INSTALLATION & OPERATION MANUAL

NLA SERIES

HVAC
EXPANSION TANK

ASME

Products Comply
NSF / ANSI
Standard 61

SINCE 1908
wessels company

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Phone: 317-888-9800
Website: westank.com

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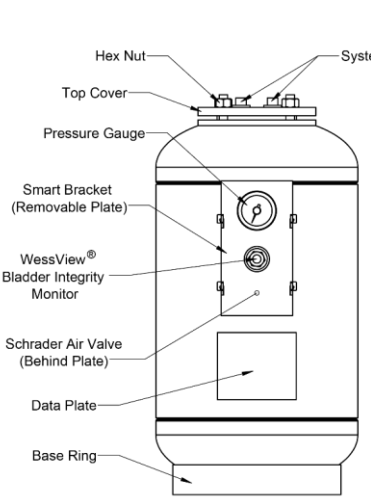
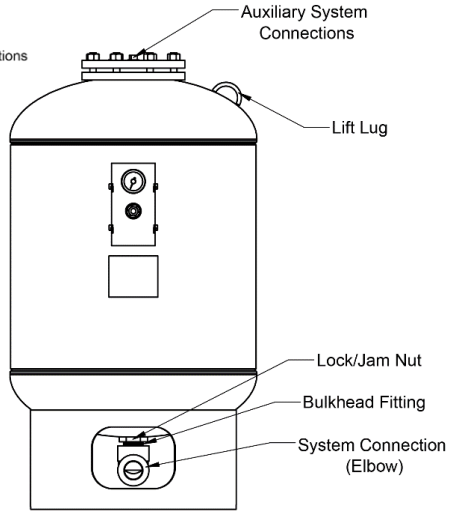
WARNING: Carefully read the handling and storage requirements to avoid serious personal injury and/or damage to property and to ensure safe use and proper care of this product.

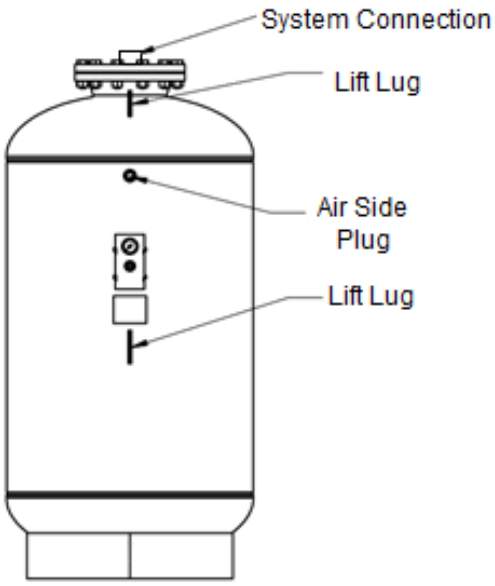
SECTION 1: Parts and Accessories



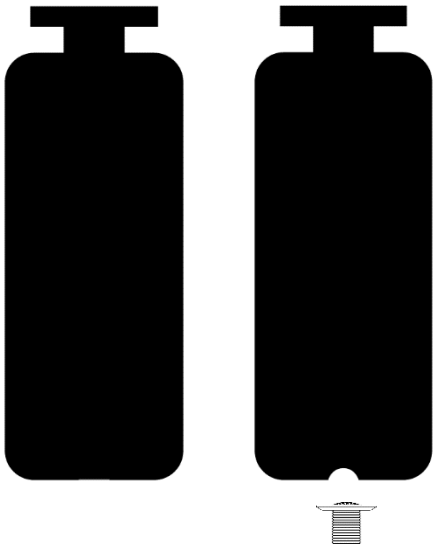
NLA-35 and 50



NLA-85 thru 800L

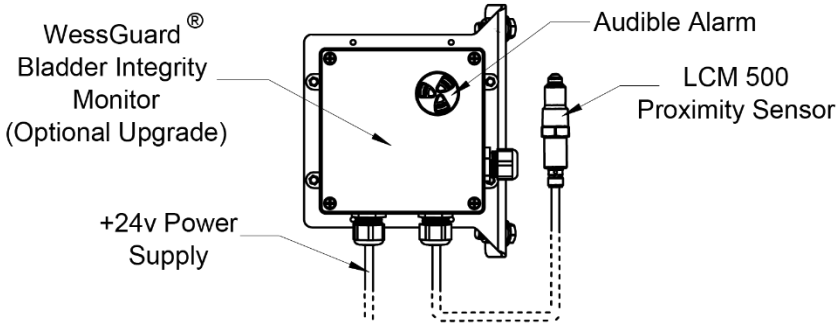


NLA-1000 and up



Bladder

Bladder with
Bulkhead Fitting



System Application	Factory Pre-charge	Maximum Pressure
HVAC Heat/Cool	40 PSIG	125 PSIG

SECTION 2: Inspecting the Tank

Wessels ASME tanks are rigidly constructed and designed to be easily handled by the end user. Upon receiving product, a visual inspection should be performed, as damage may have occurred during transit.

SECTION 3: Handling and Storage

All tanks should be moved using the lift lugs welded to the unit (if equipped). Lifting the tank by clipping an eye hook into the lift lugs is the safest and most effective way to move the unit. Note that not all lift lugs are placed at the center of gravity, the unit may shift once lift off the ground. Ensure that the weight of the unit does not exceed the rating of the rigging equipment.

WARNING: Bladder tanks are shipped from the factory with an air pre-charge. Damaging these tanks can be extremely dangerous.

Outdoor Storage:

- Cover all units with a tarp to protect from the elements.
- Do not store in potential flood plain.
- Cover all openings on the units to prevent foreign matter from entering the unit.
- Place in a safe location, away from heavy traffic.
- Bladder tanks are under pressure during shipment. Damaging these tanks could be extremely dangerous.

Indoor Storage:

- Cover all openings on the units to prevent foreign matter from entering the unit.
- Unit should be stored in a dry environment, away from any potential sources of moisture.
- Place in a safe location, away from heavy traffic.
- Bladder tanks are under pressure during shipment. Damaging these tanks could be extremely dangerous.

SECTION 4: Operation

- A bladder pressure tank contains pressurized air and water, separated by a flexible bladder that holds the water. These tanks are typically pre-charged with air at the factory. As water pressure changes, the volume of air in a bladder tank contracts and expands. Periodically, the amount of air in the tank should be measured and the tank recharged if the air is too low.

- A properly sized bladder tank's water storage capacity, or drawdown, for a typical HVAC system will be typically 30-40% of the tank's total volume. This volume performs several important functions:
    - It maintains the desired range of water pressure in the HVAC system.
    - It provides the hydraulic HVAC system "ground" by establishing the point-of-no-pressure-change due to the pump operation.
    - Reduces water pressure transients allowing for careful balancing of fluid flows to system piping mains, sub-mains, and branches.

SECTION 5: System Hydrostatic Testing and Tank Isolation - ⚠ WARNING

During HVAC system installation, piping is commonly joined by welding, soldering, or mechanical fittings and subsequently subjected to hydrostatic pressure testing to verify system integrity. Hydrostatic testing is typically performed at pressures significantly higher than normal operating conditions. If leaks are identified, system pressure is reduced, repairs are made, and the system is re-tested until satisfactory results are achieved.

Bladder and diaphragm expansion tanks must be fully isolated from the piping system during all hydrostatic testing. Failure to isolate the tank may result in excessive fluid entering the bladder or diaphragm assembly, causing abnormal loading, material overstress, and permanent damage.

Damage resulting from improper hydrostatic testing procedures is not a manufacturing defect and may void the manufacturer's warranty.

⚠ WARNING — Excessive Acceptance During Hydrostatic Testing

Expansion tanks are pre-pressurized to the system's required design fill pressure (for example, 20 psig). When hydrostatic testing is conducted at elevated pressures, such as 100 psig or 150 psig, the increased differential pressure can force excessive water volume into the bladder or diaphragm. For example, a system hydrotested to 100 psig may backfill approximately 70 percent of the tank's total volume, while testing at 150 psig may backfill approximately 79 percent of the tank's volume.

Although Wessels bladder tanks are designed for 100 percent acceptance capability, excessive water weight during hydrostatic testing can impose abnormal tensile loading on the upper bladder material, potentially stretching and weakening this area over time. Wessels diaphragm tanks, while offering among the highest acceptance levels in the industry, are engineered as partial-acceptance tanks. Exceeding the maximum rated acceptance during testing may stretch the diaphragm beyond its designed operating range, increasing the risk of premature failure.

Proper isolation of expansion tanks during hydrostatic testing is mandatory to prevent damage and ensure long-term system reliability.

SECTION 6: Preventative Maintenance

The bladder tank should be checked periodically (at least once per year) to ensure the pre-charge pressure is properly maintained. Changes in pre-charge pressure can significantly alter the tanks performance and reduce the life expectancy of the bladder. If it appears that a bladder tank is not operating correctly, check the tank's air pre-charge:

1. Isolate tank from the system – close ball valve.
2. Drain the water from the tank bladder. Drain between tank and isolation ball valve.
3. Check the tank's pressure on the gauge included in the smart bracket system.
4. Add air if the pressure is below system minimum pressure as dictated by the system pressure reducing valve. Use caution when using an air compressor or air pump and follow compressor manufacturer's safety warnings. As air is added, note the discharge from the open drain:
    a. If water, continue adding pressure as needed to fully evacuate the water from the tank. Re-check the pre-charge pressure and adjust to required minimum pressure.
    b. If air, there is a tear or hole in the bladder. The bladder will need to be replaced.

5. Release air if the pressure is equal to or above the minimum required system pressure (as set by the system pressure reducing valve).
6. Check for leaks in the air charging system by spraying a soap solution on the air charging valve. Check for any air leaks from any NPT threaded connections.
7. Open isolation valve to the system.

SECTION 7: Is the Tank Waterlogged?

You should also check a bladder tank to determine if it's waterlogged. A tank is waterlogged if it is completely filled with water or has too much water to function correctly. Waterlogged bladder pressure tanks contribute to the following problems:

- High pressures causing pressure relief valves to operate
- Wild pressure swings during boiler/chiller operation.
- Premature tank failure: The inside walls of a waterlogged tank can corrode and weaken from the exposure to water.

Reasons for Waterlogging

Bladder tanks can become waterlogged for many reasons. Some of the more common reasons are:

- Sediment, such as iron and manganese, can coat the surface of the bladder, causing it to harden and become less flexible.
- Sediments can plug the fill or draw line, preventing the tank from filling and emptying normally.
- Excessive levels of certain chemicals can damage the bladder, causing it to become brittle and less flexible.
- Tanks sitting directly on the ground or on another surface that is continually moist can rust and lose structural integrity.

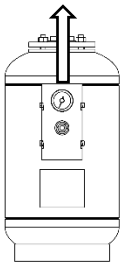
SECTION 8: Replacing the Bladder

The life expectancy of the bladder is designed to exceed 50,000 thermal cycles of the boiler or chiller. Some factors, such as incorrect pre-charge setting or damage from debris, can lead to a premature breach of the bladder's integrity and require a changeout. If the WessView® integrity monitor shows red, the bladder may need to be replaced (see Section 8). This manual is a guide to properly replace the bladder and reset the tank to operating condition.

WARNING: Remove air from the tank. Failure to remove air may lead to serious injury or death.

Models NLA-35 thru 800L (See Page 8 for NLA-1000 and up)

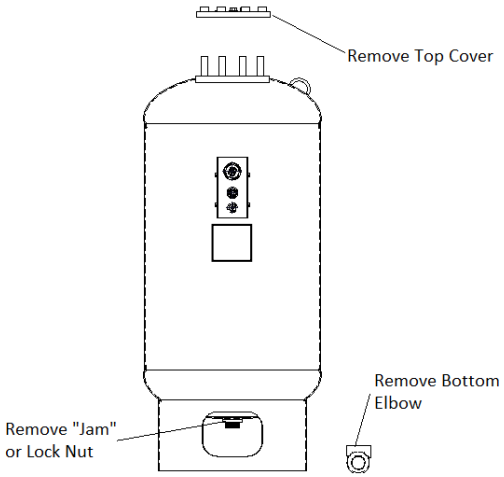
1. Slide the smart bracket removable plate up and off to access the Schrader air charge. Using an air valve core tool, remove the valve core. If a valve core tool is not available, **USE CAUTION** to remove the entire charge valve from the tank to release air.



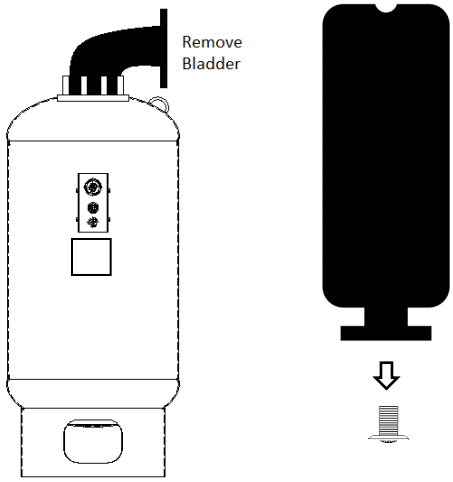
2. Remove all nuts and bolts from the top cover. Carefully lift the plate and set aside.

3. Remove all water from the tank. The water may be on both sides of the bladder, which may require pumping water out through the top after the top cover is removed. The tank can be placed on its side to aid in draining all the water.

4. Remove the elbow and jam nut from the bottom system connection (NLA-85 thru NLA-800L). Push the bulkhead fitting into the bladder, and the bottom bladder collar into the tank.

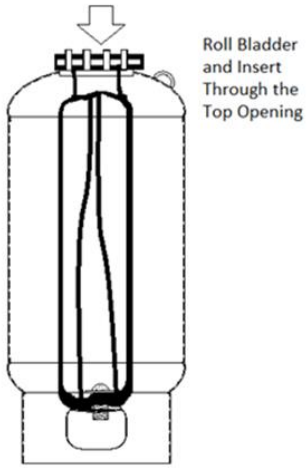


5. Remove the old bladder by pulling it out of the top hole. Remove the bulkhead fitting from inside the bladder and set aside to be used in the new bladder.



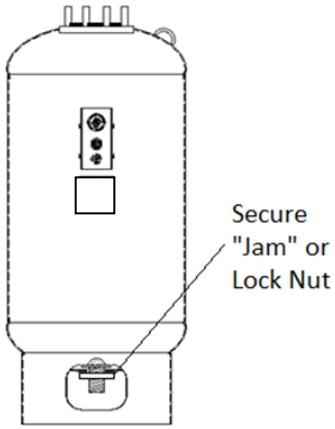
6. Carefully inspect the inside of the tank, as well as the new bladder. Drop the bulkhead fitting into the new bladder and work the threads through the bottom bladder hole.

7. Roll the new bladder lengthwise into a double tube shape. Tape can be used to keep the bladder in this shape. Insert the new bladder into the top of the tank. Ensure that the bulkhead fitting is through the system connection hole at the bottom of the tank. If tape was used on the bladder, remove it as the bladder is being inserted.

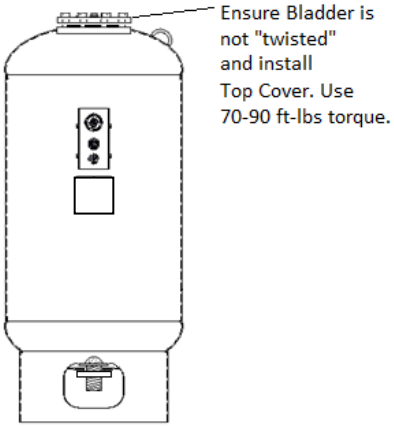


8. Secure jam nut with a pipe wrench to approximately hand tight + ¾ turn. Wrap bulkhead fitting with Teflon tape, and apply sealant. Attach the elbow to the bulkhead fitting.

9. From the top opening, make sure the bladder is not twisted inside the tank. The collar of the bladder should be resting outside of the tank. Re-attach top cover on to the tank and make an airtight seal by screwing the bolts in a crisscross pattern.

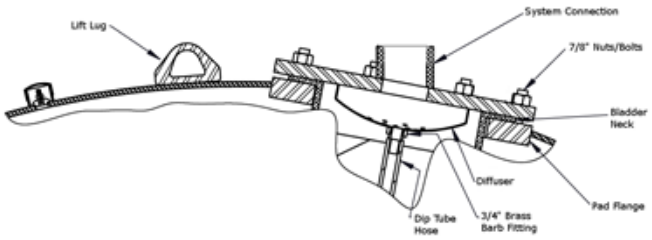


10. Screw on the valve core and use dry air or nitrogen to charge the tank to the required pre-charge pressure. Slide plate back on to smart bracket. Use a rubber mallet if needed to completely slide plate.

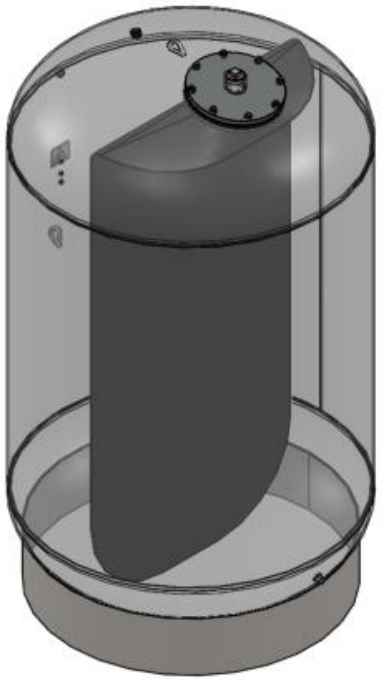


Models NLA-1000 thru 150000

1. BLADDER REMOVAL - Tank Preparation
   - Remove any air from the air charge valve
   - Remove bottom drain to evacuate water that escaped to the tank air side
   - Remove tank top cover
     - Attached to cover is diffuser, ¾" brass barb fitting, and dip tube hose
     - Inspect all components for integrity for reuse
   - Remove water inside bladder with sump or other means
   - Remove bladder and inspect for potential failure mode
   - Lay tank on its side if possible



2. INSPECT INTERIOR
   - Use strong trouble light to verify
   - No sharp or rough edges
   - No weld pinholes on openings or seams
   - No dirt or foreign debris (remove if found)

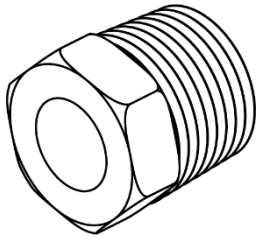


3. BLADDER INSTALLATION
   - Check replacement bladder for defects
   - Lay bladder with collar neck facing floor
   - Roll bladder from both sides
   - Top Flange
   - Insert bladder
   - Push in until collar is against weld neck
   - Fold both collar ends (bladder reinforced area) into flange
   - Use rubber mallet if needed until collar is flush with flange
   - Make sure dip tube hose is securely fastened to brass fitting
   - Feed dip tube hose into bladder (open bladder if necessary)
   - Bolt on and tighten down top flange (70-80 ft-lb torque)
   - Apply thread tape and sealant to 1" sq. hd. plug and
   - reattach to tank drain

4. PRE-CHARGE
   - Pre-charge to required system pressure – equals the minimum system pressure created by the system pressure reducing valve. If unknown, set pressure to 10 psi plus height of all piping above the tank, multiplied by 0.433
   - Test for leaks at bottom drain, top 1" NPT air-side connection and top cover using soapy water
   - Slide plate back on to smart bracket. Use a rubber mallet if needed to completely slide plate.

WARNING: Without dip tube, the bladder will rupture during air charging.

SECTION 9: Troubleshoot WessView® Bladder Integrity Monitor



The WessView® bladder integrity monitor is a specially designed sight glass adaptation that turns red when it contacts moisture. This usually means water has escaped or breached the internal tank bladder.

Is your WessView® red? You may need to replace your bladder and WessView® bladder monitor.

WARNING: Release air pressure from the tank before replacing WessView®. Failure to remove air may lead to serious injury or death.

1. Slide the smart bracket removable plate up and off and depress air valve. If water sprays from the air valve, you likely have a ruptured bladder and will need to replace. See page 6 for instructions on how to replace a bladder.

   If no water comes out, pre-charge your tank. If the pre-charge holds, your tank bladder is operating correctly. Contact your contractor for a WessView® bladder monitor replacement. If water sprays from the air valve, move on to step 2.

WARNING: WessView® can be triggered by highly humid or moist air. When pre-charging, make sure to use dry air or nitrogen.

2. If water sprays from air charge valve, isolate tank and drain of all water.

3. Pre-charge tank with dry air or nitrogen to the required setting, which is usually the same as the line pressure in the supply line.

4. Observe if air comes out from the water supply connection. If air is leaking, then the tank may be faulty and may require repair or replacement. If pre-charge holds and the air side of the tank is empty of water, please contact your contractor to request a WessView® replacement.

   Visit westank.com/wessview for more information.

SECTION 10: Warranty

MINIMUM ORDER: $50 net shipped to one location are eligible for warranty protection.
PRICES: Prices and terms are subject to change without notice. Expedite fees may be applicable – Consult factory TAXES: Applicable taxes apply separately.

FREIGHT TERMS: All orders are F.O.B. Factory.

PAYMENT TERMS: Terms are Net 30 Days to pre-approved accounts. New accounts must be pre-paid or by credit card until credit is approved. Any accounts over 45 days past due will be placed on credit hold until account is current.

CREDIT APPROVAL: Purchases are subject to credit investigation and approval.

LIMITED WARRANTY: Wessels Co. warrants that its products are of the kind and quality quoted and warrants these products to be free of defective material and/or workmanship only. This warranty is not applicable to operational failures, gasket leaks or malfunctions caused by improper application, installation and/or maintenance. Warranty not applicable if electrolysis condition or abnormal water condition exists. Anode inspection of glass lined storage tanks is required every 6 months. Wessels Co. requires paid receipts to show maintenance of anodes on glass lined tank claims. Any claim for adjustment under this Limited Warranty must be made within the Warranty period (see below). Wessels Co. shall replace or repair at its option, all parts which upon examination by Wessels Co. prove to be defective material and/or workmanship within the above Limited Warranty. If required by Wessels Co., parts that are claimed defective must be promptly delivered to the Wessels Co. manufacturing facility, transportation charges prepaid. Wessels Co. will not however, accept any claims for labor costs incurred by the user in removing or reinstalling a product and/or part thereof. This warranty does not apply if the defect is due to failure to use the product for its intended purpose, the result of an accident, abuse, misuse or unauthorized alteration, or because the product was not installed and maintained in accordance with standard plumbing practices. However, any and all costs required to ship, disassemble, remove, reassemble, reinstall a bladder and/or tank, shall not be borne by the Wessels Co. and IS NOT COVERED under this warranty. IN NO EVENT SHALL WESSELS CO. BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Any implied warranties which the user may have including merchantability and fitness for a particular purpose, shall not extend beyond the period (see below) from date of manufacture of any product. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

WARRANTY PERIODS: 1 YEAR FROM DATE OF SHIPMENT: All Wessels Co. products (except N-style, T-style and glass-lined storage tanks) when used on applications for which they are intended. 5 YEARS FROM DATE OF SHIPMENT: Non-code T-style Thermal Expansion Tanks, non-code N-style expansion tanks, Glass-lined Storage Tanks for potable water without coils, heating devices or burners and temperatures not exceeding 180 degrees Fahrenheit.

WARRANTY RETURN: A return authorization number is required on all material returned for warranty. All freight charges are the responsibility of the shipper.

PRODUCT RETURN: A return authorization number is required on all material returned. A 25% re-stocking charge will apply (minimum of $50 restocking charge).

PRODUCT CHANGES: We reserve the right to change or modify product design or construction without prior notice and without incurring any obligation to make such changes and modifications of products previously or subsequently sold.

For questions about installation or maintenance of your tank or to order a new bladder call Wessels Company at (317) 888-9800 or visit us at www.Westank.com.