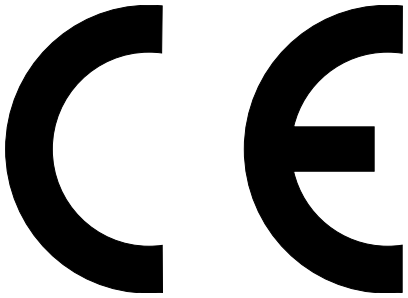
Regulatory Compliance Manual



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NOTICE

This manual provides warnings and procedures that are intended to inform the owner and/or operator of the hazards present when using the Liquid Controls Meter on LP-Gas and other products. The reading of these warnings and the avoidance of such hazards is strictly in the hands of the owner-operators of the equipment. Neglect of that responsibility is not within the control of the manufacturer.

Publication Updates and Translations

The most current English versions of all Liquid Controls publications are available on our website, **www.lcmeter.com**. It is the responsibility of the Local Distributor to provide the most current version of LC Manuals, Instructions, and Specification Sheets in the required language of the country, or the language of the end user to which the products are shipping. If there are questions about the language of any LC Manuals, Instructions, or Specification Sheets, please contact your Local Distributor.

Introduction

This manual provides details of some of the standard regulatory approvals carried on Liquid Controls products. There are many other approvals that may be applicable to a specific installation or product type. The owner must ensure that the system into which the product is installed complies with all applicable local regulations.

This manual is designed to accompany the manuals supplied with the Liquid Controls components ordered. Any information relating to ATEX or PED requirements not found in the accompanying manuals will be found in this manual.

Only trained personnel should install, operate, and maintain Liquid Controls meters, registers, and accessories.

System Information

This manual provides warnings and procedures that are intended to inform the owner and operator of potential hazards present when using a Liquid Controls meter and its accessories. The reading of these warnings and the avoidance of these hazards is strictly the responsibility of the owner and operator of this equipment. Neglect of this responsibility is not within the control of the manufacturer of the meter and its accessories.

The system into which these components are installed must have a safe means of:

- filling
- discharging
- draining
- relieving pressure
- shutting down in an emergency
- protection in the event of an external fire

System Considerations

Liquid Controls components are considered pressure accessories only. They are not suitable for preventing system damage or failure. They have not been protected against external or internal damage from system or environmental factors such as:

- over-pressurization (pumps size, thermal expansion, blocked discharge, etc.)
- hydraulic shock
- excessive vibration
- closed valves
- overheating
- extreme cold
- excessive flow
- excessive low flow
- pressure surges, pulsations
- lightning
- seismic load
- fire/explosion-engulfment
- snow/ice loads

It is essential that the designer of the system evaluate the system for these types of concerns and any other applicable concerns in design and protection by means such as pressure relief valves, burst discs, safety valves, shelters, grounding, fusing, material compatibility, etc., as required.

It is also the responsibility of the system owner to make sure any personnel working on or around the equipment have been properly trained on all applicable concerns.

Liquid Controls components are designed to bolt to a platform or support. Never hang any components on the connecting piping or hang any external loads on any LC component. Ensure that all connections are metallurgically compatible and compatible with the environment in which it will be utilized.

In addition, Liquid Controls components rely on internal spacing tolerances which can degrade or fail from erosion, abrasion, or fouling. As such, it is important to evaluate the system and take measures to prevent this from happening. Proper filtration is recommended to assist in achieving this.

The meter and accessories must remain **full of product** at all times. This will ensure the meter and accessories will have a longer service life. An easy way to accomplish this is to put the meter and accessories in the line below the piping center-line. The meter and accessories should be installed in a bypass loop below the center-line with block valves upstream and down stream.

NOTE: Any portion of the pipe system that might isolate or block flow must be provided with pressure relief to prevent damage from thermal expansion or over-pressurization.

Upstream lines must remain full to prevent air from entering the LC components. If upstream or inlet lines are constructed in a manner which allows reverse flow, foot valves, or back checks must be installed.

SYSTEM INFORMATION

It is not possible to detail or warn against every possible scenario or event. It is the owner's responsibility to understand the fluids and systems into which Liquid Controls products will be installed. Personnel should be fully trained and be adequately warned and protected against inherent hazards of the system. They should have:

- access to current MSDS sheets
- access to appropriate protection equipment
- access to appropriate tools
- knowledge of location and proper use of safety equipment such as fire extinguishers
- knowledge of safety procedures such as evacuation routes

Liquid Controls meters and accessories are often used with petroleum, LPG, and other liquids which may be explosive, extremely flammable, highly flammable, flammable, very toxic, toxic, oxidizing, harmful, or corrosive. Extreme situations may arise leading to severe injury or fatality if appropriate safety precautions are not followed.

Consult with your local fire department and state and local regulations to make sure that you are adequately prepared for the level of hazard present. This may require special tools such as non-sparking screwdrivers, wrenches, etc., or restriction of power equipment.

Make sure that all necessary safety precautions have been taken. Provide for proper ventilation, temperature control, fire prevention, evacuation, and fire management.

Read this manual as well as all the literature provided in your owner's packet.

Contact Liquid Controls for technical guidance in case of extraordinary service conditions.

Contact Liquid Controls for technical guidance in case of non-standard functions and characteristics of the products being required for service.

LC components are metallurgically designed to be physically compatible with a given type of liquid. For information on fluid and component compatibility, refer to Liquid Controls Publication 400-11.

A meter should not be used with a liquid different from the one specified. This could cause O-Rings, gaskets, and seals to degrade and result in leaks. It is the end user's responsibility to evaluate the suitability of the liquid with regard to safety of personnel, safety of compression, material compatibility, weight and density consideration, venting, draining, and disposal.

It is critical to select the right Liquid Controls product for the fluid and system into which the products will be installed. Contact Liquid Controls for technical guidance:

- for extraordinary service conditions.
- in case of non-standard functions and characteristics of the products being required for service.

INSTALLATION

Unpacking

1. The overall weight is marked on the outside of each box. Boxes and components inside the boxes should be handled with appropriate lifting methods for the weight involved.
2. Most products are tested with solvent (unless products are ordered for food grade applications which are tested with water). This solvent is drained from the products, but may be present in residual quantities. Two pages of a sample MSDS are shown on Pages 16-17. Appropriate precautions with regard to safety of personnel, environment and material compatibility with the end-use system should be considered.
3. If you receive a cardboard carton, be careful removing staples. They can be very sharp.
4. If you receive a larger product bolted to a pallet, be careful when unbolting it. The product may tip over without restraining bolts.

NOTE: LC wood packaging is manufactured in Canada in accordance with the Government Certification Program. These products carry the international “bug” certification symbol stamp along with the suppliers CA 00009 KD HT approval number. The softwood used in the manufacture of LC’s packaging is kiln dried to temperatures that ensure that the core temperature of the lumber reaches a minimum of 56 degrees Celsius for at least 30 minutes. No pressure treated wood is used. All packaging complies with the regulations in Council Directive 94/62/EC Packaging and Packaging Waste and may be disposed of accordingly.

5. If you receive a number of smaller parts packed in foam in a carton, be careful to identify and keep all parts. The foam is sealed within bags and can not be mixed with the parts.
6. Do not lift products by any of the following:
   a. Thermowells
   b. Electrical junction boxes or wiring
   c. Interconnecting hoses or copper tubing

Installation Considerations

To ensure proper meter and accessory installation, adhere to the following:

1. Flush the entire piping system prior to component installation to rid the system of all debris. Use a liquid compatible with the construction of the LC components. Water is acceptable if the system is blown dry.
2. Protective thread caps are placed in all meter and accessory openings prior to shipment. These are to remain in place until attachment to piping is to occur.
3. Keep all external surfaces of the meter and accessories clean.
4. Position the LC components with service in mind. Provide ample work space. Supply a platform or support for LC components mounting.
5. Securely bolt the LC components to a platform or support. Never hang LC components on the connecting piping or hang any external loads on any LC components.
6. Apply appropriate pipe compound to male threads only.
7. Install the LC components in conformance with all applicable federal, state, local, construction, electrical, and safety codes.
8. Do not weld to the product or adapt the product in any way.
9. Class 10 Meters for LPG must be installed in accordance with the requirements of ANSI-NFPA 58 in addition to all other state and local codes.
10. Do not expose any portion of the system to pressures in excess of rated working pressures without an automatic safety valve to vent the overpressure discharge to a place of safety away from the operator and other people. It is the installer’s responsibility to provide for venting safety and the hardware required to do so.
11. Do not expose the LC components to excessive vibration. This can cause the connections to weaken and leak.
12. Locate the system in a place that is protected against vehicle impact or heavy tool contact.

Drawings

Drawings and photographs are included in the Installation & Parts Manuals for all products.

Putting Into Service

Prior to system start-up, ensure that:

1. The system components are properly secured
2. All connections are tight
3. All valves are in the closed position

Placing into operation:

The system must be filled slowly with liquid and be free of air and debris prior to start-up. The system may be filled by gravity or by the use of a pump.

Check to determine that all fittings and flanges are tight and liquid lines are closed.

1. Open the vapor line between the LC components and the supply tank.
2. Using vapor pressure only, check each joint with a liquid soap solution to inspect for leaks.
3. When all joints have been checked and no leaks found, admit liquid slowly to avoid operation on vapor at speeds greater than the minimum indicated on the serial number plate and to ensure that cavities do not contain vapor which can be compressed.

NOTE: Proper slow filling can be accomplished by throttling the system with a valve at the LC components outlet or by allowing the system to fill by gravity.

4. With the valve open between the supply tank and the LC components, slowly open the valve located down stream of the LC components until the meter's register begins to move, indicating there is fluid moving through the LC components.

NOTE: Do not run the meter faster than 25% of the rated flow during start-up.

5. Once the product is flowing out of the end of the system, the valve can be opened to a flow rate which does not exceed the maximum for which the meter is rated.

Refer to the manuals shipped with the LC components for information specific to your component models.

USE

LC components are metallurgically designed to be physically compatible with a given type of liquid. For information on fluid and component compatibility, refer to Liquid Controls Publication 400-11. A meter should not be used with a liquid different from the one specified. This could cause O-Rings and seals to deteriorate and result in leaks. It is the end user's responsibility to evaluate the suitability of the liquid with regard to safety of personnel, safety of compression, material compatibility, weight and density consideration, venting, draining, and disposal.

Liquid Controls components are considered pressure accessories only. They are not suitable for preventing system damage or failure. They have not been protected against external or internal damage from system or environmental factors such as:

- over-pressurization (pumps size, thermal expansion, blocked discharge, etc.)
- hydraulic shock
- excessive vibration
- closed valves
- overheating
- extreme cold
- excessive flow
- pressure surges, pulsations
- lightning
- seismic load
- fire/explosion-engulfment
- snow/ice loads

Danger Areas (Pressure Relief Valve)

A pressure relief valve is located on the top of the air eliminator on systems which measure LPG or NH_3. This valve is designed to vent off pressure should it exceed 450 PSI (31 BAR).

Under normal conditions, the useful safe service life of a pressure relief valve is 10 years from the original date of manufacture. However, the safe useful life of the valve may be shortened and replacement required in less than 10 years depending on the environment in which the valve operates. Inspection and maintenance of pressure relief valves is very important. Failure to properly inspect and maintain pressure relief valves could result in personal injuries or property damage. The LP-Gas dealer must observe and determine the safe useful life of relief valves in his territory.

Should the pressure meet or exceed the rated pressure of the relief valve and product leaks through the valve, one of two things must occur once the pressure has been adequately reduced:

1. The relief valve is to be replaced.
2. The valve is to be inspected for proper reseating. If it is determined that the valve does not reseat properly and cannot be returned to its normal operation, the relief valve must be replaced.

Internal pressure must be completely removed from the meter and accessories and all fluid drained prior to removal of the pressure relief valve. Failure to do so may result in personal injury.

This valve will require removal and the air eliminator port plugged when performing hydrostatic-testing of the system. Hydrostatic-testing is conducted at 1.5 times the rated pressure of 350 PSI (24.1 BAR) or 525 PSI (36.2 BAR). The valve is rated at 450 PSI (31 BAR) and would vent, preventing proper hydrostatic-testing.

⚠ WARNING

Before disassembly of any meter or accessory component, **ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES.** Pressure must be 0 (zero) psi. Close all liquid and vapor lines between the meter and liquid or gas pressure source.

For **Safety Rules regarding PPG,** refer to **NFPA Pamphlet 58** and local authorities.

Failure to follow this warning could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of product.

In the Event of a Gas Leak

In the event of a large gas leak: Evacuate the area and notify the fire department.

In the event of a small, contained gas leak:

1. Stop the leak and prevent accidental ignition.
2. Prevent the entrance of gas into other portions of the buildings. Some gases, such as LPG, seek lower levels, while other gases seek higher levels.
3. Evacuate all people from the danger zone.
4. See that the gas is dispersed before resuming business and operating motors. If in doubt, notify your local fire department.

In the Event of a Gas Fire

In the event of large fires or fires that are spreading: Evacuate the building and notify your local fire department. Stop the leakage only if you can safely reach the equipment.

In the event of small, contained fires that you can safely control: Stop the leakage if you can safely reach the equipment. Then use the appropriate extinguisher: Class B fire extinguisher, water, fog, etc., depending on the materials. If in doubt, call your local fire department.

MAINTENANCE

Keeping accurate maintenance records can be an excellent tool in determining whether the frequency of inspection/testing is appropriate for a system. There are always hazards associated with maintenance, inspection and testing. As such, the involved personnel must be fully trained, take all necessary precautions, and comply with all local and national legislative requirements and regulations.

The customer, owner, operator or partner (whoever performs or contracts to perform the work) is responsible for the safety of personnel, equipment and the environment before, during and after the maintenance, inspection or testing.

Prevent pipe strain or stress from occurring when making meter or accessory repairs. Pipe strain and stress occurs when the pipes are not supported or are not aligned correctly to the LC components. The weight of the pipes must always be supported independent of the LC components. This means that the meter and accessories can be easily removed without affecting the pipes or the pipe alignment. Never leave any of the pipes hanging.

Check with regulatory agency that governs Weights & Measures in your area. Removing the dust cover seal wire or other maintenance procedures may require Weights & Measures recalibration.

Look for gaps when disassembling a meter. Use a feeler gauge to check for gaps between the bearing plate and housing. If gaps are found, check the bearing plates for flatness with a straight edge. Gaps can be caused by shock problems that must be resolved. Contact your full-service distributor for assistance if this occurs.

Examine all fasteners to make sure they are not bent, rusted, or have pulled threads. The threads should all appear evenly placed. If the bolts are bent, check the housing and cover for flatness. Use a straight edge to determine flatness. Repair pulled threads with threaded insert fasteners. These can be used in many instances.

Coat threads with anti-seize when replacing fasteners.

Torque all fasteners such as screws and bolts in accordance with specifications listed in the Torque Chart in the Installation and Operation Manual for the component in question.

Do not mar or scratch any of the precision machined surfaces by prying or sanding parts.

Stone the machined surfaces when reassembling the meter to assure that the machined surfaces are free of burrs and mars.

When removing flanges with gaskets, carefully scrape off the flange gaskets. Make sure that the flange surface has been scraped clean. Discard the old flange gasket and install a new flange gasket. Never reuse old flange gaskets.

When removing any connections with O-Rings, carefully check for damage. Cracked, rough, or worn O-Rings should be replaced. A more serious problem of hydraulic shock may be indicated if the O-Rings look nibbled. Hydraulic shock problems must be verified and resolved.

Use a straight edge to check bearing plates for flatness. Warped bearing plates can be caused by hydraulic shock.

If the LC components are used for seasonal work, the LC components should be removed from the system and thoroughly flushed with a compatible liquid at the end of each season. This requires removing the drain on the front and rear covers and flushing the product from the front and rear covers. If flushing with water is preferred, extra care should be taken to drain the LC components completely and dry all internal parts after flushing with water. Immediately refill the LC components with a compatible liquid (or oil misting) to prevent corrosion as well as ice damage to parts from moisture that may have been overlooked after flushing and drying.

In service inspection and testing of the meter and accessories is required. Recommended levels of maintenance and inspection will vary depending on the fluids being metered. General inspection should be conducted annually at a minimum. This inspection should include a evaluation of the integrity of all pressure containing and safety related components and seals as well as the component mounting and integrity of the piping. In addition, hydrostatic testing must be conducted at least once every 5 years at 1.5 times the pressure marked.

In-service inspection shall not harm or negatively influence the operation of Liquid Controls products. Where the hydrostatic pressure test is harmful or impractical, other tests of a recognized value may be carried out.

For tests other than the hydrostatic pressure test, such as pneumatic testing, additional test and safety measures, such as non-destructive tests or other methods of equivalent validity, must be applied before those tests are carried out. If using a fluid other than water for the hydrostatic-test, it is the end user's responsibility to evaluate the suitability of the liquid with regard to safety of personnel, safety of compression, material compatibility, weight and density consideration, venting, draining, and disposal.

Even with water, the material compatibility should be considered with all parts in the system as well as with the final product.

Adjustments

Refer to the product Installation & Operation Manual for instructions on proper adjustments.

Modifications

Only parts provided by or authorized by Liquid Controls should be used to ensure quality and life of the LC components.

Weldments and castings are designed to the requirements in the ASME Boiler and Pressure Vessel Code with safety factors of 4 (standard products) and 5 (LPG products) respectively. Current design requirements include a minimum of 1/16" corrosion allowance with welded joint coefficients taken from ASME Section VIII as applicable.

Do not weld to any part of the assembly, except to a Liquid Controls provided weld flange.

SAFETY MARKINGS

THE FOLLOWING PRODUCT SAFETY MARKINGS MIGHT BE PRESENT INDIVIDUALLY OR IN COMBINATION

CE

This equipment complies with all applicable directives. The CE mark is followed by the registration numbers of the Notified Bodies, if applicable, which performed the Quality Assurance Notification pursuant to applicable Directives. Declaration of Conformity lists the Notified Bodies and their registration numbers.

The explosive atmospheres symbol under EU Directive 2014/34/EU for Potentially Explosive Atmospheres (ATEX), under which the equipment . . .

II
is found to be suitable for use in surface (not mine) installations

2G
where a high level of protection is provided against flammable gases, vapors, or liquids, which may exist during normal operation.

c
protected by construction per EN13463-5

k
protected by liquid immersion per EN13463-8

T6
Temperature code for ATEX surface temperature limitations. T6 ≤ 85°C

ATEX FILE #
The number of the file that documents ATEX compliance.

Tamb. -40˚ to +70˚C
The ambient temperature at which the meter properly operates

MAX PRESSURE
The maximum working pressure to which the equipment should be subjected on a normal basis

PRODUCT
The intended process fluid

YEAR OF MFG.
Year of manufacturing

c UL US

Listed by UL to both the Canadian and US requirements. Listed product information is placed in the vicinity of the UL mark.

⚠ WARNING

Relieve Internal Pressure

All internal pressure must be relieved to zero pressure before disassembly or inspection of the meter or any of the meter accessories.

Serious injury or death from fire or explosion could result from maintenance of an improperly depressurized and evacuated system.

Liquid Controls meters and accessories are often used with petroleum, LPG, and other liquids which may be explosive, extremely flammable, highly flammable, flammable, very toxic, toxic, oxidizing, harmful, or corrosive. Extreme situations may arise leading to severe injury or fatality if appropriate safety precautions are not followed.

Consult with your local fire department and state and local codes to make sure that you are adequately prepared for the level of hazard present. This may require special tools such as non-sparking screwdrivers, wrenches, etc., or restriction of power equipment.

Make sure that all necessary safety precautions have been taken. Provide for proper ventilation, temperature control, fire prevention, evacuation, and fire management.

Removal of LC Components

- Relieve internal pressure of the system prior to removal or disassembly of the LC components.
- Drain product from the LC components using drain plugs located at the bottom of the meter and accessories, if applicable. Collect the drained liquid in an appropriate container. Do not let the liquid drain on the ground. Refer to the manuals provided with the components for proper draining information. The drained fluid should be handled in accordance with all local, state, and federal guidelines.
- Remove the LC components from the system.

Disposal

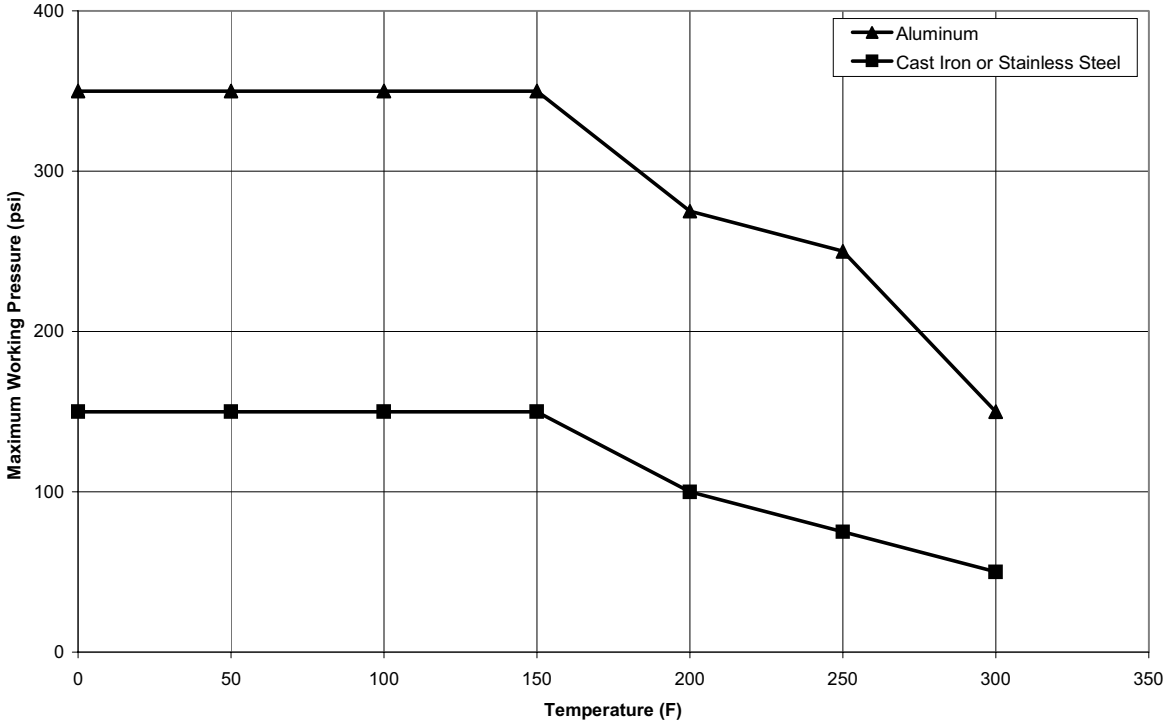
Dispose of any fluid according to the requirements of all state, local, and federal regulations.

Product Ratings with Regard to Temperature and Pressure

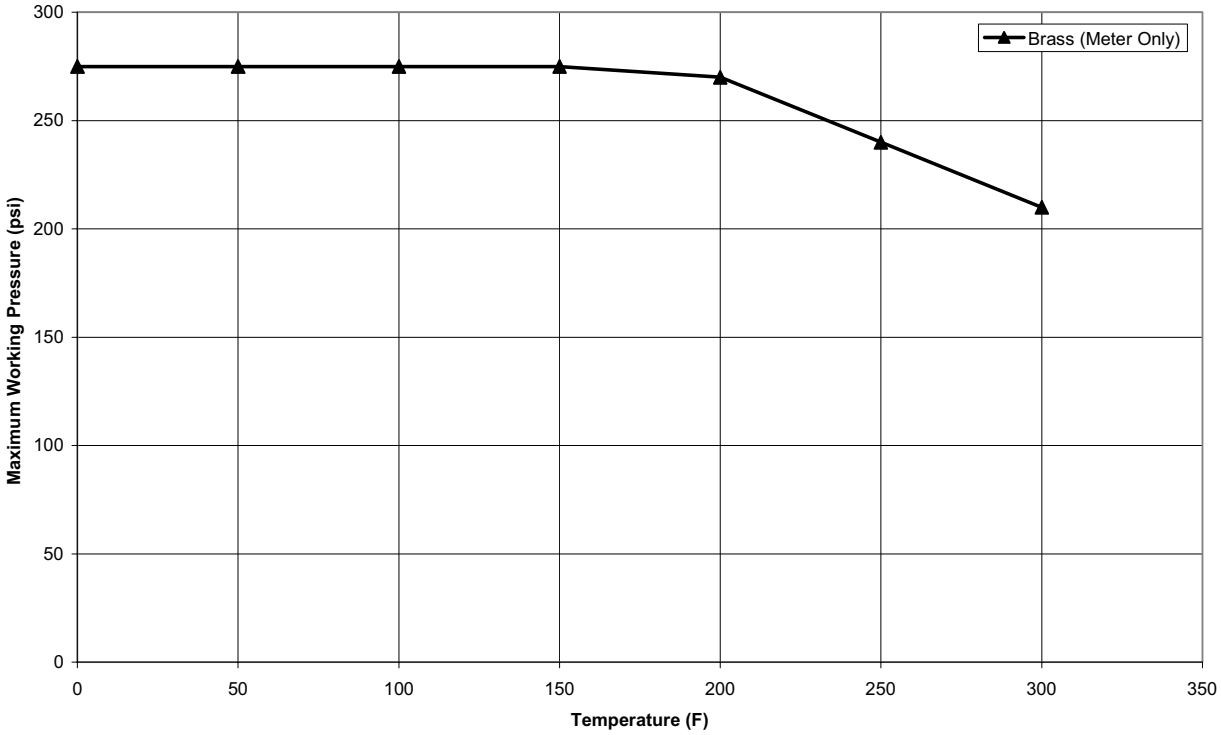
Liquid Controls products have been designed and evaluated to operate within the full range of the ratings on the name plate without derating. For derating information, refer to the charts on the following two pages. If additional information is required, contact Liquid Controls.

PRESSURE/TEMPERATURE CURVES

Pressure vs. Temperature Curves for PD Meters and Accessories



Pressure vs. Temperature Curves for PD Meters and Accessories



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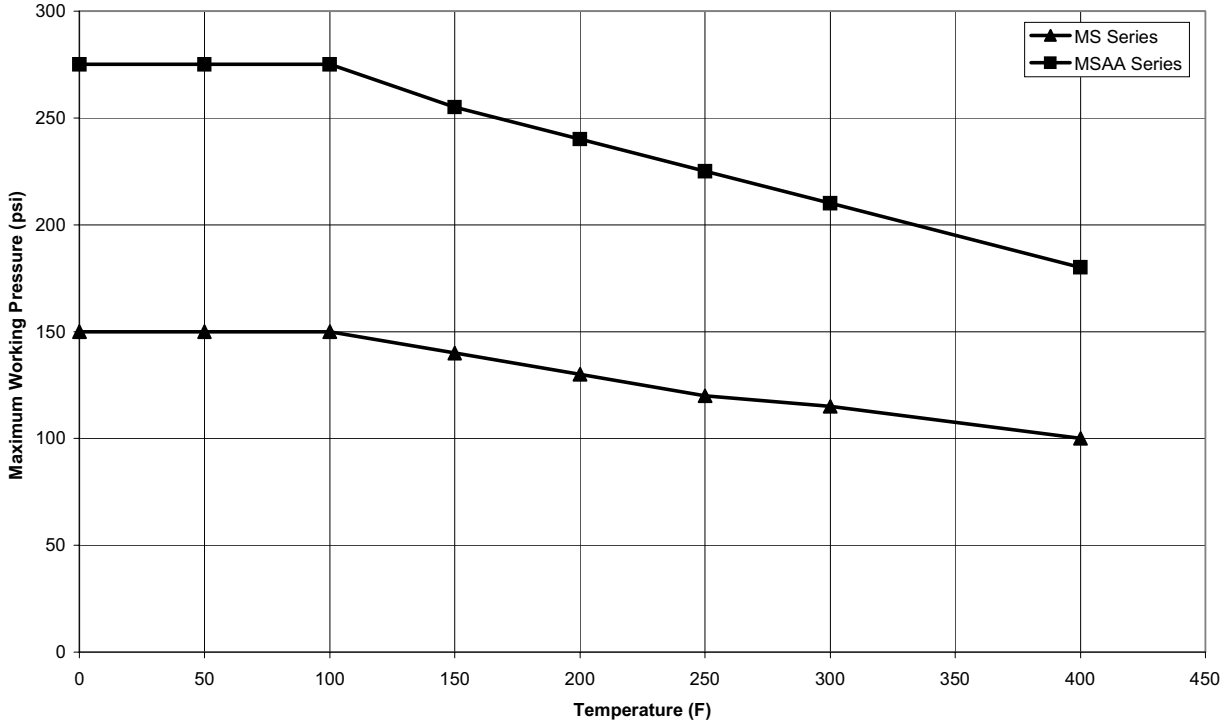

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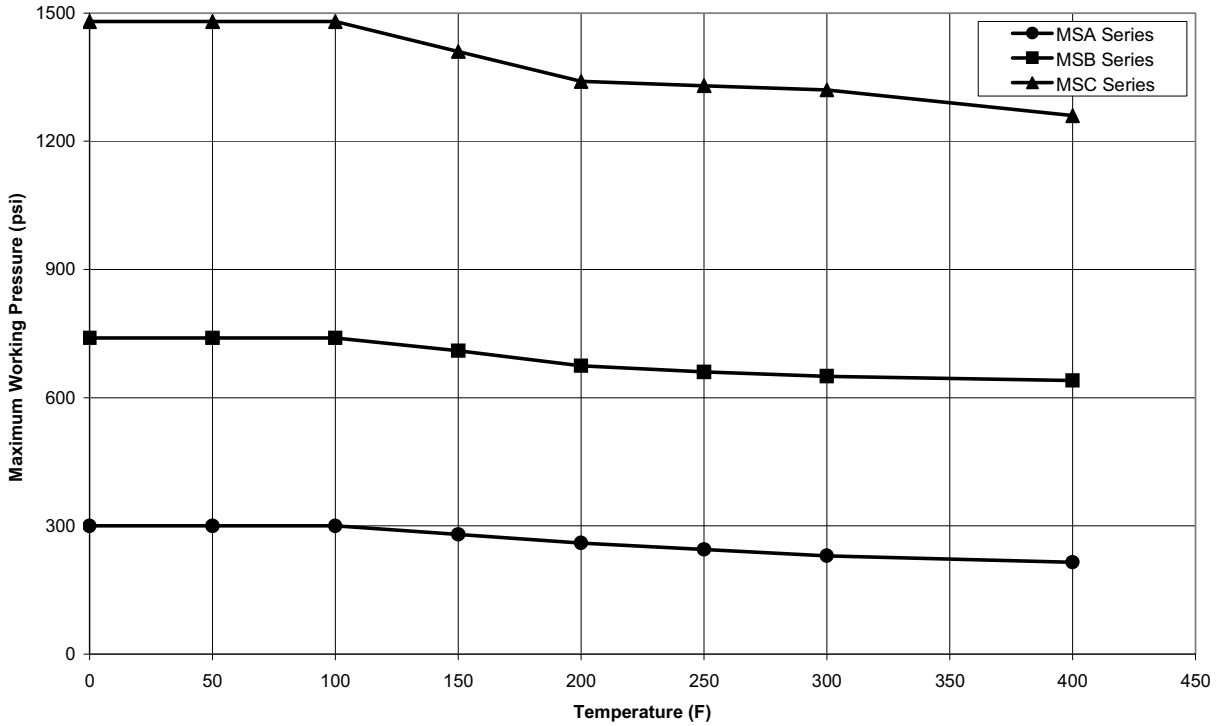

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