alert when the MDV has decayed and, depending on usage, this may extend the standard time interval and increase the hours of use of each cup.

Just as Output 1 (H-1) can be used to “anticipate” part present and send a signal to the PLC decreasing machine cycle time, Auto Surveillance Output (P-1) can be used to “anticipate” machine downtime. Though the vacuum cycle is still reaching H-1, the system's peak degree of vacuum may be decreasing over time. Without the system monitoring provided by Auto Surveillance, it's probable that the peak degree of vacuum will decrease to a point of dropping a part or failing to reach H-1. Both events can cause machine downtime and decrease product throughput. However, because the system is alerted, maintenance can be performed to return the vacuum system to optimum performance before system failure.

Sensors with Auto Surveillance Mode prevent machine downtime, reduce operating costs, minimize dropped parts and reduce scrap while increasing production throughput and profits.

For more information, please contact Bob Buerkel, Product Manager, Vacuum and Pressure Sensors, Parker Hannifin Corporation, tel: 269-629-2512, email: bbuerkel@parker.com

INDUSTRIAL MARKETING

On-line Marketing for Industrial Companies

BY ROD SMITH

Increase Brand Awareness

In last month's column we talked about providing value to the visitor of your companies' web site. Most people don't visit an industrial web site for entertainment. If they come to the site, make it worthwhile for them by providing "easy knowledge-transfer" to them. That is what they are looking for. Some surveys indicate that a high percentage of capital equipment purchasers turn to the web to begin researching potential vendors.

This month we will discuss how to drive people to your companies' web site and thereby increase brand awareness. Marketing your domain name and using Search Engine Optimization (SEO) techniques are the recommended methods.

Marketing the Industrial Domain Name

How can we make people aware of our domain name? We don't do television ads! While I know a good industrial magazine I'd recommend advertising in, focus first on the basics. What your company does every day provides the best marketing opportunity.

1. Stylize the domain name into your company logo or find a way for it to appear in all company stationary.
2. Place the domain name prominently on all machines you manufacture and/or sell. This is what end users will see the most over the next 7 years. Don't be modest about it either!
3. Develop a uniform e-mail sign-off, which includes the domain name, for all employees of your company. Think about how many emails reach customers every day. Invite that customer, who is on-line reading your email, to click on a link to discover something interesting that will help their business.

Search Engine Optimization

Books are written on this topic but I'll try to condense it into a paragraph. The whole idea is to show up on the first page of a Google search engine screen when an end user types in a key word of interest to you like "air compressor".

1. Hire a good firm with references and strong links into Google. Once you do well with Google, start worrying about other search engines.
2. They will modify the source code of your web site so it is seen by the search engines and placed on the first page — no need to do search engine ads.
3. They will start tracking your ranking on major search engines (by page and by key word). Just choose two or three key words and do well with them.
4. Every month, you should track "unique visits" per day. This tells you how many people came to your web site every day. Watch out for other metrics like "visits" which count for every page a visitor clicks on.

Increase your industrial brand awareness with a focused strategy on driving customers to your web site.

This is the second of three articles on on-line marketing. Rod Smith is the former Vice President of Sales & Marketing for Hankison, PPC, & Deltech (divisions of SPX Corporation) and for Quincy Compressor (a division of EnPro Industries). For more information: rod@airbestpractices.com or tel: 251-680-9154

INDUSTRY NEWS

Press Releases

New Air Services from Festo ENERGY SAVING SERVICE

Learn how cutting compressed air consumption can save you money — with the Festo Energy Saving Service!

Using compressed air more efficiently helps save money. Generally, there is a potential savings of up to 35% of the energy costs of pneumatic systems through better maintenance. Festo now offers individual services to customers wishing to achieve more efficient use of compressed air.

- The Energy Saving Service covers everything from consumption and leakage measurements through to machine inspection and final analysis.

Festo Energy Saving Service includes:

- Consumption and Leakage measurements — Analysis of consumption and leakage measurements
- Machine Inspection — pinpoint leaks; analysis of weak points
- Machine Repair — assistance in elimination of leaks of defective components
- Final Analysis — cost/benefit analysis; documentation

With the Energy Savings Service, you can expect:

- Increased Productivity — significant reduction in energy costs
- Increased Process Reliability — professional maintenance of pneumatic systems
- Environmental Protection — reduced energy consumption cuts down on the greenhouse effect

All resulting in reduced energy usage, reduced downtime and greater productivity!

For more details, please visit: www.festo.com/us/airservices/FESS

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with 56 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performance, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

Festo Contact Information for publication:

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E-mail: customerservice@us.festo.com

Website: www.festo.com/usa



FESTO

HITACHI BRINGS OIL FREE AIR TECHNOLOGY PRODUCTS TO NORTH AMERICA

TARRYTOWN, NY, October 1, 2006 — Hitachi America, Ltd., Industrial Systems Division, today announced entry into North America with its Air Technology Group Products. Providing value via technology is the cornerstone of the Air Technology Group, leveraging the applications experience and efficiency of Hitachi inverters, motors and compressors.

To fulfill requirements for a wide variety of customers, Air Purity is achieved via incorporation of Oil-Free Rotary Screw, Oil-Less Scroll & Oil-Free Vortex Blower compressor technologies. Hitachi's Air Technology Group Products are incorporated into many market applications such as medical, food & beverage, pharmaceutical, electronics, etc. With nearly 100 years of experience in air compression, Hitachi is able to provide the customer with proven, reliable and efficient options.

Hitachi's Air Technology Group is to be based in Charlotte, NC. The facility will be the center for all Air Technology Group business operations, warehousing, and training for Distribution Partners and OEMs.

For more information, please visit www.hitachi.us or contact Nitin G. Shanbhag at airtechinfo@hal.hitachi.com.

Hitachi America, Ltd., Industrial Systems Division, supplies a broad range of industrial products and services. The division supplies sophisticated industrial equipment, components and services for application in pharmaceutical plants, food & beverage processing, steel making, mass transit systems, chemical plants, and other manufacturing facilities.

Hitachi America, Ltd., a subsidiary of Hitachi, Ltd., markets and manufactures a broad range of electronics, computer systems and products, and consumer electronics, and provides industrial equipment and services throughout North America. For more information, visit <http://www.hitachi.us>.

Hitachi, Ltd., (NYSE: HIT / TSE: 6501), headquartered in Tokyo, Japan, is a leading global electronics company with approximately 356,000 employees worldwide. Fiscal 2005 (ended March 31, 2006) consolidated sales totaled 9,464 billion yen (\$80.9 billion). The company offers a wide range of systems, products and services in market sectors including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.



HITACHI

INDUSTRY NEWS

Press Releases

ENDRESS+HAUSER TO BUILD NEW MANUFACTURING FACILITY IN GREENWOOD, INDIANA

The Endress+Hauser Group will expand its locations in Greenwood, Indiana. The Endress+Hauser Flowtec Division is extending its manufacturing facilities and offices. The company intends to invest over \$17 million (USD) in Greenwood, Indiana within the next two years. With this, a substantial amount of new jobs will be created. Groundbreaking for the new facility will take place in the first half of April 2006.

The Endress+Hauser Flowtec company based in Reinach, Switzerland is responsible for flow measurement technology within the Endress+Hauser Group. The new expansion of its U.S. division will consist of 74,000 sq/ft for manufacturing, including a new state of the art calibration laboratory, and 16,000 sq/ft for offices and training facilities.

Made in USA:

The new facility will be dedicated to the manufacturing and calibration of electromagnetic flow meters; Endress+Hauser will expand its domestic offering to meters with line sizes up to 48". The new high precision and accredited calibration laboratory will be the only one of its kind in the United States.

At the same time Endress+Hauser Flowtec will also remodel its present facilities to accommodate the heavy growth of its Coriolis-, Vortex- and Ultrasonic- product lines. With this, Endress+Hauser is underlining its complete commitment to the North American market and its loyal customers.

Ready for the future:

Endress+Hauser Flowtec is considering this present construction as a first step. The site development and the site capacity will allow for future expansion as needed. Endress+Hauser Flowtec is also serving its Central- and South American customers out of the Greenwood, Indiana plant.

The Endress+Hauser Group

Endress+Hauser is a global provider of measurement instrumentation, services and solutions for industrial process engineering. In 2004, the group employed 6,294 associates, generating approximately \$940 million (USD) in revenues and approximately \$50 million in profits. The family owned business comprises 71 companies in 35 countries, managed and coordinated by a holding company in Reinach, Switzerland. Competent employees and partners guarantee quality sales and services in every part of the world.

Endress+Hauser 

People for Process Automation

Products

With a wide range of sensors, instruments, systems and services; Endress+Hauser covers the areas of level, flow, pressure and temperature measurement, as well as liquid analysis and recording. The range also includes the connection of field instruments to process control systems, as well as automation and logistics solutions. Our products set the standard in quality and technology. In 2004, Endress + Hauser spent 8.9 percent of its revenues on research and development and logged 168 patent applications.

Industries

Our customers are primarily from the chemical, petrochemical, pharmaceutical, food, water & wastewater, paper, energy and oil and gas sectors. They optimize their process engineering procedures with the support from Endress+Hauser, while taking into consideration environmental protection, safety and economic efficiency.

History

Endress+Hauser was founded in 1953 by Georg H. Endress and Ludwig Hauser. Since 1975, the Endress family has sole ownership of the Group. In 1995, Klaus Endress took over the management of the Group from his father. For more than 50 years, the company has developed organically from being a specialist in level measurement to a provider of complete solutions for industrial measuring technology and automation, while continually breaking into new markets



ISO 17025 certified calibration rig allows Endress+Hauser to deliver highly reliable measuring instruments with fast delivery times to our customers throughout North and South America. The large calibration rig above handles flow tubes up to 12 inches in diameter.

ATLAS COPCO COMPLETES ACQUISITION OF COMPANY IN HEALTHCARE SECTOR

Stockholm, Sweden, August 25, 2006: Atlas Copco North America Inc. has acquired Beacon Holdings Corporation (parent company to BeaconMedaes and Medaes), United States, from The Riverside Company. The BeaconMedaes group is a solutions provider, predominantly of medical air systems and medical utility delivery systems for hospitals.

In 2005 revenues were approx. MSEK 720 (MEUR 77) and the operating profit margin approx. 7%. The purchase price, paid in cash, was MSEK 700 (MEUR 75). The BeaconMedaes group is headquartered in Charlotte, North Carolina, the United States and has 386 employees. The company has assembly facilities and a strong presence in both the United States and Great Britain. It is a world-leading supplier of medical air equipment, including medical air compressors, vacuum systems and pipeline components. Its products, for example, supply breathing air for hospitals and compressed air to drive surgical tools.

BeaconMedaes becomes Atlas Copco's competence center for medical air and medical utility delivery systems. The business is part of Atlas Copco Compressor Technique's Industrial Air division and the products will be sold under the brand names Atlas Copco, Medaes and BeaconMedaes.

For further information please contact: Joanna Canton, Media Relations Manager +44 (0)7971 65 01 15 Atlas Copco is a world leading provider of industrial productivity solutions. The products and services range from compressed air and gas equipment, generators, construction and mining equipment, industrial tools and assembly systems, to related aftermarket and rental. In close cooperation with customers and business partners, and with more than 130 years of experience, Atlas Copco innovates for superior productivity. Headquartered in Stockholm, Sweden, the Group's global reach spans more than 150 markets. In 2005, Atlas Copco had 27 000 employees and revenues of BSEK 53 (MEUR 5 600). Learn more at www.atlascopco.com.



DOMNICK HUNTER'S MINI DRY AIR SYSTEM

PNEUDRI MiDAS, a mini dry air system, provides plant engineers uninterrupted clean dry compressed air just where they need it without the need for drying the entire compressed air system which can be both costly and totally unnecessary. **PNEUDRI MiDAS** contains both a high efficiency and particulate filter along with a desiccant cartridge inside a single module allowing contaminated compressed air in and clean dry air out. A 100% service can be achieved in less than 15 minutes due to the quick release top cap arrangement, which does NOT require the inlet/outlet ports to be disconnected as with traditional systems. Boasting top end re-pressurization, **PNEUDRI MiDAS** ensures uninterrupted compressed air at all times. The unit can be placed directly after a compressor OR after a particular application where the air is critical to the operating process or end product. Units can be wall or canopy mounted using an optional mounting kit where space is limited. The unit is available at a pressure dewpoint of -40° F or -100° F and at flow rates of 3 to 20 scfm at 100 psig. Typical applications include: Computer Numerical Control (CNC) Machines, Coordinate Measuring Machines, Laboratories, Lasers, Packaging Machines, Instrumentation, Processing Equipment and Conveying Machines.

For more information contact domnick hunter at (800) 345-8462 or visit our website at www.domnickhunter.com.



domnick hunter

INDUSTRY NEWS

Press Releases

IMMEDIATE AVAILABILITY! QUICK-SHIP BLOWER PACKAGES FROM 5 TO 200 HP

Kaeser Compressors, Inc. announces our new Quick-Ship package blower series. Kaeser now stocks a full range Com-paK Plus rotary lobe blower packages in 5–200 hp. Available for immediate delivery, most units can be shipped in one working day.

The complete Com-paK Plus units include our optimized and proprietary tri-lobe Omega Plus profile plus a generously sized motor, silencers, instrumentation and valves. All maintenance points, including the automatic belt tensioning device, oil drains and filter elements, are accessible through the wide-opening canopy on the front. All power and process connections are at the rear allowing multiple units to be mounted side by side with no need for additional access clearance. The standard sound dampening enclosure lowers typical noise levels to 75 dB(A) or less. An integral ventilation fan provides efficient cooling, even under extreme load conditions.

Need it now? Whether it's a new installation or a replacement unit, Kaeser has the solution. For more information on our Quick-Ship series, call us today 800-777-7873 or visit us at www.kaesercompressors.com.



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COMPRESSORS

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FLUKE LAUNCHES LEM INSTRUMENTS POWER QUALITY TEST EQUIPMENT IN US MARKET

EVERETT, Wash. — Fluke Corporation, the world's leading supplier of test and measurement equipment, is adding LEM Instruments power quality tools to its line of power quality testing equipment. Designed to address a wide range of power quality testing applications, the LEM Instrument products are now available from selected Fluke distributors.

LH1050/1060 Power Clamp Meters combine the functionality of a current clamp and a power and harmonics meter in a single handheld instrument designed to meet international safety standards (IEC 61010, CAT III 600 V rating) and ease of use. They offer a wide range of measurement capability suitable for use in installing and testing of dc power systems, in measuring harmonics voltage and current on industrial systems, and in power and energy optimization. The LH1050 Power Clamp Meter has a suggested US list price of \$649, and the LH1060 Power Clamp Meter has a suggested US list price of \$749.

Analyst 2060 Power Quality Clamp Meter is a handheld instrument that combines the functionality of a current clamp, power quality meter, oscilloscope and data logger. With a comprehensive range of measurement functions, the Analyst 2060 Power Quality Clamp Meter is designed to meet international safety standards (IEC 61010, CAT IV 600 V rating) and ease of use in applications including commissioning and maintaining variable speed drives, installing and testing of dc power systems, and measuring harmonics voltage and current on industrial systems. It features a large display for viewing waveforms, charts and multi-parameter measurements, enables immediate harmonics analysis with a 'live' bargraph display, and supports trend measurement analysis by logging data on up to 5 parameters for 24 hours. The Analyst 2060 Power Quality Clamp Meter has a suggested US list price of \$1,095.

Analyst 3P Three-Phase Power Analyzer is a handheld instrument for recording and analyzing power and energy in commercial and industrial facilities. Combining data logging with the functionality of a voltage, current and power meter, the Analyst 3P includes 4 flexible current probes for measuring all three phases and neutral. It enables users to set up recording in seconds for NEC-required load studies, to easily view trends and recorded data with the PQLogView software included with the unit, and to generate reports. It features an oscilloscope function for visualizing voltage and current measurements, as well as voltage event capture and harmonic analysis functions. The Analyst 3P Three-Phase Power Analyzer has a suggested US list price of \$2,195.

Memobox Power Distribution Network Analyzers are a line of portable power quality recorders designed for low- and medium-voltage applications including those in electric utility network environments. Memobox analyzers are capable of monitoring up to 500 parameters, and can store measurements in memory for up to 85 days. The units come with application software designed for intuitive operation that provides trend diagrams, statistical summaries, report writing and real-time data monitoring in the online mode. There are three models to choose from: Memobox 300 P analyzer is an IP65-protected recorder that enables users to monitor the most common power parameters including V, A, W, VA, VAR, PF, energy, flicker, voltage events and THD; Memobox 300 A analyzer includes all the features of the 300 P analyzer, as well as advanced monitoring capabilities including voltage and current harmonics, interharmonics, ripple, unbalance and frequency; and the Memobox 808A analyzer is an IP50-protected power quality recorder that features a real-time LC display, five hour UPS and expanded memory capabilities. The Memobox 300 P Power Distribution Network Analyzer has a suggested US list price of \$3,995; the Memobox 300 A Power Distribution Network Analyzer has a suggested US list price of \$4,995; and the Memobox 808 A Power Distribution Network Analyzer has a suggested US list price of \$5,995.

For more information on the complete line of power quality testing equipment available from Fluke, visit www.fluke.com/pqproducts, or contact Fluke Corporation, P.O. Box 9090, Everett, WA USA 98206, call (888) 308-5277, fax (425) 446-5116, or e-mail fluke-info@fluke.com.

Fluke Corporation, which acquired LEM Instruments in June 2005, is the world leader in compact, professional electronic test tools. Fluke customers are technicians, engineers, electricians and metrologists who install, troubleshoot, and manage industrial electrical and electronic equipment and calibration processes for quality control.

The Fluke logo consists of the word "FLUKE" in a bold, black, sans-serif font, followed by a registered trademark symbol (®). The logo is centered on a solid yellow rectangular background.

JOB MARKET

Job Openings in the Compressed Air Industry

Consulting Services • Career Opportunities • Compressor Products • Clean Air Treatment Products



Sales Professionals

At Kaeser, we pride ourselves on being the world's leading innovator in air system technology. Being a leader means making a commitment to attracting the best and brightest professionals to become part of our company. As we continue to grow we are searching for aggressive, self-motivated Sales Professionals.

Successful candidates will have the following skills and attributes:

- ✓ A minimum of 2-5 years air compressor or industrial equipment sales experience
- ✓ Time and territorial management skills
- ✓ Professional presentation skills
- ✓ PC skills including Word, Excel, PowerPoint, and ACT Database

We offer a competitive salary and commission program, as well as a comprehensive benefit package.

Kaeser has opportunities in various locations throughout the US. For the most up-to-date information on specific openings, contact our Human Resources department.

PO Box 946, Fredericksburg, VA 22404

800-984-9930 ext. 530 ■ Fax: 540-834-4506 ■ hr@kaeser.com

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ZORN COMPRESSOR & EQUIPMENT

**SERVICE MECHANICS NEEDED:
(TWO POSITIONS)**

Wisconsin's leading independent distributor of compressed air equipment is seeking experienced service technicians with mechanical, electrical, and refrigeration skills to service industrial air compressors in Green Bay and Southeastern Wisconsin. Zorn Compressor & Equipment is a privately owned company that has been serving Wisconsin industry for more than 40 years. Benefits include company service truck, uniforms, health insurance, 401k plan, and a very competitive wage rate. Please send resume via fax to 262-695-7023, email us at jobs@zorn-air.com or call us at 800-476-4637.

Scales Industrial Technologies, *An Employee Owned Company* and growing leader in the compressed air industry is looking to add qualified energetic self-starters to our team. We are presently interviewing for Field Service Technicians, Shop Technicians, Machinists and Sales Engineers.

We offer a comprehensive benefits package including; company stock, 401K, medical and education.

Send resume to
niff@scalesair.com

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Carle Place, NY 866-248-9096
Sharon Hill, PA 866-522-8480
Meriden, CT 800-627-9578
Worcester, MA 877-798-0454

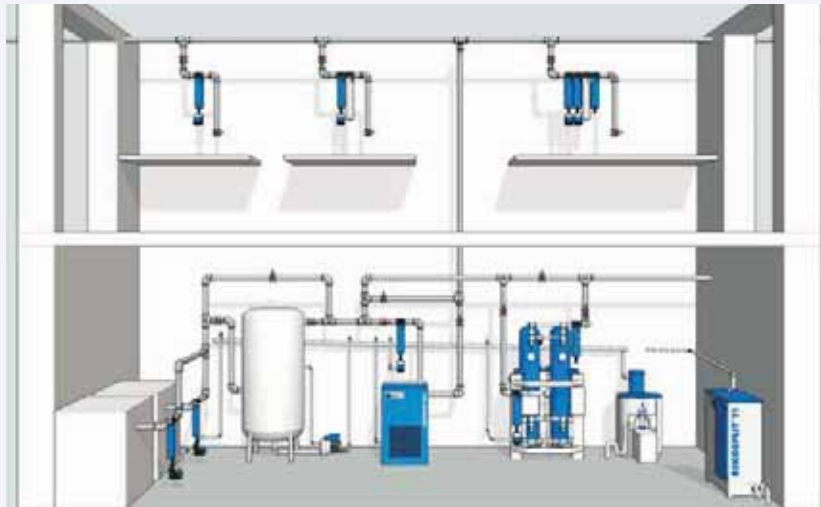


ADVANCED SOLUTIONS FOR YOUR COMPRESSED AIR CHALLENGES

The BEKO range of reliable performance products includes all aspects of economical, safe and ecologically responsible compressed air use. With their unique and diverse capabilities, all of the product families meet the demands of tomorrow's advancements today, from individual components right up to those of complete large-scale systems.

Being that every system, no matter how large or small, is made up of individual components, only components that are designed to work with each other, and are suited to rigorous applications and conditions can fulfill their performance expectations in a reliable and environmentally friendly way.

BEKO does more than manufacture phenomenal products, we are a complete solutions provider. Ranging from analysis of the problem, to specification, installation support, maintenance resolutions and comprehensive customer service, the BEKO know-how for compressed air use is customer oriented with a global focus.



CONDENSATE TECHNOLOGY		COMPRESSED AIR TREATMENT		MEASUREMENT TECHNOLOGY	PROCESS TECHNOLOGY
Condensate Discharge	Condensate Treatment	Filtration	Drying	Instrumentation	Deep Cooling
					
BEKOMAT® the convincing concept for condensate discharge	BEKOSPLIT® QWIK-PURE® for the safe, reliable treatment of all condensate types	CLEARPOINT® process reliable and flow optimized filters and water separators for compressed air and technical gases	DRYPOINT® AC DRYPOINT® M DRYPOINT® RA adsorption, membrane and refrigeration dryer lines	A full range of products for leak detection, as well as flow meters and dew point meters for air quality control.	BEKOBLIZZ® optimized cooling process with dry, deep cooled compressed air



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At Kaeser, our tradition of saving energy goes back generations.

We didn't start engineering the world's most energy-efficient compressors when it became the "in" thing to do. And now – when it matters more than ever – our eight decades of design innovation and fine-tuning translate into systems that are up to 25% more energy-efficient than the competition.

That adds up to a lot of valuable energy ... and bottom-line dollar savings, too. Enough, in fact, to pay for your compressed air equipment many times over.

With age comes experience. So, when you're comparing compressor performance and reliability, it pays to remember the lengths we've gone to ... for generations.



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Certified Management Systems

