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BOA
Building Operators Association of Canada

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President's Message

I hope this message finds you & yours well & in good health



I am pleased to announce that the BOMA 5th Class Building Operator Course will be launching soon! We are still looking for more students to fill the class. Please contact BOMA Calgary at 403-237-0559 or register at boma.ca. While it has been a struggle to get this off the ground again, BOMA has it in hand and is ready and excited to help Building Operators attain the 5th Class Certificate of Competency.

To ensure we are providing the highest quality education, we are actively collaborating with our sister association in Ontario, the Toronto Building Managers and Operators Association (TBMOA). Since Pan Global closed its doors, there has been a noticeable gap in the Building Operator curriculum. Recently, we have seen some companies claim to be the premier training providers by simply showing students videos on "how it should be done," which we feel falls short of true professional development. Please be patient as we navigate this transition. We are currently engaging with major industry players and regulators to upgrade and modernize our course material to ensure it meets the highest standards. We will keep you posted on our progress.

Shifting gears to building operations best practices, I want to highlight the critical importance of disaster planning in commercial buildings. Having a written emergency plan is simply not enough; staff need to understand their roles and continuously test whether the plan actually works. I actually pulled the following points from an AI tool and thought it was pretty good! A practical, comprehensive emergency program should include:

- **Emergency planning:** Identify hazards such as fire, earthquake, severe weather, power failure, hazardous-material incidents, and security threats.
- **Roles and responsibilities:** Establish who is responsible for evacuation, communications, first aid, building systems, tenant coordination, and contacting emergency services.
- **Tabletop exercises:** Conduct discussion-based scenarios where building management, security, maintenance, tenants, and other key personnel walk through a simulated emergency and make decisions without deploying resources.
- **Evacuation and other drills:** Where appropriate, conduct practical exercises to test alarms, evacuation procedures, assembly areas, accessibility arrangements, and accountability.
- **After-action review:** Document problems discovered during exercises, assign corrective actions, and set deadlines for fixing them.
- **Regular updates:** Review the emergency plan periodically and whenever there are significant changes to the building, occupants, hazards, or procedures.

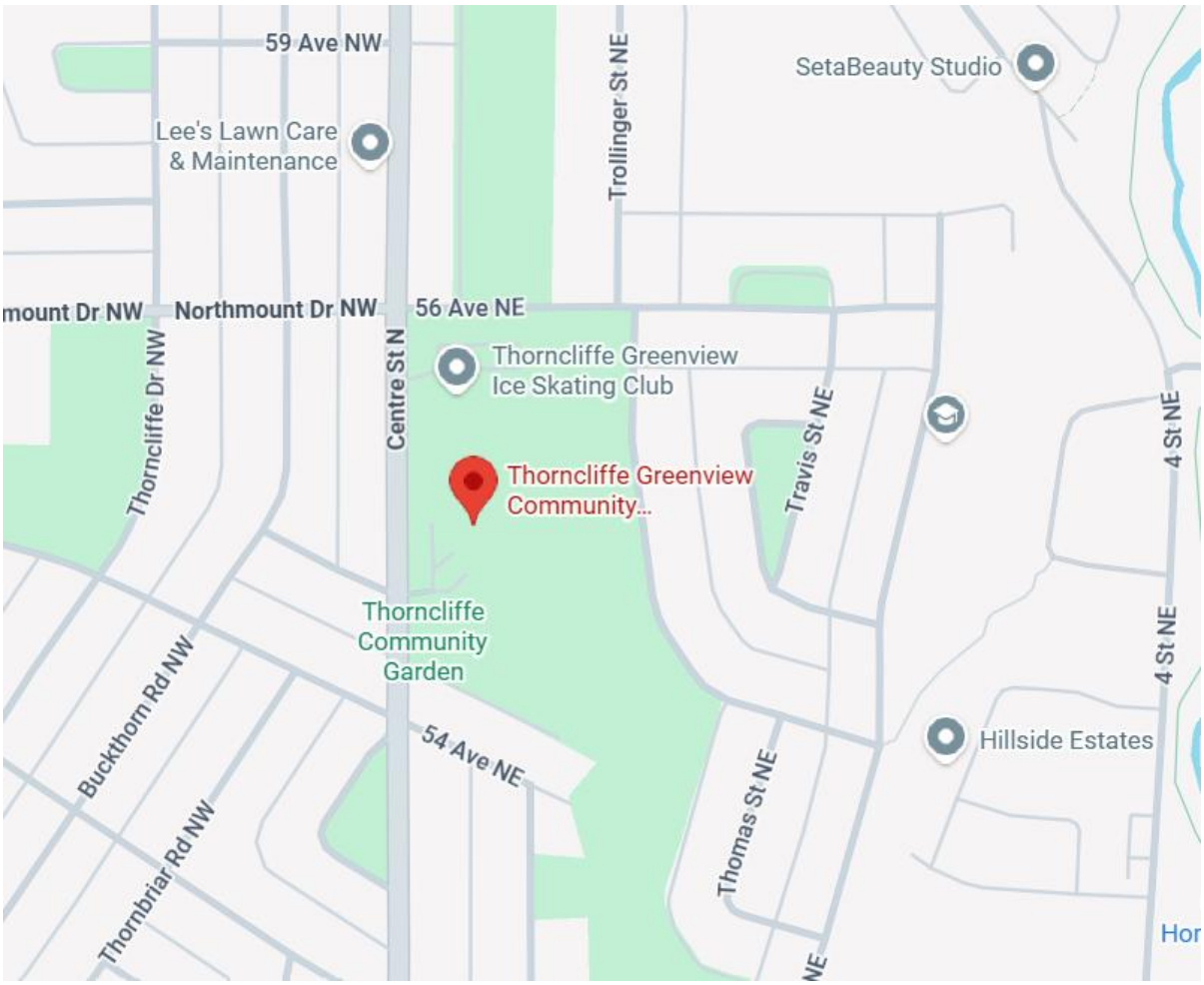
Tabletop exercises are particularly useful because they can reveal gaps in communication, decision-making, staffing, emergency contacts, backup systems, and coordination before a real disaster occurs.

As a reminder, our meeting times begin at 5:00 PM and end around 7:00 PM. I hope to see you at the next meeting!
Respectfully,

Les Anderson,
President, BOA Calgary

Join us at our Monthly Meeting on Tuesday November 10th, 2026 at our new location:

Thorncliffe Greenview Community Centre
5600 Centre St N, Calgary, AB T2K 0T3



Meeting at 5pm to 7pm
Free Parking

Join Us:

TUESDAY NOVEMBER 10TH, 2026 AT 5PM

FOR OUR MONTHLY MEETING

Title: Smarter Connected Buildings:
How Intelligent System Integration Improves Building Operations

Presenter Eddison Sambury
Senior Project Manager
Intelligent Integrated Systems Group
Smith & Andersen

Location: Thorncliffe Greenview Community Association & Recreation Centre Boardroom
5600 Centre St N. Calgary, AB T2K 0T3

Presentation Extract

- Why building systems (security, BAS, lighting, AV) are so often disconnected — and what that costs operators in time and budget
- What "intelligent integration" really means, in practical terms
- Real examples of connected systems reducing troubleshooting time and improving tenant experience
- Practical steps building operators can take to advocate for and plan smarter system upgrades
- Open Q&A

Bio :

Eddison Sambury is a Senior Project Manager with the Intelligent Integrated Systems group at Smith + Andersen, where he leads the design and delivery of integrated building technology projects, including access control, security, AV, and building automation — for commercial real estate clients across Western Canada. With 25 years in infrastructure, systems, and operations, spanning oil sands capital projects in Fort McMurray to multi-million dollar ITS and AV integrations, Eddison brings a track record of managing complex, high stakes builds where systems have to work the first time, every time. He speaks regularly on Intelligent Building Systems and practical AI integration for industry audiences looking past the hype.

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ABSA, the pressure equipment safety authority, has a new office in Calgary, located at:
#100, 1111 - 57 Ave. NE.

All in-person activities in Calgary, including exams, will be held at this office. Our Edmonton office, where our Finance team processes payments, is unaffected.

If you have any questions or concerns, please reply to this email or phone **ABSA Reception in Calgary at *403-291-7070.***

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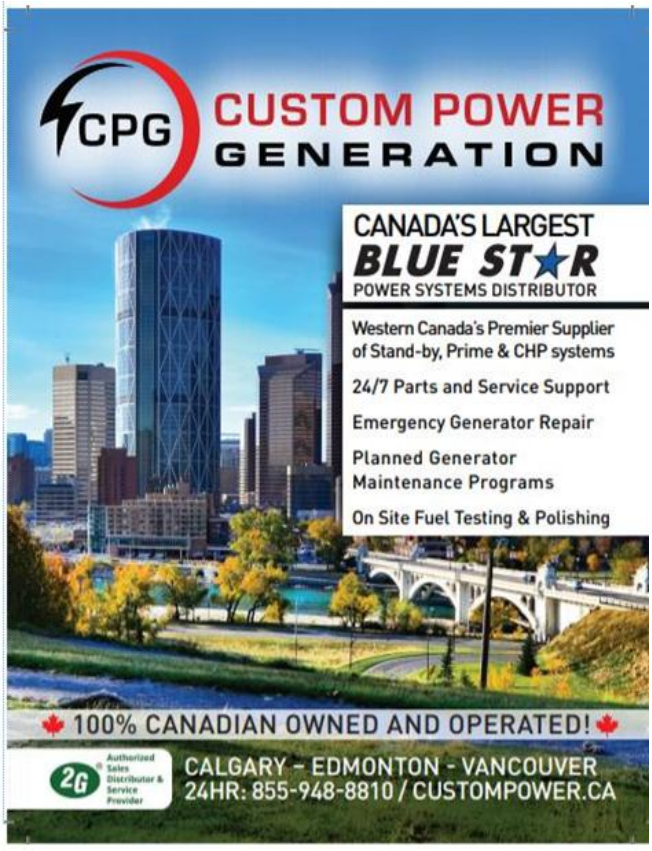
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YOUR OPERATOR IQ!

Can you troubleshoot in both the boardroom and the boiler room? We need a facility expert who knows the difference between a quick fix and a sound investment. Try our monthly Operator IQ challenge…answers on page 32

1. **Bent tube watertube boilers:**

a) cannot have the furnace water-lined
b) make more efficient use of the furnace
c) are externally fired
d) cannot be fitted with heat recovery components
e) have poor utilization of floor space

2. **Since furnace pressure is often positive on a packaged watertube boiler, in order to prevent flue gas leakage:**

a) an induced draft fan is incorporated
b) smokestacks are made taller
c) an economizer is used
d) a steel casing forms a seal for the furnace
e) soot blowers cannot be used

3. **A problem with a "D" type watertube packaged boiler is:**

a) excessive vibration
b) ceiling height requirements
c) refractory maintenance for the external furnace
d) its need to be top supported
e) its poor water circulation

4. **The advantage of a water-cooled furnace is:**

a) hotter furnace temperature
b) less brickwork required
c) less chance of a furnace explosion
d) decreased boiler efficiency
e) increased air/fuel turbulence

5. **In early boilers furnace walls were constructed of brick, which has been replaced using:**

a) baffles
b) steel casing
c) tubes to form the furnace walls
d) plastic insulation
e) block insulation

6. **Handhole and manhole openings**

a) permit inspection, cleaning, and repairs
b) require a cast iron reinforcing ring
c) have their long axis, lengthwise along the shell
d) are not required on low pressure hot water boilers
e) are required on high pressure



Aging School Buildings Pose Health Risks to Students

By Ken Sandler, Facility Influencer



Experts at a summit highlighted how aging infrastructure, inadequate funding, poor indoor air quality and extreme weather threaten student health and school operations.

Key Takeaways:

- Aging K-12 infrastructure, outdated HVAC and plumbing systems, and a $90 billion facility funding shortfall create persistent challenges for maintaining healthy school environments.
- Poor ventilation, moisture issues, chemical exposures and other indoor environmental hazards can contribute to asthma, respiratory problems and reduce student concentration.
- Extreme weather and longstanding funding inequities disproportionately affect schools and communities, underscoring the need for coordinated investment in facility upgrades and preventive maintenance.

Is anyone against keeping schoolchildren healthy? Surely not, yet the challenges for maintenance and engineering managers seeking to ensure that K-12 facilities consistently provide healthy environments to students and teachers remain stubbornly persistent.

Five organizations recently came together to co-host the Healthy Schools for Healthy Kids Summit in Washington, D.C., to detail the reasons healthy school facilities are so important, factors that have created barriers to upgrading these buildings and campuses and the way these groups and their allies can work together. The meeting brought together advocates, elected officials, health experts, facility managers, academics, students and others to address these issues.



"Can you make a better investment in society than in our schools?" asked Jason Hartke, executive vice president for external affairs and global advocacy for International WELL Building Institute, during his remarks.

Children typically spend 5-7 hours per day in classrooms, making schools' impact on kids profound. While many people might recall the way a good or bad teacher directly affected their lives, do they remember the indoor air quality in their schools? They also can have a lifelong imprint.

Healthy schools' challenges

While school facilities should be safe havens for students, they too often represent minefields. The potential hazards are many, particularly with the average age of school buildings approaching 50 years old and one-half of school districts nationwide needing to update or replace multiple systems, including HVAC and plumbing.

Despite these challenges, the funding gap for school facility improvements continues to widen. The 2025 State of Our Schools report estimated that school districts nationwide face a $90 billion shortfall in facility funding.

Dilapidated, outdated school facilities are an embarrassment and represent genuine threats to student and teacher health and safety. These threats can include exposures to toxic substances from lead and asbestos to pesticides and harsh cleaning chemicals. Moisture management issues also can create health issues, including asthma triggers, while poor ventilation and gaps in cleaning, operations and maintenance can exacerbate all these problems.

Asthma is a major focus. Kenneth Mendez, president and CEO of the Asthma and Allergy Foundation of America says one in 12 American children have asthma, with 50 percent of those children having missed school days, with higher percentages reported among black and Latino children. Asthma triggers in the school environment can include mold, dust, chemicals and school bus exhaust.

Erika Eitland, director of Human Experience Research at the architecture firm Perkins & Will, says "the policy mismatch" that "many of the buildings that our kids are in, our teachers are in, predate major environmental legislation," such as laws prohibiting lead paint and asbestos. Even though these substances have been generally banned from building products starting in the 1970s, many school facilities have not yet fully removed them.

In facilities as complex as K-12 schools, many additional hazards can crop up. Dr. Robert Amler, vice president for government affairs at New York Medical College, offered the example of a school installing an off-gassing polyurethane floor in a gymnasium without adequate ventilation in a place where children spend the day hyperventilating.

"There is one good ingredient to go in a lung, and that's air," Amler says. "Nothing else."

Climatological changes, including increasing temperatures, wildfires, floods and hurricanes, multiply the threats to schools. Joel Scheraga, senior advisor for the Healthy Schools Network, says, "In the 2024-2025 school year, nearly 10,000 schools, approximately 10 percent of all public schools, were forced to temporarily close because of weather-related events. That translated into over 9 million students affected."



The impact of school closures affects mental health, as well as physical health. "A school building is also a city center, a community center," says Nsedu Obot Witherspoon, executive director of the Children's Environmental Health Network. "It's used for many different functions beyond the learning. The symbolism of it being hurt, gone, washed away, is very traumatic."

Dr. Taylor Brewer, pediatric resident at Children's National Hospital in Washington, D.C., offered the example of parents wanting to get their kids checked for ADHD. After investigating, she found the children were forced to study in

schools without air conditioning. And on the hottest days, they simply couldn't concentrate.

"Children are not small adults," Amler said. "Their exposures are very different because their bodies are not only smaller, but they absorb faster."

The impact of unhealthy schools is very unevenly distributed, reflecting deep-seated patterns of social inequity. Jenna Riemenschneider, vice president of advocacy and policy at the Asthma and Allergy Foundation of America, cited research showing a $23 billion gap in the funding between majority white schools and majority black schools.

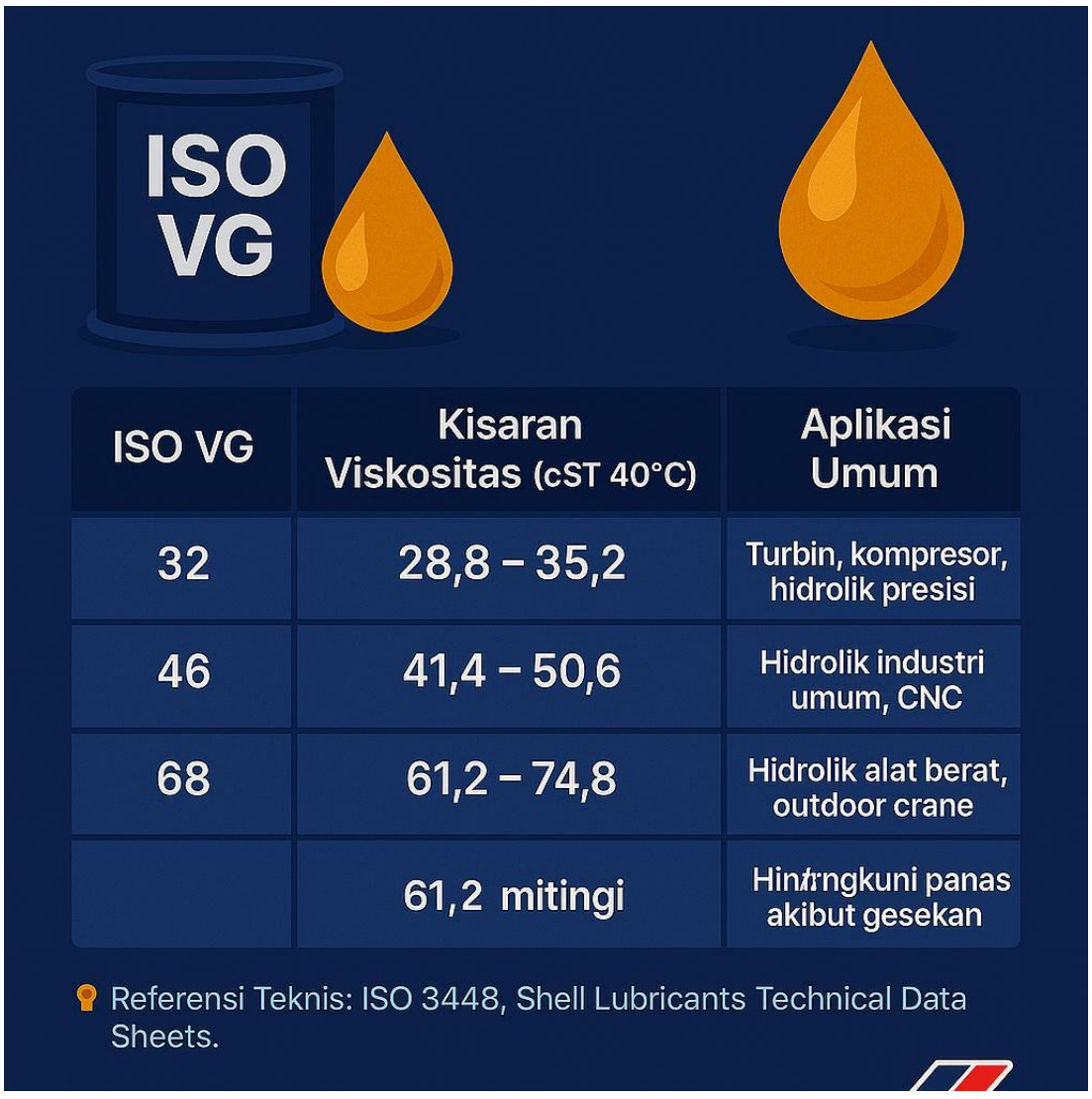
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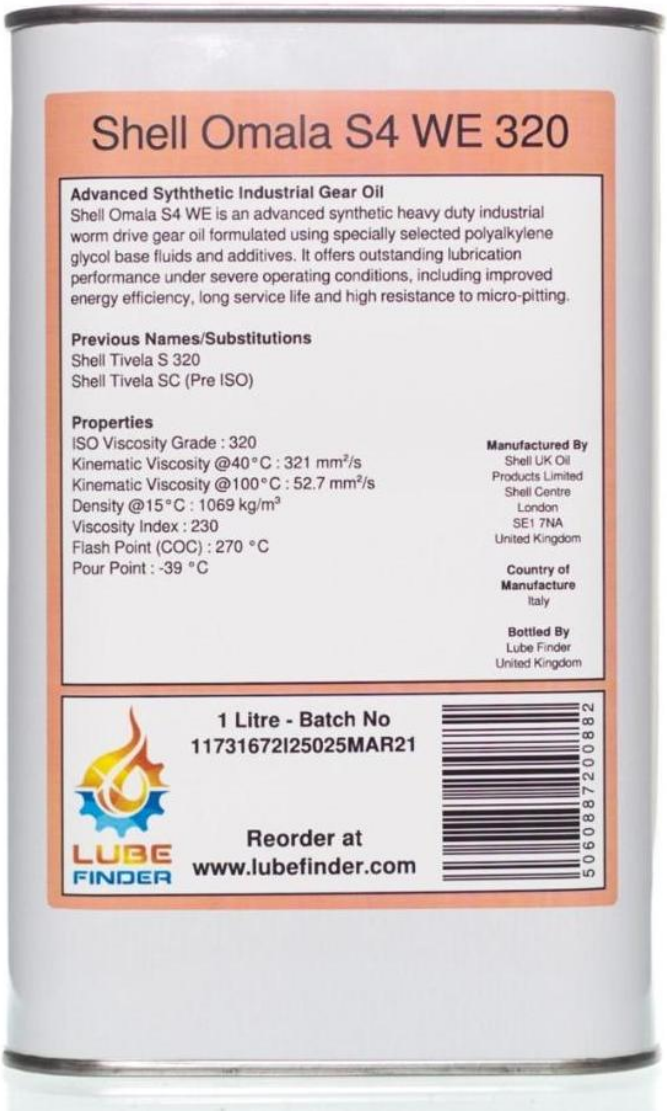
Understanding The Information On An Oil Can

Reading Information On An Oil Can Is An Important Skill For Building Operators. It Helps You Select The Correct Lubricant For Pumps, Motors, Compressors, Bearings, And Other Building Equipment.

1. Understand the information on an oil can







When reading an oil container, look for these important details.

Label information	What it means	Example
Oil type	The kind of oil and its intended use	Hydraulic oil
Viscosity grade	How thick or thin the oil is under specified conditions	ISO VG 46
SAE grade	Viscosity classification commonly used for engine and gear oils	SAE 10W-30
ISO grade	Industrial lubricant viscosity classification	ISO VG 32
API rating	Engine oil performance classification	API SP

Label information	What it means	Example
Manufacturer	Company that produces the oil	Brand name
Operating temperature	Temperature limits specified for the product	Check product data sheet
Safety information	Hazards, handling precautions, and first-aid instructions	Read the safety label

2. Learn how to read oil viscosity

Viscosity means **how easily oil flows**. Think of the difference between water and honey.

- Thin oil flows easily.
- Thick oil flows more slowly.
- The correct viscosity depends on the equipment manufacturer's requirements.

Example A: ISO VG 32

This is a relatively light industrial oil.
It has a nominal kinematic viscosity of **32 mm²/s (cSt) at 40°C**.
Typical applications may include certain hydraulic systems and circulating lubrication systems.

Example B: ISO VG 46

This oil is slightly thicker than ISO VG 32 at 40°C.
It is commonly used in hydraulic systems, provided the equipment manufacturer specifies it.

Example C: ISO VG 68

This oil is thicker than ISO VG 46 at 40°C.
It may be used in certain industrial hydraulic systems, circulating systems, and other applications requiring this viscosity.

Important: ISO VG 32, 46, and 68 are not interchangeable just because they are all industrial oils. Always check the equipment manufacturer's specifications.

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3. Understand the difference between SAE and ISO grades

Building operators frequently encounter both systems.

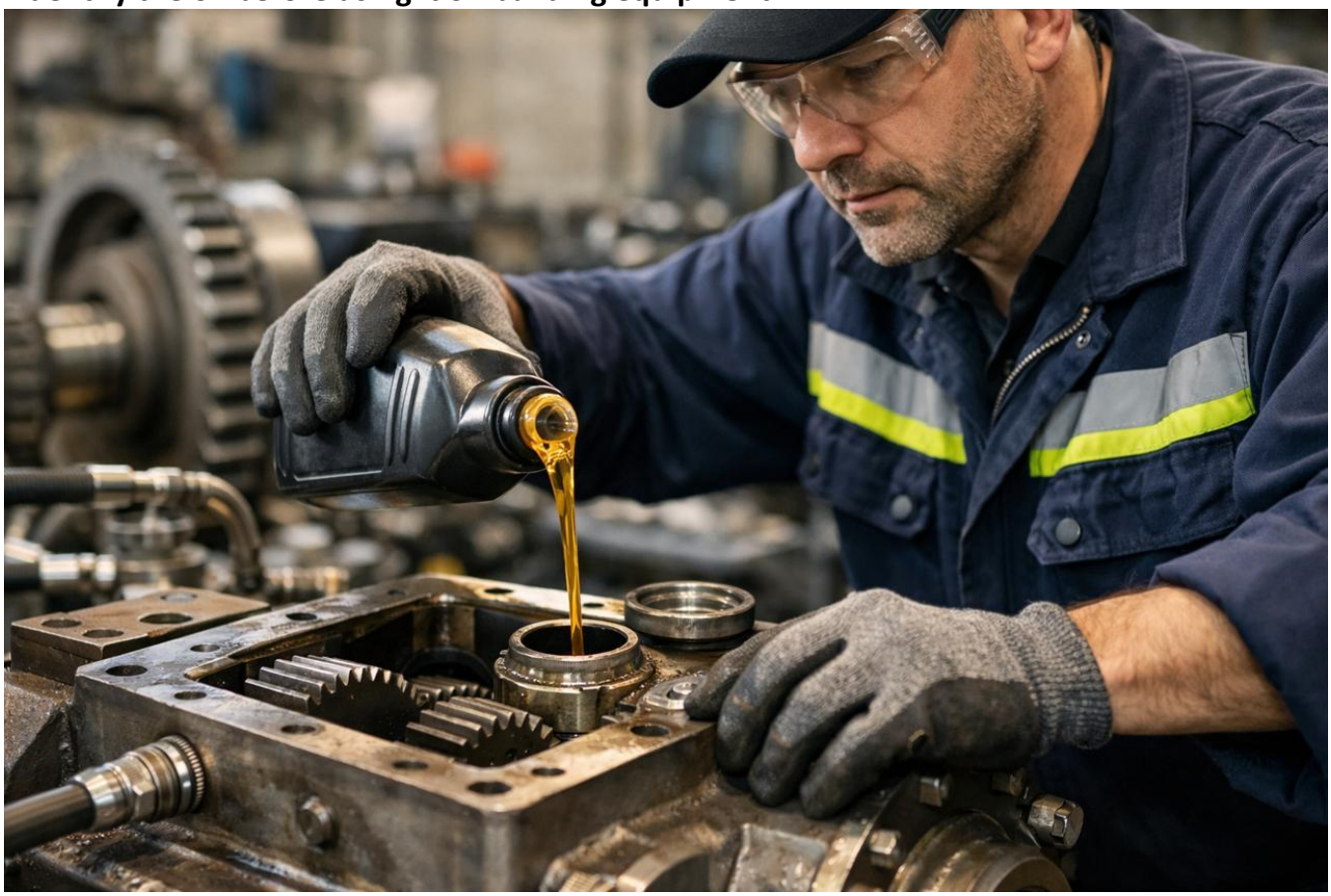
SAE	ISO VG
Commonly used for engine and automotive gear oils	Commonly used for industrial lubricants
Example: SAE 5W-30 engine oil	Example: ISO VG 46 hydraulic oil
Uses SAE viscosity classifications	Uses ISO viscosity classifications

Important: SAE 30 and ISO VG 32 are not equivalent grades, even though their numbers a re similar. They use different classification systems and test conditions.

Also, SAE 5W-30 is a multigrade engine oil. The numbers describe its performance under specified cold- and high-temperature viscosity tests.

---

4. Identify the oil before using it on building equipment



Building operators may encounter several types of lubricants.

Equipment	Lubricant to look for
Hydraulic elevator system	Specified hydraulic oil
Electric motor bearings	Manufacturer-approved bearing grease or oil
Industrial gearbox	Specified gear oil
Air compressor	Compressor oil approved for that model
Hydraulic pump	Hydraulic oil meeting the required specifications
Fan bearings	Specified bearing grease or oil

Never assume that one oil can be used for every piece of equipment.
For example, hydraulic oil is not automatically suitable for an air compressor or gearbox.

---

5. Read the safety information
Before using oil, check the label and its Safety Data Sheet (SDS).
Look for:

- **Hazard warnings:** Potential health or environmental hazards.
- **PPE requirements:** Gloves, eye protection, or other protective equipment.
- **Handling instructions:** How to handle and transfer the oil safely.
- **Storage instructions:** Temperature, container closure, and storage requirements.
- **Spill procedures:** How to respond to a leak or spill.
- **Disposal instructions:** How to dispose of used oil properly.

Never mix different lubricants unless the manufacturer confirms they are compatible.

---

6. A practical example for building operators
Imagine you are inspecting a mechanical room and find an oil container marked:

HYDRAULIC OIL — ISO VG 46

Here is how you would interpret it:

1. **Hydraulic oil:** It is intended for hydraulic applications.
2. **ISO VG:** The viscosity classification follows the ISO industrial lubricant system.
3. **46:** Its nominal kinematic viscosity is 46 cSt at 40°C.
4. **Application:** Confirm that the equipment requires ISO VG 46 hydraulic oil.
5. **Safety:** Read the label and SDS before handling it.

If the pump requires ISO VG 32, do not use ISO VG 46 without confirming that the equipment manufacturer permits it.

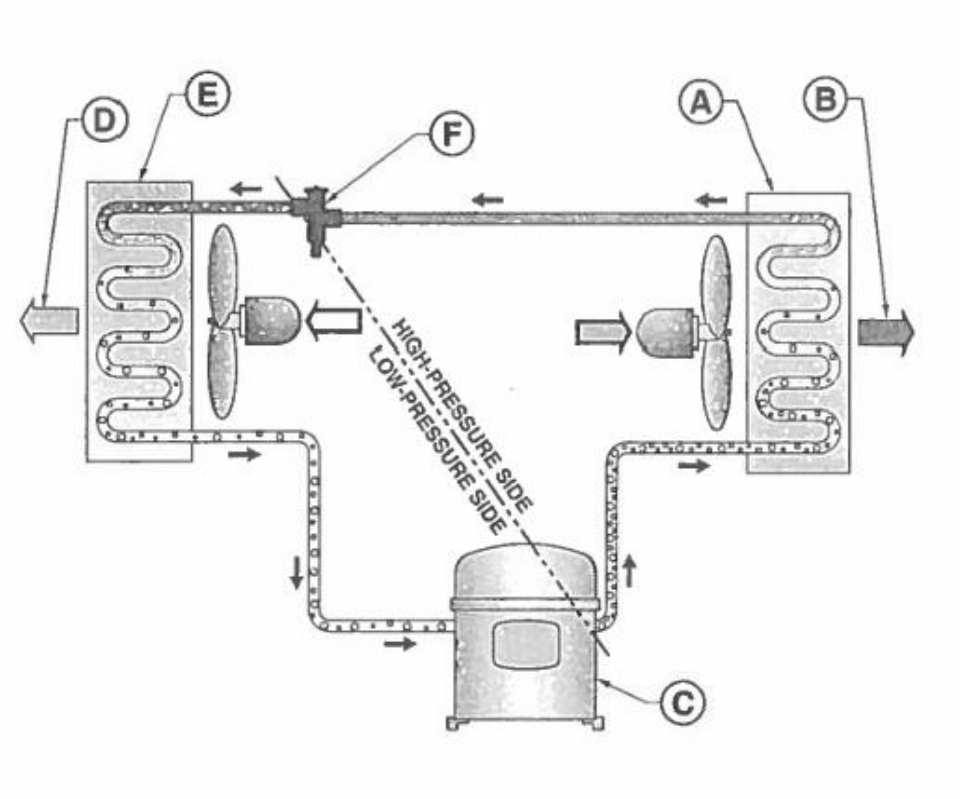
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7. What to check before adding oil
Use this checklist during your building maintenance rounds.

- Confirm the equipment identification.
- Read the equipment manual or lubrication chart.
- Identify the required oil type.
- Confirm the viscosity grade.
- Check any required performance specifications or approvals.
- Inspect the oil container for contamination or damage.
- Follow the correct filling procedure and oil-level requirements.
- Record the maintenance activity if required.

Compression Refrigeration Cycle

Label the picture correctly…..*Answers on page 32*



_____ 1. Cool air

_____ 2. Hot air

_____ 3. Metering device

_____ 4. Evaporator

_____ 5. Compressor

_____ 6. Condenser

Morning Meetings: Maintenance Planning and Scheduling

All over the world, most plants have morning meetings. As a consultant, I have been asked to sit in on many of these meetings, and my conclusion from these experiences is that most of them are not very effective or meaningful to the attendees.

First of all, the focus of the meetings is often on past events. For example, each department reports what happened yesterday, and very little time is spent on today's plans. In addition, even less time is spent on activities that must take place tomorrow and beyond.



The worst-case scenario

Let me tell you a little about the least effective meetings I have attended by describing a generic case. At this meeting, the room is noisy, people have to stand up because there is no place to sit, and there are no visual aids such as an overhead projector, flip charts or a whiteboard.

In addition, the leader of the meeting does not lead the meeting at all and often speaks with a low voice, making it impossible to hear. Attendees receive the latest production report and are asked – one by one – to read the part for which they are responsible. At this point, it is common to see that people do not listen to parts of the production report that do not directly apply to them. In addition, when they read their own parts, others do not listen to them either.

In the very worst scenarios, maintenance craftspeople do not start working in the morning until they have talked with their supervisor. This often causes a delay in work because the supervisor attends the morning meeting at 8 a.m., while the crew arrives at 7 a.m. The crew has learned, from long experience, that job schedules and work assignments are frequently changed as a result of the morning meeting. Therefore, they wait until the supervisor comes back from the morning meeting around 8:30 a.m. to begin work for the day.

Creating more effective meetings

To improve the effectiveness of your plant's morning meetings, I propose that you ask yourselves some of the following basic questions:

- Why do I attend the meeting?
- Do I attend because our plant has always had those meetings every day at 8 a.m.?

- Do I attend because this is the most efficient way for the organization to receive information about what happened last night?
- What do other attendees expect from me, and what do I expect from them?
- Is there a way I can improve communication at these meetings? For example, could I prepare my part of the presentation with charts and other visual aids and hope that others follow the example?
- Do we need to have these meetings every day, or would it be enough to have them on Mondays and Fridays?
- Do we need to have these meetings in the morning, or could we move it to mid-day and then focus on tomorrow's activities?

Effective meeting characteristics

Some very effective meetings I have attended share some of the following characteristics:

- The leader leads the meeting, and he or she can be distinctly heard throughout the entire room.
- The meeting starts on time and ends on time.
- Visual aids are used, and only information meaningful to the majority of the attendees is presented. Especially effective meetings present all their information using Power Point or other presentation software projected on a large screen.
- The meeting focuses on communicating important information, describing recent results and defining problems that must be solved.
- Each meeting includes a three- to five-minute teaching/discussion break.

No meetings?

Personally, I believe it is good to have meetings if they are productive, and it is a given that attendees must include operations and maintenance people at a minimum. If the purpose of your meetings is to spread information, you can sometimes accomplish this using internal televisions and computer networks. With those capabilities, you can possibly have fewer meetings.




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UPS Battery Maintenance Guide for Reliable Backup Power



A UPS system is only as reliable as its battery system. While UPS electronics provide power conversion, regulation, and protection, the batteries provide the stored energy required to maintain critical loads when utility power fails.

For data centers, hospitals, commercial properties, financial institutions, airports, industrial facilities, telecommunications sites, and other mission-critical environments, proper **UPS battery maintenance** is essential for backup power reliability, battery life, and operational continuity.

A well-designed preventive maintenance program can identify battery degradation before it results in reduced runtime, unexpected alarms, or UPS failure during a utility outage.

Why UPS Battery Maintenance Is Important

UPS batteries gradually deteriorate even when they are rarely used. Battery aging can be accelerated by temperature, charging conditions, installation environment, excessive discharge, poor ventilation, and inadequate maintenance.

A battery may appear normal during routine operation but have significantly reduced capacity when an actual power failure occurs. Proper maintenance helps facility teams:

- Detect deteriorating batteries before failure
- Improve UPS backup-power reliability
- Reduce the risk of unexpected downtime
- Extend useful battery service life
- Identify abnormal voltage and resistance conditions
- Verify battery connections and installation conditions

- Maintain appropriate UPS runtime
- Support preventive replacement planning
- Improve overall critical-power-system reliability

Common UPS Battery Technologies

The appropriate maintenance strategy depends partly on the battery technology used.

1. VRLA Batteries

Valve-Regulated Lead-Acid (VRLA) batteries are widely used in UPS applications. They are commonly available as AGM or other sealed lead-acid designs.

VRLA batteries are popular because they are relatively compact, require limited routine maintenance, and are available in many UPS battery configurations.

However, VRLA batteries have a finite service life and are particularly sensitive to temperature.

2. Flooded Lead-Acid Batteries

Flooded lead-acid batteries are used in some larger critical-power installations.

Their maintenance requirements are generally greater because facility personnel may need to monitor electrolyte levels, ventilation, specific gravity, connections, and other operating conditions according to the battery manufacturer's requirements.

3. Lithium-Ion Batteries

Lithium-ion batteries are increasingly being used in UPS applications because of their higher energy density, potentially longer service life, smaller footprint, and reduced maintenance requirements compared with traditional lead-acid systems.

However, lithium-ion UPS battery systems require appropriate **Battery Management Systems (BMS)** and manufacturer-specific monitoring and maintenance procedures.

4. Other Emerging Battery Technologies

Technologies such as lithium iron phosphate (LFP) and sodium-ion batteries are also attracting attention for stationary energy-storage and UPS applications.

Regardless of battery chemistry, maintenance should always follow the battery and UPS manufacturer's requirements.

Key Factors That Affect UPS Battery Life

Several environmental and operational factors can significantly influence battery performance.

1. Temperature

Temperature is one of the most important factors affecting battery life.

Excessive ambient temperature can accelerate battery aging, particularly for VRLA batteries. Maintaining the battery room or UPS environment within the manufacturer's recommended temperature range is therefore critical.

Facility teams should monitor:

- Ambient temperature
- Temperature variations
- Battery cabinet temperature
- Hot spots
- HVAC performance

A battery system located in an environment that is consistently hotter than the manufacturer's recommended operating temperature may experience significantly reduced service life.

2. Charging Voltage

The UPS charger must maintain the battery at the appropriate charging voltage.

Incorrect charging voltage can contribute to:

- Overcharging
- Undercharging
- Reduced battery capacity
- Excessive battery heating
- Premature battery aging

Charging parameters should be verified against the battery manufacturer's specifications and the UPS manufacturer's requirements.

3. Battery Age

UPS batteries have a limited-service life.

Even when a battery has not experienced many discharge cycles, its capacity can gradually decline because of chemical aging.

For this reason, battery age should always be considered when evaluating UPS reliability.

4. Discharge History

Repeated deep discharges can place additional stress on batteries.

Facility personnel should maintain records of significant UPS battery discharges and utility events whenever possible.

These records can help identify batteries that may require additional testing or replacement.

UPS Battery Preventive Maintenance Checklist

A comprehensive preventive maintenance program should include visual inspection, electrical measurements, environmental checks, testing, and documentation.

1. Visual Inspection

Begin with a detailed visual inspection.

Look for:

- Swollen or deformed batteries
- Cracks or physical damage
- Leakage
- Corrosion
- Discolored terminals
- Loose connections
- Damaged cables
- Abnormal battery temperature
- Contaminated battery surfaces
- Damaged battery cabinets or racks

Any abnormal condition should be investigated before the battery system is returned to normal operation.



2. Check Battery Connections

Lose or high-resistance connections can create localized heating and voltage drops.

Technicians should inspect battery terminals, interconnections, cables, and associated hardware according to the manufacturer's maintenance procedures.

Where appropriate, connection torque should be verified using the manufacturer's specified values.

3. Measure Individual Battery Voltage

Individual battery voltage measurements can provide useful information about battery condition.

An abnormal voltage compared with other batteries in the string may indicate a developing problem.

However, voltage alone does not provide a complete assessment of battery capacity.
This is why battery voltage measurements should be evaluated together with other diagnostic measurements.

4. Battery Impedance or Conductance Testing
Battery impedance, conductance, or resistance testing is an important predictive maintenance technique for many UPS battery systems.

These measurements can help identify batteries whose internal characteristics differ significantly from the rest of the string.
Trending is especially valuable.

Instead of looking at one measurement in isolation, maintenance teams should compare results over time.

A significant change in impedance or conductance may indicate deterioration and justify additional investigation.

5. Inspect Battery Temperature
Temperature measurements should be taken during preventive maintenance.

Technicians should look for unusual temperature differences between batteries.

A single battery operating noticeably hotter than neighboring batteries can warrant further investigation.

Thermal imaging can also be useful for identifying abnormal heating at connections or battery terminals when performed safely and appropriately.

UPS Battery Testing
Battery testing should be selected based on the UPS system, battery technology, criticality of the load, manufacturer's requirements, and facility risk-management strategy.

Battery Monitoring
Continuous battery monitoring systems can provide valuable information such as:

- Individual battery voltage
- String voltage
- Temperature
- Internal resistance or impedance
- Battery current
- Alarm conditions
- Battery health trends

Monitoring can help facility personnel identify developing problems between scheduled maintenance visits.



Battery Discharge Testing
A controlled battery discharge test can provide information about the battery system's ability to support the required load for a specified period.

However, discharge testing must be carefully planned because it intentionally consumes stored battery energy.

Before conducting a discharge test, the facility should evaluate:

- Critical load requirements
- Available bypass arrangements
- Generator availability
- Redundant UPS capacity
- Test duration
- Battery recharge requirements
- Manufacturer requirements
- Emergency procedures

For highly critical facilities, testing should be performed under an established procedure with appropriate risk controls.

UPS Battery Replacement

Battery replacement should be based on battery age, condition, test results, monitoring data, manufacturer recommendations, environmental conditions, and the facility's reliability requirements.

Waiting until a battery completely fails is generally a poor maintenance strategy for a critical UPS system.

A proactive replacement strategy allows facility managers to schedule the work before battery degradation becomes an operational risk.

Signs That UPS Batteries May Require Replacement

Potential indicators include:

- Repeated battery alarms
- Abnormal battery voltage
- Significant impedance increase
- Reduced UPS runtime
- Swollen batteries
- Excessive temperature
- Corroded terminals
- Physical damage
- Failed battery tests
- Significant differences between batteries in the same string
- Batteries approaching or exceeding their expected service life

A single abnormal measurement does not necessarily mean that the entire battery system requires immediate replacement. The condition should be evaluated by a qualified technician using the appropriate diagnostic procedures.

UPS Battery Room and Environmental Requirements

The battery environment plays a major role in reliability. Facility personnel should maintain appropriate:

- Temperature control
- Ventilation
- Cleanliness
- Access clearance
- Electrical protection
- Battery cabinet condition
- Emergency procedures



The battery installation should also comply with applicable electrical codes, safety requirements, and manufacturer instructions.

For larger installations, battery rooms and cabinets should be inspected as part of the overall critical-power preventive maintenance program.

How Often Should UPS Batteries Be Maintained?

The appropriate maintenance frequency depends on the UPS system, battery technology, operating environment, criticality, and manufacturer recommendations.

A typical maintenance strategy may include:

- **Routine monitoring:** Continuous or regular monitoring of battery alarms, temperature, voltage, and system status.
- **Visual inspection:** Periodic inspection for physical damage, corrosion, swelling, leakage, and abnormal conditions.
- **Preventive maintenance:** Scheduled inspection and electrical measurements performed by qualified technicians.
- **Battery testing:** Periodic impedance, conductance, or other appropriate testing, with discharge testing performed when justified by the system's maintenance program.
- **Replacement planning:** Maintain records of battery installation dates, test results, failures, and replacement history.
- The exact interval should always be established according to the applicable manufacturer's recommendations and the facility's maintenance program.
- **UPS Battery Maintenance Documentation**
- Documentation is often overlooked but is essential for critical-power systems.

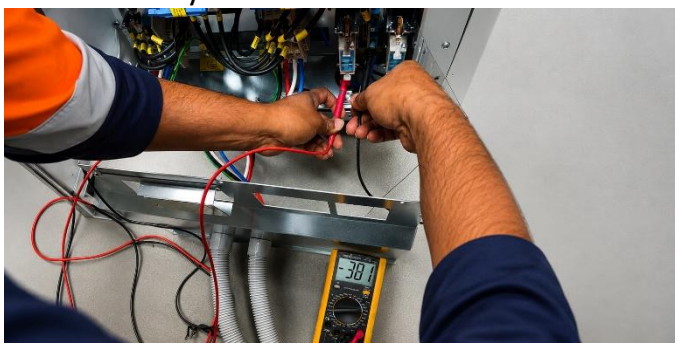
A professional UPS battery maintenance report should document:

- UPS manufacturer and model
- UPS capacity
- Battery manufacturer and model
- Battery installation date
- Number of batteries
- Battery string configuration
- Individual battery voltage
- Impedance/conductance measurements
- Temperature measurements
- Connection inspection
- Battery alarms
- Visual inspection results
- Test results
- Abnormal findings
- Corrective actions
- Recommended replacement timeline

Historical records make it possible to identify trends and support better maintenance decisions.

Common UPS Battery Maintenance Mistakes

Several maintenance practices can increase the risk of battery failure:



Ignoring Temperature

Operating batteries in an excessively warm environment can accelerate aging.

Relying Only on Battery Voltage

Normal voltage does not necessarily mean that a battery has adequate capacity.

Waiting for a Battery Alarm

A battery may deteriorate before the UPS generates an alarm.

Replacing Batteries Without Investigating the Cause

If batteries repeatedly fail prematurely, the underlying cause should be investigated. Temperature, charging parameters, installation conditions, load behavior, or other system issues may contribute to premature failure.

Poor Documentation

Without historical measurements, it becomes difficult to determine whether battery condition is improving, stable, or deteriorating.

Performing High-Risk Testing Without Proper Planning

Battery testing on a critical UPS system should be planned carefully to avoid unnecessarily exposing critical loads to risk.

Best Practices for Reliable UPS Battery Maintenance

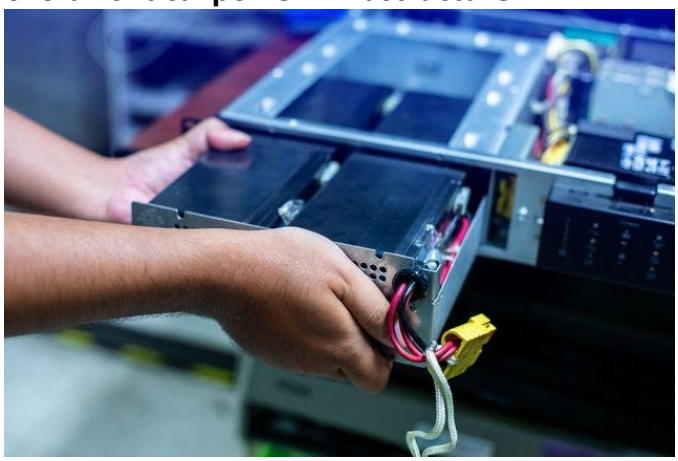
For critical facilities, an effective UPS battery maintenance program should combine **inspection, measurement, monitoring, testing, trending, and proactive replacement planning**.

Recommended practices include:

1. Follow the UPS and battery manufacturer's maintenance requirements.
2. Maintain appropriate environmental conditions.
3. Inspect batteries and connections regularly.
4. Record individual battery measurements.
5. Use impedance or conductance testing where appropriate.
6. Trend battery measurements over time.
7. Monitor battery temperature.
8. Maintain accurate battery installation and replacement records.
9. Investigate abnormal readings rather than relying only on alarms.
10. Develop a proactive battery replacement strategy.
11. Use qualified technicians for maintenance and testing.
12. Maintain clear emergency and battery-failure procedures.

UPS Battery Maintenance and Critical Power Reliability

UPS battery maintenance should not be treated as an isolated task. It is an important part of the overall **critical power infrastructure**.



A reliable UPS system requires coordination between:

- Utility power
- UPS equipment
- Battery systems
- Generators
- Automatic transfer switches
- Distribution equipment
- Power quality
- Critical loads
- Monitoring systems

- Preventive maintenance programs

A battery that appears healthy during normal operation may not provide the expected runtime during a prolonged utility failure. Proper maintenance and testing help reduce this uncertainty.

Conclusion

The battery system is one of the most critical components of a UPS installation. Proper **UPS battery maintenance** helps facility teams identify battery degradation, improve backup-power reliability, reduce unexpected failures, and plan battery replacement before it becomes an emergency.

For data centers, hospitals, financial institutions, airports, industrial facilities, and other critical environments, the goal should not simply be to maintain batteries—it should be to establish a **predictive and documented battery maintenance program** that provides visibility into battery condition throughout its service life.



Regular inspections, electrical measurements, temperature monitoring, impedance or conductance testing, appropriate discharge testing, accurate documentation, and proactive replacement planning can significantly strengthen the reliability of the overall UPS system.

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KenKen Puzzle

How to solve the Kenken Puzzle

- Fill in the numbers from 1 to 6
- Don not repeat the number in any row or coloumn
- The numbers in each heavily outlined set of squares, called cages, must comn=bine (in any order) to produce the target number in the top corner using the mathematucal operation indicated
- Cages with just one square should be filled with the target number in the top corner
- A number can be repeated within a cage as long as it is in the same column

Answers on page 32

8		5	2					9
	1	9			4		7	6
	4		8		1		5	
	7		9					
5		1	7	6		2	9	
9				1			8	3
	9	4						8
			6	4			3	
7	6	8	3		9	4	1	

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6	4	7	8	9	1	3	5	2
4	7	3	9	8	2	5	6	1
5	8	1	7	6	3	2	9	4
9	2	6	4	1	5	7	8	3
3	9	4	1	5	7	6	2	8
1	5	2	6	4	8	9	3	7
7	6	8	3	2	9	4	1	5

Your Operator IQ Answers:

1. b
2. d
3. a
4. b
5. c
6. a

Compression Refrigeration:

1.D 2.B 3.F 4.E 5.C 6.A





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It saw a fork up ahead.



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