Suggested Actions

- Inspect the condensate traps and determine if they are operating properly.
- Review your condensate removal method and, if possible, the load on compressors during non-production hours. If it releases too much air, consider upgrading to zero-loss drain traps.

References

From Compressed Air Challenge® (CAC):

The Compressed Air System Best Practices Manual, Guidelines for Selecting a Compressed Air System Service Provider

From DOE's Industrial Technologies Program and CAC:
Improving Compressed Air System Performance: A Sourcebook for Industry

Training

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

Offered by the Compressed Air Challenge; for the latest course schedule and locations see *www.compressedairchallenge.org*

For additional information on industrial energy efficiency measures, contact the EERE Information Center at 1-877-337-3463 or visit the BestPractices Web site at www.eere.energy.gov/industry/bestpractices.

Remove Condensate with Minimal Air Loss

Removing condensate is important for maintaining the appropriate air quality level required by end uses. However, significant compressed air (and energy) losses can occur if condensate removal is done improperly.

Excess compressed air loss during condensate removal can occur due to several factors. The table below illustrates several condensate removal methods and the characteristics of each method.

Condensate Removal Method	Characteristics
Manual operation	• Operators manually open valves to discharge condensate. • Depends on people opening valves at the appropriate time for the necessary amount of time. • Often leads to excess loss because air escapes when the valves are left open to drain the condensate.
Level-operated mechanical float traps	• Use a float connected by linkage to a drain valve that opens when an upper setting is reached and closes when the drain is emptied. • Require considerable maintenance. • Are prone to blockage from sediment in condensate. • Are prone to getting stuck in open position (leak excess air) and in the closed position (does not allow condensate to be drained). • Inverted bucket traps may require less maintenance, but will waste air if the condensate rate is inadequate to maintain the liquid level in the trap. • Most suited for a fully-attended powerhouse operation with scheduled maintenance.
Solenoid-operated drain valves	• Have timing devices that can be set to open for specified amounts of time at pre-set adjustable intervals. • The period during which the valve is open may not be long enough for adequate drainage of accumulated condensate. • The valve will operate even if little or no condensate is present, resulting in air loss. • Require strainers to reduce contaminants, which can block the inlet and discharge ports of these devices.
Zero-loss traps	• Have a float or level sensor that operates an electric solenoid or ball valve to maintain the condensate level in the reservoir below the high level point, or a float activates a pneumatic signal to an air cylinder to open a ball valve through a linkage to expel the condensate in the reservoir to the low level point. • Wastes no air. • Considered very reliable. • Reservoir needs to be drained often to prevent the accumulation of contaminants.

Other Points to Consider

Drain the condensate often and in smaller quantities rather than less frequently and in larger quantities. Consider oversized condensate treatment equipment to handle unexpected lubricant loading and to reduce maintenance.

All drain traps should be inspected periodically, with parts repaired or replaced as required. If replacement is the decision, consider using zero loss drain traps.

About DOE's Industrial Technologies Program

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

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

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

The Industrial Technologies Program and its BestPractices activities 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), compressed air systems (AirMaster+), steam systems (Steam Scoping Tool), 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.eere.energy.gov/industry/bestpractices** or by contacting the EERE Information Center at **877-337-3463** or via the Web at **www.eere.energy.gov/informationcenter/.**

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

BestPractices emphasizes 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.

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

EERE Information Center
1-877-EERE-INF
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www.eere.energy.gov

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A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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