Suggested Actions

- Walk through your plant and identify all compressed air uses and, if possible, the flow and pressure requirements of each use.
- Take steps to eliminate any inappropriate uses. Consult with a compressed air systems specialist to see if other equipment (blowers, mechanical or hydraulic devices) will be more cost-effective for those applications.

References

Improving Compressed Air System Performance: A Sourcebook for the Industry, Motor Challenge and Compressed Air Challenge, April 1998.

Training

- *Fundamentals of Compressed Air Systems* - 1 day
- *Advanced Management of Compressed Air Systems* - 2 day

Offered by the Compressed Air Challenge. Call the OIT Clearinghouse or visit the BestPractices Web site (www.oit.doe.gov/bestpractices) for the latest schedule and locations.

For additional information on industrial energy efficiency measures, contact the OIT Clearinghouse at (800) 862-2086.

Eliminate Inappropriate Uses of Compressed Air

Compressed air generation is one of the most expensive utilities in an industrial facility. When used wisely, compressed air can provide a safe and reliable source of power to key industrial processes. Users should always consider other cost-effective forms of power to accomplish the required tasks and eliminate unproductive demands. Inappropriate uses of compressed air include any application that can be done more effectively or more efficiently by a method other than compressed air. The table below provides some uses of compressed air that may be inappropriate and suggests alternative ways to perform these tasks.

Possible Inappropriate Uses	Suggested Alternatives/Actions
Clean-up, Drying, Process cooling	Low pressure blowers, electric fans, brooms, nozzles
Sparging	Low pressure blowers and mixers
Aspirating, Atomizing	Low pressure blowers
Padding	Low to medium pressure blowers
Vacuum generator	Dedicated vacuum pump or central vacuum system
Personnel cooling	Electric fans
Compressed air-operated cabinet coolers	Air-to-air heat exchanger or air conditioner
Air motor-driven mixer	Electric motor driven mixer
Air-operated diaphragm pumps	Proper regulator and speed control; electric pump
Idle equipment*	Put an air-stop valve at the compressed air inlet
Abandoned equipment**	Disconnect air supply to equipment

*Equipment that is temporarily not in use during the production cycle.
**Equipment that is no longer in use either due to a process change or malfunction.

Example

The table below shows inappropriate uses of compressed air in an automobile assembly plant. The plant took several action steps, identified in the table, to eliminate or reduce these inappropriate uses.

Operation	Original peak flow (cfm)	# of hours	Action taken	Revised peak flow (cfm)	Peak flow reduction (cfm)
Open hand-held blow guns	200	6500	Installed nozzles	50	150
Vacuum generator	1000	5000	Motor-driven vacuum pump	0	1000
Personnel cooling	800	3500	Used fans	0	800
Pneumatic actuators	750	3500	Replaced with electric actuators	0	750

Total CFM reduction: 2700

The plant audit showed that the energy used to generate the compressed air averages 18 kW/100 cfm. The aggregate electric rate at the plant is $0.05 per kWh.

Annual savings = [kW per cfm] x [cfm savings] x [# of hours] x [$ per kWh]

$$= \frac{18}{100} \times [(150 \times 6500) + (1000 \times 5000) + (800 \times 3500) + (750 \times 3500)] \times \$0.05 = \textbf{\$102,600}$$

Net savings:

Calculate electric energy costs for the motor-driven vacuum pump, fans, and actuators, and subtract these costs from the annual savings calculated to determine the net savings. Note that there will be a one-time cost of installation for the added equipment.

About DOE's Office of Industrial Technologies

The Office of Industrial Technologies (OIT), through partnerships with industry, government, and non-governmental organizations, develops and delivers advanced energy efficiency, renewable energy, and pollution prevention technologies for industrial applications. OIT is part of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy.

OIT encourages industry-wide efforts to boost resource productivity through a strategy called Industries of the Future (IOF). IOF focuses on the following nine energy and resource intensive industries:

- Agriculture
- Aluminum
- Chemicals
- Forest Products
- Glass
- Metal Casting
- Mining
- Petroleum
- Steel

OIT and its BestPractices program offer a wide variety of resources to industrial partners that cover motor, steam, compressed air and process heating systems. For example, BestPractices software can help you decide whether to replace or rewind motors (MotorMaster+), assess the efficiency of pumping systems (PSAT), or determine optimal insulation thickness for pipes and pressure vessels (3E Plus). Training is available to help you or your staff learn how to use these software programs and learn more about industrial systems. Workshops are held around the country on topics such as "Capturing the Value of Steam Efficiency," "Fundamentals and Advanced Management of Compressed Air Systems," and "Motor System Management." Available technical publications range from case studies and tip sheets to sourcebooks and market assessments. The *Energy Matters* newsletter, for example, provides timely articles and information on comprehensive energy systems for industry. You can access these resources and more by visiting the BestPractices Web site at **www.oit.doe.gov/bestpractices** or by contacting the OIT Clearinghouse at **800-862-2086** or via email at **clearinghouse@ee.doe.gov.**

BestPractices is part of the Office of Industrial Technologies' (OIT's) Industries of the Future strategy, which helps the country's most energy-intensive industries improve their competitiveness. BestPractices brings together the best-available and emerging technologies and practices to help companies begin improving energy efficiency, environmental performance, and productivity right now.

BestPractices focuses on plant systems, where significant efficiency improvements and savings can be achieved. Industry gains easy access to near-term and long-term solutions for improving the performance of motor, steam, compressed air, and process heating systems. In addition, the Industrial Assessment Centers provide comprehensive industrial energy evaluations to small and medium-size manufacturers.

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