

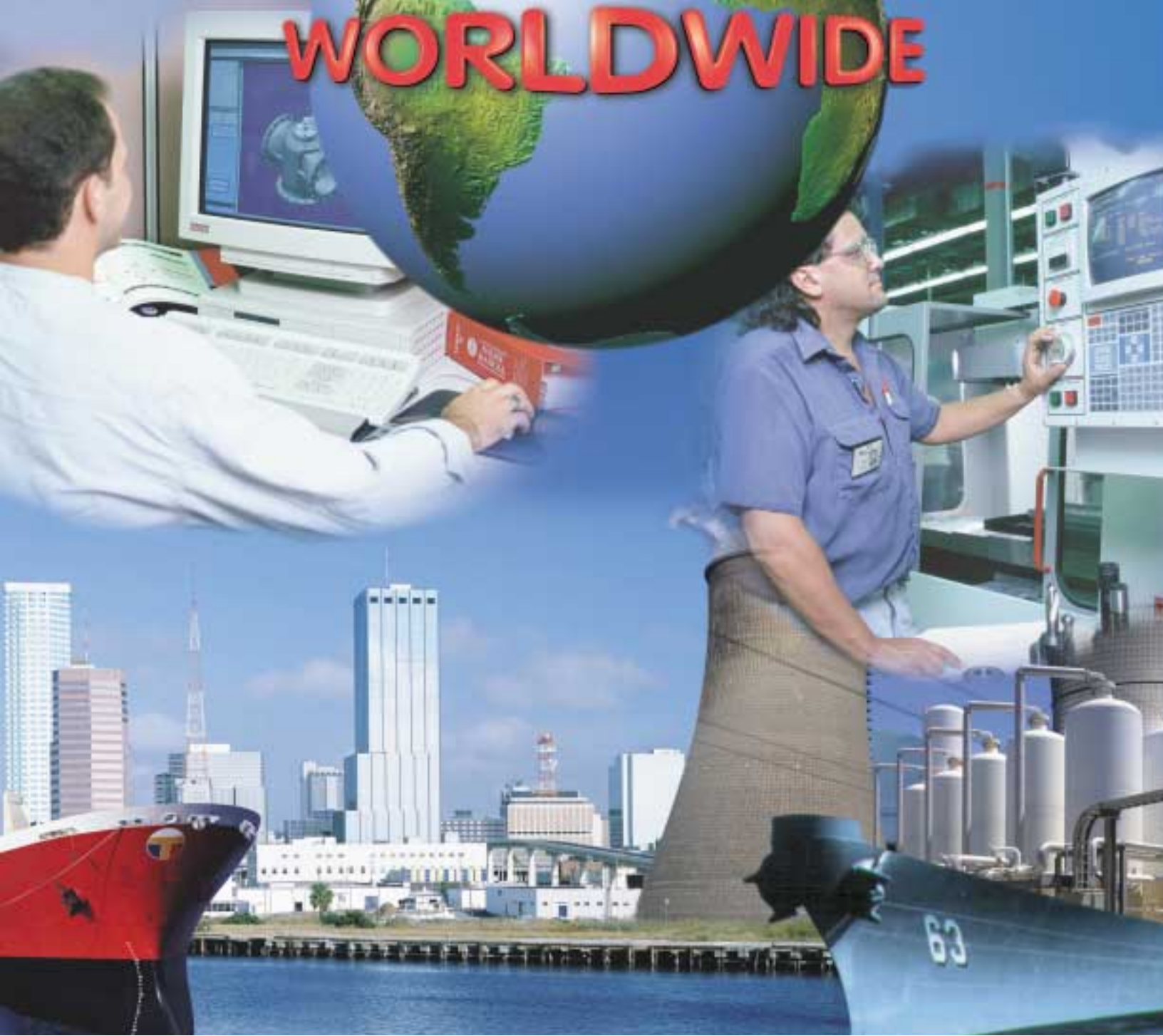


LESLIE
CONTROLS, INC.

A division of **CIRCOR** International, Inc.

CONTROL VALVES
INSTRUMENTATION
REGULATORS
STEAM WATER HEATERS
SERVICE
FABRICATION

Sales and Service
WORLDWIDE



A Century of Superiority in the Handling and Control of Fluids

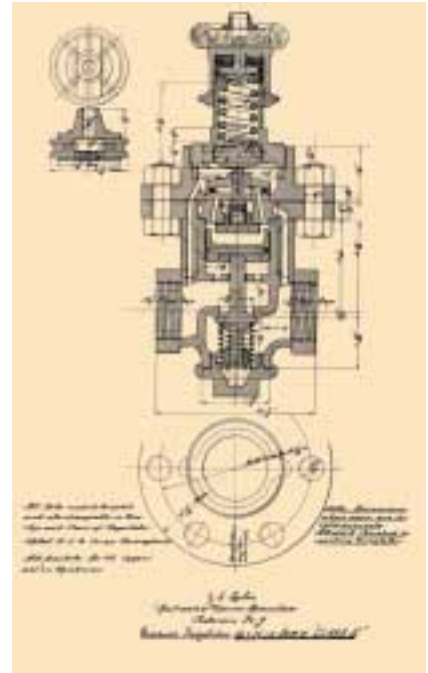
Contents

<i>Quick Delivery Program</i>	<i>3</i>
<i>Linear Control Valves</i>	<i>4-7</i>
<i>Rotary Control Valves</i>	<i>8</i>
<i>3-Way Control Valves</i>	<i>9</i>
<i>On/Off Valves</i>	<i>10</i>
<i>Specialty Products</i>	<i>11</i>
<i>Actuators & Positioners . . .</i>	<i>12</i>
<i>Electro-Pneumatic Controllers</i>	<i>13</i>
<i>Pilot Controllers</i>	<i>14</i>
<i>Pressure Reducing Valves</i>	<i>15-17</i>
<i>Complimentary Products . .</i>	<i>18</i>
<i>Temperature Regulators . .</i>	<i>19</i>
<i>Steam-Water Heaters . .</i>	<i>20-21</i>
<i>Fabrication, Service & Repair</i>	<i>22-23</i>

It has been one hundred years since Canadian born John Leslie advertised his first major product, a steam powered snowplow for railroad locomotives. By 1905 The Leslie Company was operating a foundry, machine shop and small office in Lyndhurst, New Jersey, and building a reputation for producing reliable steam pressure valves and regulators. The company was a major supplier of steam control equipment for military and merchant ships during both World Wars and has continued as a supplier of military/commercial marine service products. Leslie's product line grew over the years to incorporate equipment for industrial and utility customers, and in 1968 the company moved into a larger plant in Parsippany, New Jersey.

In Parsippany, Leslie built on decades of experience manufacturing high quality valves for military and industrial markets to solidify it's reputation as a premium quality manufacturer, with products such as the venerable "Super G" Series regulators and the Class DLO control valve line.

After moving our headquarters to a newly built 150,000 sq. ft. facility in Tampa, Florida, Leslie broadened it's scope to encompass a comprehensive array of products for total fluid management of steam and other fluids. In 1990, Leslie Controls was purchased by one of the world's largest independent valve manufacturers, Watts Industries.



The Aeroflow product line, one of the most innovative and diverse family of control valves in the world, was introduced in 1994. Our 1995 acquisition of the K&M Valve Company added the widely recognized K-Max Rotary, GTB Top & Bottom Guided, GTW 3-Way and Synflow Sweep Angle control valve lines to our Process Chemical and Oil & Gas Industry offerings. In 1999, Watts Industries split and Leslie Controls became a corporation in the Fluid Regulation Division of the newly formed NYSE company, Circor International. A few months later, the CPC-Cryolab line of cryogenic valves was added to the Leslie product line.

With 250 employees, Leslie Controls has grown to serve power generation, oil and gas, petrochemical, chemical process, HVAC, food processing, commercial marine, and military marine markets through a network of over 100 manufacturers' representatives worldwide.



Leslie's Quick Delivery



Leslie's QD (Quick Delivery) System Ships from Stock

Leslie maintains a large finished goods inventory to provide you with the best possible delivery to satisfy your need for Regulators, Control Valves, Strainers, Instantaneous Hot Water Heaters, K-MAX Rotary Control

Valves and On-off Solenoid Actuated Valves. We can same day ship products with standard configurations as well as modified products from stock in just a matter of days. Visit our website for a complete list of available products.

- **Same Day Delivery** from stock is available
- **Linear and Rotary Control Valves** in a variety of materials
- **Instantaneous Hot Water Heaters** (available skid mounted for fast installation)
- **Spring, Air Actuated and Steam Piloted Pressure and Temperature Regulators** for immediate delivery
- **Two Stocking Locations** to serve you

We offer a wide selection of body materials, trim, pressure ratings and end connections on very short lead times. To get a delivery quote on any one of hundreds of Leslie Products, visit us at www.lesliecontrols.com or call us for the name of your local Leslie representative.



Linear Control Valves

Aeroflow High Performance Control Valves

- 1 - 16" Valve Sizes
- ANSI CL 150 - 4500, DIN PN10 - 400
- Body Mat'l: WCB, C5, WC9, CF8M
- Cv Range: 0.01 - 3100
- End Conn.: BWE, SWE, RF, RTJ, THD

The unique technology of the Aeroflow begins with aerodynamic vanes cast into the valve body inlet and outlet. Inlet vanes help divert incoming flow evenly around the cage, minimizing turbulence and flow instability as well as improving flow capacity. Outlet vanes minimize turbulence to reduce noise and body erosion. A wide range of interchangeable trim options and custom characterized cages provide the flexibility of many sought after benefits.

Tight Shut-Off (*exceeds ANSI Class VI*)

Unlike competitive valves rated for Class IV, V, or VI shut-off, Aeroflow's pressure energized pilot balanced plug provides zero cc/min. leak rates, without penalty of huge actuators, even with metal to metal seats at full body pressure/temperature ratings. Aeroflow's shut-off capability is in a class all its own. The pilot balanced plug design minimizes actuator size and cost. Proven pilot design also eliminates the need for any piston seals to insure tight shut-off, greatly increasing the valve's reliability.

Parts Interchangeability

With the exception of bodies, all parts are interchangeable between globe and angle body styles with the same size and function. Facilities needing various trim designs in both globe and angle style bodies can minimize parts inventories, maintenance and training.

Tri-Sheer Protected Seat Design

Proven in more than 20 years of power plant service, Leslie's "protected" seat design protects Aeroflow's superior shut-off characteristic three ways. First, the protected seat prevents high velocity transients at opening or

closure of the valve. Secondly, a five-stage pressure drop occurs near the seating position and last, the plug/seat surface is withdrawn from the direct flow to prevent direct particle impingement or clamping. The Tri-Sheer allows prolonged throttling at the seat without wire draw due to high clearance flow velocities.

Quick-Change Seat Design

In 4-16" body sizes, Aeroflow's seat ring is not threaded, welded, or loaded in place by the cage. Seat retention and seat gasket loading are accomplished with a stainless steel load ring and multiple silver-plated load screws for controlled seat gasket loading which is impervious to thermal shock.

Hung Cage for Thermal Expansion

The quick-change seat features a cage which is hung in the body. This allows the cage to expand freely through sudden wide variations in fluid temperature. This tolerance for cage expansion solves the typical problems seen in cage retained designs such as cage warping, plug binding, galling, and crushed gaskets.



Custom Characterized Cage Throttling

Massive 400 Series stainless steel cages resist warping or deformation and provides plug/window throttling through closure. The flow window can be shaped to meet specific Cv requirements and system characteristics. This custom characterized cage is standard in our Aeroflow control valve line and is available with all plug/seat options.

Les-Cav Multi-Stage Cage

Les-Cav multi-stage trim is designed to throttle liquids with maximum pressure drops from 0-4000psi without damaging cavitation and resultant noise or vibration. Les-Cav is easily tailored to the exact requirements of each application.

Les-Sonic Cage

Single stage Les-Sonic cage can provide up to 25 dBA noise reduction in compressible fluid applications. When combined with a Les-Sonic Silencing Orifice noise reductions of up to 35 dBA are possible.

Mini-P Multi-Stage Plug

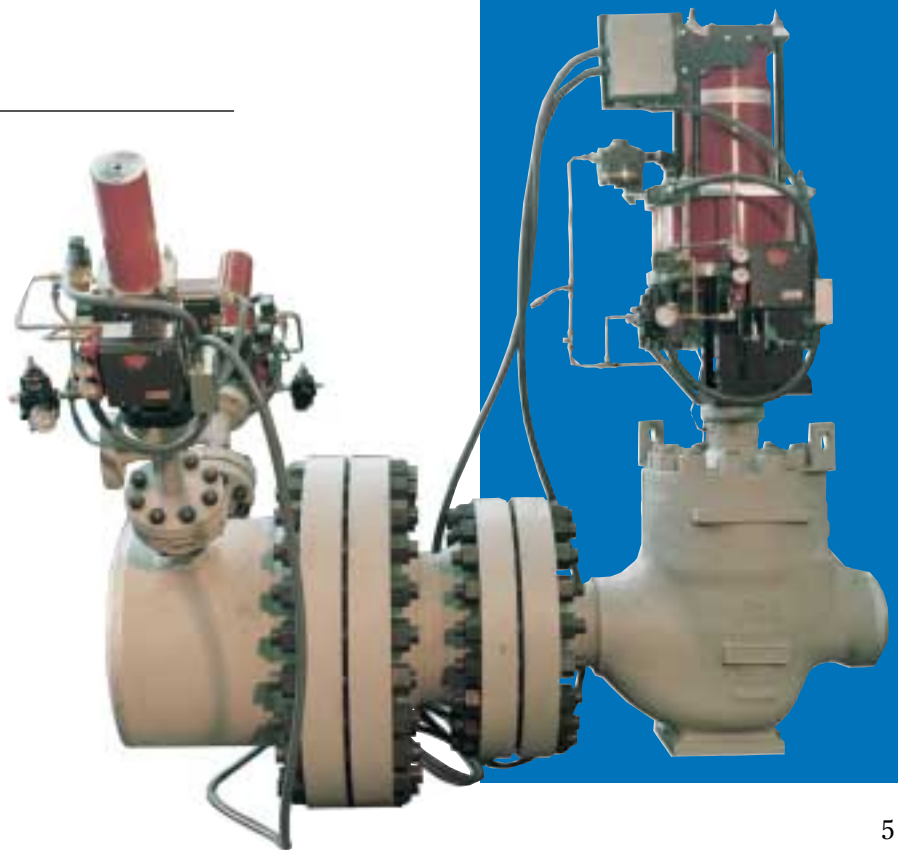
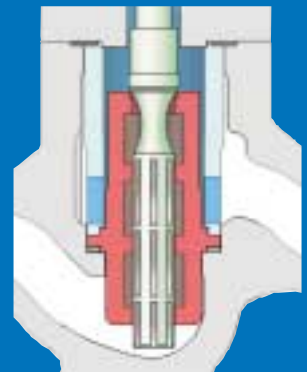
The Mini-P multi-stage plug is designed for low-flow high-pressure drop cavitating services. The unique axial flow design will control cavitation and the resultant noise, vibration, and valve erosion damage. The pressure drop is taken along the length of the plug in the milled slots and chambered liner. The Mini-P can be easily tailored to the exact Cv requirements of each valve application.

C³ Combination Characterized Cage

Special characterized cages can be designed for applications that require high rangeability, with low end cavitation protection or low end noise abatement. This flexibility allows Leslie to provide one valve where other manufacturers may require two, lowering overall equipment, installation, and maintenance costs.

Steam Conditioning Equipment

Leslie offers it's unique Aeroflow pressure reducing valve in combination with a state of the art, variable area, mechanically atomized desuperheating system. This combination system meets today's stringent requirements for control and turndown without the temperature stress problems associated with combination valves. We offer complete fabricated systems that include either Globe or Angle body PRV designs with noise attenuation plates (as required), customized trim selection and desuperheating equipment.



Linear Control Valves

DLO/DLOS-2 Single-Seated, Unbalanced Valves with Cage Retained Seat

- 1 - 4" Valve Sizes
- ANSI CL 125 - 300, DIN PN10 - 40
- Body Mat'l: Cast Iron, WCB, CF8M

These versatile single-seated, unbalanced, cage-retained trim, diaphragm control valves put the premium on performance at a competitive price. Suitable for use in steam, water, gas and process applications, this valve series has found acceptance in industries ranging from food and beverage processing to power generation.

Greater Versatility

Heavy, 2-point stem guiding makes the DLO-2 especially suitable for dirty, viscous and corrosive fluids as well as for clean fluids. Because there are

- Cv Range: 0.5 - 201
- End Conn.: RF, THD, SWE, BWE

absolutely no threaded internal parts, these valves are ideal for corrosive services. They can be maintained without removing the valve from the pipeline.

Trim and cage options include 316 stainless steel (standard), resilient seats or hardfacing with Stellite® alloy.

Lower-Cost Maintenance

Leslie's unique design allows maximum interchangeability of parts. Substantial reduction of spare parts inventory is possible because trim parts and actuators can be used on many different body sizes.

DBOY-3, DBOYS-3 and DBOS-3 Single-Seated, Balanced Valves with Cage Throttling Trim

- 2 - 12" Valve Sizes
- ANSI CL 150 - 600, DIN PN10 - 100
- Body Mat'l: Cast Iron, WCB, WC9, CF8M
- Cv: 26 - 1240
- End Conn.: BWE, SWE, RF, RTJ, THD

These Leslie control valves are rugged, reliable units specially designed for use in steam, water, gas, vapor and non-corrosive liquid service. The balanced cage-throttling design permits these valves to be operated with small, compact and economical actuators against fluid pressure drops up to 1480 psig and 800°F, (subject to body pressure/temperature ratings and actuator limits).

Hung-Cage Construction

A unique hung-cage throttling design eliminates gasket damage and bonnet or seat leaks due to thermal expansion. Anti-cavitation (*Les-Cav*) and low-noise

(*Les-Sonic*) cages are available for special situations. Cages and trim material are 400 series stainless steel with optional Stellite® hardfacing available.

Standard valve packing is braided Teflon® graphite. Teflon® chevron and laminated graphite is optional for higher temperature service.

Easy Maintenance

The cage trim is easy to remove for inspection or replacement. There are no welded, screwed-in or press-fit parts. Capacity changes are achieved simply by replacing the cage. There's no need to replace any other parts or add any adapters.



Type VLG “Lil’ Gator”

- 1/2 - 2” Valve Sizes
- ANSI CL 150 - 300
- Materials: Cast Iron, Bronze, WCB, CF8M
- Cv Range: 0.03 - 70
- End Conn.: RF, THD

The Leslie VLG Lil’ Gator general service control valve features a compact, efficient design. VLG control valves provide greater flow capacity and performance than most comparable models, yet are economically priced. Special features range from a streamlined body that minimizes turbulence and pressure drop to erosion resistant stainless steel trim. You can select from multiple port sizes and flow characteristics to meet your application requirements.

Field Reversible Actuator

The 36 and 60 square inch actuators are field reversible. Using the same parts, you can quickly change from

reverse to direct action. In addition, interchangeable actuator sizes are available to meet varying operating conditions. Long service life is provided through closely guided, low friction internal parts, erosion resistant material and other special design features.

Typical Applications

Engineered for industrial, commercial and institutional use, the VLG Lil’ Gator is ideal for process control in the food, chemical, pulp and paper, and petrochemical industries. The VLG Lil’ Gator also provides superior performance in HVAC applications and package systems such as heat exchangers, water purification systems, feed water and fuel control systems.



Class GTB Double-Seated

- 1 - 16” Valve Sizes
- ANSI CL 125 - 600
- Materials: Cast Iron, WCB, WC9, CF8M
- Cv Range: 0.1 - 2760
- End Conn.: RF, RTJ, THD

In dirty, sticky, and erosive applications, where cage guided valves fail, plug characterization, stem guiding, and balancing effect give the double-seated GTB design the best combination of features necessary to succeed.

Since inlet pressure exerts force on the upper and lower plugs, the forces are balanced. This balancing effect reduces the net thrust required to move the plug, allowing for smaller actuators to be used in higher pressure drop applications and resulting in lower overall installation cost and dimensional envelope.

Two-Point Guiding

The GTB valve plug is supported and rigidly guided by upper and lower

guide bushings. This exceptional stability and minimal valve plug deflection even under high pressure drop conditions, and allows precise control and characterization of fluid.

Field Reversible Plug

The Equal Percentage V-Port, Equal Percent Contoured, Linear Contoured, and Quick Opening plugs are easily reversed in the field so that either a fail open or closed action can be obtained using the same actuator.

Optional Extended Bonnet

Bonnet options include the standard bolted configuration and extension bonnet for temperatures below 32°F (0°C) and above 450°F (232°C).



Rotary Control Valves

K-MAX Rotary Control Valves

- 1 - 8" Valve Sizes
- ANSI CL 150 - 600
- Body Mat'l: WCB, CF8M, Exotic Alloys
- Cv Range: 0.25 - 800
- End Conn.: RF, Wafer

High Performance Design

The Leslie K-Max is designed and engineered to handle nearly all industrial process control requirements. For over 15 years, the K-Max has been in successful service in thousands of applications worldwide including high and low pressure steam, clean, dirty, and corrosive liquids and gases, and erosive and abrasive slurries.

Alloy 6[®] trim hardening option, bi-directional flow capability (while maintaining shut-off class in either direction), and triple bearing large diameter precision splined shaft for torsional and flexural rigidity with excellent radial support.

Greater Efficiency

Efficient straight-through flow design allows for a much lower cost per Cv than conventional globe style valves with the same high degree of quality people have come to expect from Leslie.

Superior Features

Other features include reduced port trim options, Class V shutoff option,

HyperFlex Series High Performance Butterfly Valves

- 2 - 36" Valve Sizes
- ANSI CL 125 - 600
- Body Mat'l: Cast Iron, WCB, CF8M
- Cv Range: 4 - 53500
- End Conn.: Wafer, Lug

The Hyperflex incorporates our patented, pressure assisted seat design to assure bubble-tight seating, while our FireSafe design meets API 607 4th edition requirements and ANSI Class V shutoff.

steel eliminates the need to remove the shaft when replacing packing (meets API 609 standards). Lined bearings maximize corrosion resistance and minimize shaft deflection.

One Piece, Double Offset Shaft

This design to reduces wear and enhance seating by providing a camming action that lifts the valve off the seat. The one piece shaft (in sizes 3"-16"), constructed of high strength 17-4PH[®] stainless

Available in a variety of seat designs, with operating temperature specs from -10°F to 800°F, the HyperFlex the valve of choice in a wide variety of applications where positive shut-off is required for liquids, gases, and slurries.



3-Way Control Valves

Class GTW & DOT, 3-Way Linear Control Valves

- 1/2 - 12" Valve Sizes
- ANSI CL 125 - 300 DIN PN10 - 40
- Body Mat'l: Cast Iron, Bronze, WCB, CF8M
- Cv Range: 5 - 1078
- End Conn.: RF, SWE, THD, RTJ

Plug Throttling Valves

Leslie Class GTW plug throttling, three-way globe valves are designed for mixing or diverting clean, dirty, viscous and corrosive liquids; high and low pressure steam; and clean, dirty and corrosive gases.

Seat, plug and stem material is 316 stainless steel. Shutoff is dependent on installed service requirements. Class II, IV or V shutoff is available on either or both of the two inner valve ports.

Bonnet options include the standard bolted configuration; an extension bonnet for extreme temperatures; a lube/vented bonnet for purge, leak-off or lubricator connections; bellows bonnets for zero exterior leakage; and oversized bonnets when required.

A variety of packing and gasket options are offered to meet the requirements of a range of process conditions. Packing options include PTFE V-Ring, PTFE

shredded, high temperature carbon graphite, PTFE aramid, graphite aramid and high temperature Inconel® glass. Choices for gaskets include PTFE, high temperature carbon graphite and nitrile rubber bonded non-asbestos.

Cage Throttling Valves

The Leslie Class DOT cage throttling, 3-Way control valves provide easy maintenance and increase valve stability and trim life. Spring loaded Teflon® chevron stem packing eliminates the need for periodic adjustment. The DOT features a one-piece body eliminating the conventional tail piece and extra gasketed joint.

Common applications include the circulation of water, oil, sea water, or other liquids in heating/cooling systems where there is a heat exchanger bypass control. They can also be used in blending systems and on/off selector systems.

RVK, RVD and RVB Three- Way Rotary Valves

- 4 - 16" Valve Sizes
- ANSI CL 125 - 150, DIN PN10 - 16
- Body Mat'l: Cast Iron, Ductile Iron, Bronze
- Cv Range: 145 - 3500
- End Conn.: RF

These relatively low-cost valves are designed for bypass temperature control systems in industrial, utility and marine applications. They require very low operating forces and can be used with smaller actuators, further reducing system cost. Leslie rotary valves allow nearly twice the overall

flow capacities of globe types, resulting in extremely low pressure losses and allowing the use of smaller sizes.

Superior features include smoother throttling, greater accuracy, non-fouling, non-sticking, compact size and reversible action.



On/Off Valves

2500 Series Electrically Actuated Valves

2800 Series Heat Actuated, Fire Safety Shut-Off Valves

CYS Pneumatic Two-way Valves

- 1/2 - 4" Valve Sizes
- ANSI CL 150 - 300
- Body Mat'l: WCB, CF8M
- Cv Range: 3 - 160
- End Conn.: RF, THD

Leslie 2500 Series valves are 2-way, globe type, piston valves. Direct, semi-direct, and pilot operated valve piston options make these valves ideal for use with viscous, dirty or clean fluids as well as light liquids and gases.

They are operated by an external lever connecting the lifting action of the linear actuator to the valve piston/plug through a rotary shaft. The rotary shaft principle creates a mechanical advantage enabling more force in operating the valve. It also allows stronger return spring action to ensure reliable fail-safe return.

FM Approved

The 2500 Series is FM approved for safety shut-off of fuel oils and gases. The electric actuator is FM approved explosion-proof (Class I, Groups B, C, & D, Division 1, and Class II, Groups E, F, & G), and complies with requirements for NEMA 4 watertight enclosures.

Fully Automatic or Electrically Tripped

In the fully automatic configuration the actuator has a 'NORMAL' fail to (or shelf) position. When the valve is de-energized (on any loss of signal), it will "fail" to this position. Upon reapplication of current the actuator will automatically energize and change the valve position.

In the manual reset, electrically tripped configuration the valve must be manually "latched" to leave the 'NORMAL'

position. Upon reapplying current to the actuator, it will "trip" the valve to revert to its 'NORMAL' fail-safe position. Momentary energization is all that is necessary to change the valve position, however, the actuator is rated for continuous duty operation.

Both types are quick acting two position designs. Speed of operation is less than one second, independent of line media.

Rugged, and Dependable

Because the actuator assembly is isolated from the valve body, fluid temperatures to 425°F (including steam) can be handled without the coil insulation breakdown often associated with packless solenoid valves.

The slight arc of the rotary shaft offers superior seal life expectancy compared to reciprocating stem packing glands. The Leslie 2500 Series has what it takes for quick shut-off of steam or process fluids and gases.

2800 Series for Fire Safety

The Leslie 2800 Series utilizes the same design features as the 2500 Series, but is heat actuated for fire safety.

These valves meet the requirements of API601 and conform to or exceed the requirements of OSHA para. 1910.1016 (b) (4) (iv) (c).

The 2800 Series is designed to fail closed when ambient temperature reaches the rating of the fusible link which holds the valve open. Fusible links are available in 135, 165, 212, 286, and 386°F ratings.



Specialty Products

P-Trim Multi-Stage Plug Throttling

To prevent cavitation and subsequent damage in ultra high pressure letdown service, P-Trim valves employ three techniques:

- A unique plug/chamber design sharply reduces and controls, velocity and pressure drops at any point in the valve interior.
- Material selection is limited to proven alloys that have demonstrated high erosion resistance and good wear characteristics after years in service.
- The industry's highest standards of precision machining, finish quality and overall quality assurance are met or exceeded.

The multi-keyed plug and throttling orifice chamber in Mark P Trim valves uses two to seven stages to reduce the pressure gradually instead of handling an ultra-high pressure drop in a single stage. By accurately controlling the pressure drop in each stage to 700 psi or less, velocities are reduced and cavitation noise and vibration are prevented.

The slightest casting imperfections can lead to premature valve failure, so Leslie precision machines all internal throttling surfaces assuring actual trim conforms to theoretical design values. P-Trim valves are available in 2" to 6" sizes for throttling drops to 5000 psi and body ratings to ANSI Class 3500.

Synflow Sweep Angle Valves for Synfuel Service

The Leslie Synflow Valve has been especially designed for the most difficult applications in synthetic fuel, refining, petrochemical and oil & gas industries. This type of sweep angle design has been applied successfully in:

- Slurry letdown
- Visbreaker
- Hot separator letdown
- Well choke production
- H-Oil letdown

Slurry letdown service is the most critical of these applications, involving three-phase flow of solids, liquids and gases at extremely high temperatures and pressure drops that can destroy a

conventional valve in a matter of hours.

The Synflow Valve has been used successfully in a number of synfuel pilot plant situations where its actual service life has exceeded that of other valves by several orders of magnitude. Critical body passages of the Synflow are designed to keep wear to a minimum. Plugs and seats are a special tungsten-carbide alloy for corrosion and abrasion resistance. To facilitate maintenance and inspection, all internal parts (except the seat ring) are easily removable from the top of the valve. In the bonnet closure, all boltings and gaskets are designed to eliminate problems inherent in thermal transients.

Noise Reduction Devices for Systematic Noise Control

An economical way to reduce control valve or reducing valve noise by 6 to 12 dBA is to install the Les-Sonic Silencing Orifice downstream from the valve between two flanges. A Leslie Noise Suppressor installed at the valve outlet, will reduce pipeline carried

noise by 10 to 20 dBA. For maximum reduction of pipeline transmitted noise, the combined installation of a Les-Sonic Silencing Orifice and a Noise Suppressor will reduce the sound pressure level by 16 to 32 dBA.



Actuators & Positioners

Magnum Piston Actuators/DPS Electro-Pneumatic Positioner

Magnum Series piston actuators use low volume and long stroke to maximize bleed and feed rates. Externally mounted spring return modules minimize residual volume and maximize speed of response. This low volume translates into high speed of response.

Leslie's DPS positioner, derived from Leslie's patented PMC electro-pneumatic controller technology, provides ultra-fast, stable response using a pulse modulated output and a non-mechanical, optical/digital stem position feedback.

The DPS positioner supplies a digitally controlled pneumatic output (up to 12 SCFM - 60psi supply) and uses a non-contact, direct connected optical reader. With no mechanical feedback linkages to loosen or wear, accuracy and repeatability do not degrade over time.

When mounted on an Aeroflow high gain control valve with a 6" Magnum actuator, stroke speed can exceed 3" per second. You read it right, 3" per second - with no overshoot.

Diaphragm Actuators

Leslie spring and diaphragm actuators are rugged high thrust units with flanged yoke to bonnet connections for simple maintenance and better access to stem packing. These workhorses of our

control valve lines have been proven and perfected for nearly forty years of in-service usage. They are available in four sizes: 35, 55, 85, and 135 in.²

Electric Actuators

The Rexa X-PAC and T-PAC electrohydraulic linear actuators are designed for modulating and two position service. These actuators feature a self-contained electrohydraulic power module utilizing the patented Rexa Flow Match System. This technology allows precise cylinder positioning, independent of load variations, and locks the cylinder in place when no movement is required. Because the system is hydraulically stiff, instabilities and positioning errors are eliminated. Standard output thrust ranges from 2,000-10,000 lbs. Strokes are available up to 6 inches.

Optional features include spring failure, position transmitter and handwheel. Digital, pulse, dry contact and 4-20 mA input options are available. Direct coupled rotary models are available as the R series actuator.

For thrust requirements up to 2000 lbs., Leslie offers Jordan Controls electric actuators which include a wide variety of options. Standard features include 120 or 240 VAC operation, permanently lubricated motors, anti-condensation heater and feedback transmitters. Position switches are standard on most units.

Positioners

The Moore 760 Series pneumatic and electro-pneumatic positioners provide cam characterization, split ranging, direct or reverse action and single or double output. Key features include non-interaction of zero and span adjustments and the positive cam locking mechanism for easy calibration. The PMV models P5 (pneumatic) and EP5 (electro-pneumatic) positioners

offer a wide variety of options due to their modular construction. These high capacity, vibration resistant units are easily mounted on both rotary or rectilinear actuators, with a variety of cams to choose from. Available options included limit switches, potentiometer or 4-20 mA transmitter, provided in a completely sealed F5 module.

Electro-Pneumatic Controllers

- 4 - 20mA Input/Output
- Intrinsically Safe
- Electro-Pneumatic
- DCS/PLC Interface
- NEMA 4

A Unique Approach To Simple, Reliable, Accurate Control

The Leslie PMC-1 electro-pneumatic controller represents a true breakthrough in monitoring and control of variables such as pressure, temperature, liquid level and flow rate in steam, air and other fluid systems.

PMC-1 Makes It Easy To Control Any Fluid System

Process engineers accustomed to dealing with conventional electronic controllers will find the PMC-1 a joy to work with. The PMC-1 accepts a standard transmitter or RTD input, and plugs into any conventional electrical outlet or 24 VDC power source. Maximum power consumption is 10 watts.

Eliminates The Need For Positioners

This unique controller accepts standard plant air to 100 psig, and applies a measured volume of air (up to max. pressure) to the valve actuator in controlled short-duration pulses. By design, the PMC-1 is ZERO BLEED once set point is reached.

Remote Settings Standard

Every LESLIE PMC-1 is equipped with a remote input connector that accepts 4-20 mA analog control signals. The unit can be easily configured for local or remote set-point control with a variety of default options on loss of set-point signal. This provision gives the PMC-1 an interface with programmable logic controllers (PLC's), DCS systems or any other remote set point source.

Sets Directly, In Absolute Digital Units

The LCD readout on the PMC-1 indicates process variables, expressed in whatever units are being controlled. Examples include temperature in °F or °C, pressure in psi, kPa or bar, and flow rate expressed (however it makes the most sense to technicians). Tuning is accomplished in three easy steps: the desired set point is entered, the response speed is selected and the sensitivity is entered. That's all there is to it.

A Well-Engineered Control System That Users Can Adjust Intuitively

There are no subtle complications involved in adjusting a LESLIE PMC-1. The set point, response speed, sensitivity and display modes are all adjusted by clearly labeled controls. Direct or reverse action and local or remote control can be selected by flipping switches. Once this unit is on the job, it stays on the job, protected by a water-tight NEMA 4 enclosure.

Versatile Accessories

Other products include: PMC-RS remote setpoint 1/4 DIN module for control up to 1000 feet away; RCS-90 local control module to allow remote installation of the PMC-1; Set Point Ramp Generator which provides automatic ramp-up or ramp-down to or from final process set-point; PMC-IS Intrinsically Safe unit. Additional product variations are available along with a full line of accessories.



Pneumatic Pilot Controllers

LAP, LAPB, LAUP, LAUPB, LA, LAB, LAU and LAUB Leslie-Levelmatic Liquid Level Pilot Controllers

- 3 - 15 Psig Output
- Fixed or Proportional Band
- Bi-Metallic or Liquid Filled Temperature Element

Leslie-Levelmatic pilot controllers use a simple, stable, floatless differential pressure sensing principle. They require only two simple connections to the vessel (open or closed). Standard units come in two sensing ranges: 0 to 36 inches and 0 to 200 inches(H₂O).

Normal operating pressure is 10-22 psi. Static pressure on the sensing diaphragm can be anywhere within the range of 30" Hg vacuum to 300 psig. Options include fixed or proportional band.

PRA, PRAP, PDA, PDAP, PRQ and PDQ Constant Pressure Pilot Controllers

These pilot controllers use an inherently stable force-balanced design and provide high speed response, exceptional reliability and high

output volume. Normal operating pressure is 20 to 22 psig, maximum static pressure is 900 psig and the adjustable range is 13 psia to 800 psig.

BP, BPC, RTP and DTP Constant Temperature Pilot Controllers

Leslie constant temperature pilot controllers deliver an air signal to a control valve or other control element in response to a change in sensed temperature. They are available with a bi-metallic thermal element or a factory-sealed liquid-filled bulb. Both types are shock resistant, corrosion resistant and highly reliable.

Liquid-filled thermo-element types convert temperature to a proportional pneumatic signal which is used to operate a control valve. These units are

available with adjustable proportional band and optional calibrated dials in Fahrenheit or Celsius. Sensing range is 20°F to 400°F (-7°C to 205°C).

The bi-metallic sensing element types are widely employed in heating or cooling service. Bi-metallic pilot controllers respond to minute changes in sensed temperature and provide accurate stable control. They are unaffected by moisture or oil in the air supply. Sensing range is 32°F to 600°F (0°C to 315°C).



Pressure Reducing Valves

Leslie Super G Series valves are quite simply the best pressure reducing valves on the market. Available in versions suitable for steam, air and gas pressure and temperature control, they combine the simplicity of a self-contained regulator with the performance of more sophisticated control systems at a fraction of the cost. All Super G regulators have a very high rangeability (100:1) with no maximum pressure drop or pressure ratio limitations, and are very accurate over their full flow range.

Simple and Reliable

There are only two moving parts in the valve body, making for drastically reduced maintenance headaches. The main control component is our exclusive Spiroflex[®] stainless steel diaphragm that operates smoothly over the full flow range and is capable of longer travel for high flow capacities. This is

a long-lasting diaphragm with minimal maintenance characteristics. Another benefit of the Spiroflex[®] diaphragm is the ability to achieve total control with a minimum delta-p of 0.5 psi.

Maximum Interchangeability

Many replacement parts are common across the line, thus reducing parts inventory cost. And those parts that might need inspection and replacement can be serviced without removing the valve from the line.

An Unusual Three-Year Warranty

Leslie Class GPK, GPB, and GPKP-1 pressure reducing valves, when installed and operated in accordance with our instructions, will be repaired or replaced free of charge if a failure should occur within three years from our shipping date. (We cannot be responsible for special or consequential costs or damages.)

GPK, GPB, GPS and GPSS

Air-Loaded Pressure Reducing Valves

- 1/2 - 4" Valve Sizes
- End Conn.: THD, SWE, BWE, RF
- ANSI CL 125 - 300
- Body Mat'l: Cast Iron (GPK), WCB (GPS), CF8M (GPSS), Bronze (GPB)

Leslie GP Series valves are air-loaded versions of the Super G Series valves. They provide all the advantages inherent in the Super G Series and allow set point changes in seconds with the adjustment of a simple air loader. These valves can be set remotely from an air loading panel. Combined with

the Leslie PMC-1 controller, the GP series valve provides a temperature control loop with built-in cascading action for faster, more stable response to load changes. The packless, self-contained design provides low hysteresis and inherently "leakless" performance.

GPAK Regulators for "Hard-to-Hold" Air, Gas and Vapor

- 1/2 - 4" Valve Sizes
- End Conn.: THD, RF
- ANSI CL 125 - 250
- Body Mat'l: Cast Iron

Leslie Series GPAK regulators are ideal for air, butane, CO, helium, methane, nitrogen, natural and other gases. The principle of operation is the same as the GP Series, enhanced by several special

service features. The packless construction and resilient trim give bubble-tight shutoff on gases. This minimizes costly waste of industrial gases due to valve seat or packing leakage.



Pressure Reducing Valves

GPKP-1 Steam-Piloted, Self-Contained Pressure Reducing Valves

- 1/2 - 4" Valve Sizes
- ANSI CL 125 - 250

Leslie GPKP-1 valves feature a unique patented dual diaphragm sensing chamber that provides unparalleled control, accuracy and stability in one self-contained package. Large pilot clearances are far less subject to fouling problems, non-continuous bleed results in less direct carryover

- End Conn.: THD, RF
- Body Mat'l: Cast Iron

through the pilot assembly, and the constant-gain pilot makes for unmatched performance accuracy throughout the entire operating range. A single Leslie GPKP-1 can be used in many applications where competitive designs must use multiple regulators in double reduction and 1/3-2/3 installations.



GPS-1EP External Steam Piloted Pressure Reducing Valve

- 1/2 - 4" Valve Sizes
- ANSI CL 150-300

The Leslie GPS-1EP features the GPS-1 regulator along with a VPS external pilot. The pilots have inter-changeable

- End Conn.: THD, RF
- Body Mat'l: WCB

springs for 3-20, 5-50, 10-100 and 20-150 Psig pressure ranges.



Leslie VKP Pilot-Operated Steam Pressure Reducing Valves

- 1/2 - 4" Valve Sizes
- ANSI CL 125 - 250

Leslie Class VKP steam pressure reducing valves use an adjustable, spring-controlled integral pilot valve to establish a pressure feedback loop which controls the main valve. This entirely mechanical principle tends to keep systems in equilibrium within 90 percent of the set point.

Inlet pressure capacity is available to a maximum of 250 psig and the reduced

- End Conn.: THD, RF
- Body Mat'l: Cast Iron

outlet pressure range is 3 to 150 psig.

The largest valve in this product family can handle just under 50,000 pounds of saturated steam per hour.

VKP bodies are cast iron, seating material is hardened stainless steel, and diaphragms are stainless steel.

Interchangeable springs provide setting ranges of 3-20 psig to 20-150 psig.



Leslie L Series Internal Pilot, Piston-Operated Reducing Valves and LX Series Differential Pressure Regulators

- 1/2 - 3" Valve Sizes
- ANSI CL 125 - 600
- Body Mat'l: Cast Iron (LKY), WCB (LS-5), Bronze (LY)
- End Conn.: THD, SWE, BWE, RF

General Pressure Reduction and Regulation Service

Leslie L Series internal pilot, piston operated reducing valves provide a high degree of accuracy over the entire flow range and a widely adjustable reduced pressure range. Single-seated, with a fully-guided main stem that closes with inlet pressure, this valve demonstrates superior ability for tight shut-off.

L Series valves are available with Teflon® self-cleaning piston seal or metal piston rings.

Differential Pressure Service

Leslie LX Series differential pressure

regulators maintain a constant differential between the air, gas or steam pressure passing through the regulator, and any other liquid or gas pressure whose relationship to the regulator outlet pressure should be a constant. The differential is maintained regardless of operating variation.

LX Series regulators are adjustable to a differential pressure range of 5 psi to 40 psi. All valves in this series provide this differential range, without changing springs or diaphragms.

These differential pressure regulators are available in the same sizes and ratings as the "L" Series reducing valves.



Leslie LC Series, for Gas, Liquid or Steam Service

- 1/2 - 3" Valve Sizes
- ANSI CL 300 (Bronze), CL 600 (Steel)
- Body Mat'l: WCB (LCBS), Bronze (LCB)
- End Conn.: THD, SWE, BWE, RF

Leslie LC Series direct-operated, spring loaded valves are ideally suited to many small volume applications where the controlled flow is air, gas, steam or liquid. Typical services include gland sealing, pilot plant operations, plastic mold presses and atomizers.

These small valves can be ordered with bronze or steel bodies, only in 1/2 inch size. They can handle inlet pressures as high as 1000 psig and are available with pressure reduction ranges of 2-35 and 25-400 psig.



Leslie J Series Self-Contained Reducing Valves

- 1/2" Valve Size
- ANSI CL 300
- End Conn.: THD
- Body Mat'l: Bronze

Leslie J Series small-flow reducing valves are inlet pressure-closing for positive dead-end shutoff. They are highly accurate regulators. Metal-to metal seating is available for steam service. Long-wearing resilient seat inserts should be requested for air and gas service.

Maximum inlet temperature is 150°F for air and gas service, 550°F for steam service. Maximum pressure is 300 psig for steam and 400 psig for air or gas. Available reduction ranges are 1-50 psig and 5-290 psig.

Complimentary Products

Safety & Relief Valves

- 1/2 - 6" Valve Inlet Sizes
- ASME Section I, IV, and VIII
- Body Mat'l: Cast Iron, Bronze, Aluminum
- End Conn.: THD, RF
- Set Pressures: 5 - 300 psig, 1 - 30" HG

Leslie safety & relief valves are available for steam, air, gas, liquid, vacuum and powdered solids service. Brass/bronze trim and carbon steel-zinc plated spring are standard on most; some are available with optional stainless steel trim.

Applications include steam boilers, unfired pressure vessels, pressure reducing stations, dryers and pneumatic equipment, bulk hauling trailers and storage vessels, tanks and hydraulic systems, sterilizers, compressors, etc.

Mechanical, Thermodynamic & Thermostatic Steam Traps

- 3/8 - 2" Trap Sizes
- Temperature/Pressure Rating: to 600 PSIG, 600°F
- Body Mat'l: Cast Iron, Stainless Steel
- End Conn.: THD

The Leslie trap line includes float & thermostatic, inverted bucket and thermodynamic steam traps suitable for a wide variety of applications including steam main drips, heating

equipment, process equipment and converters. All feature stainless steel internals and several are repairable in-line without breaking connections.

Self-Cleaning Y Strainers

- 1/2 - 4" Valve Sizes
- ANSI CL 125 - 250
- Body Mat'l: Cast Iron (V77S), Bronze (V77TS)
- End Conn.: THD

Leslie self-cleaning Y strainers are available in iron or bronze bodies and in line sizes that range from 1/2 to 4 inches. Standard screen perforations are 20 mesh 304 SS in the V77S (iron

body) and V77TS (bronze body) strainers, and 1/16 inch 304 SS for the V77F (flanged iron body) strainer. The V77F strainer is available to meet ANSI Class 125 or 150.

Leslie Airmate Air Loaders and Regulators

Leslie Airmate air loaders and regulators are stable, high-capacity units which provide exceptional accuracy over the entire flow range. These units are ideal for instrument air control and a variety of small flow (up to 35 SCFM) air systems. Maximum inlet pressure is 200 psig, maximum operating temperature is 150°F, and reduced pressure ranges are available in 2-30, 3-60 and 30-150 psig. Bodies are 1/4 inch die-cast aluminum. Airmate Relays are recommended where volume boosting is required.

They are fast acting, high-volume output 1:1 ratio transmitters that increase the speed of a control system. An adjustable needle valve allows control of signal pressure bypass rate. Panel Loaders are available from stock with air loader and/or process gauges mounted on an enameled aluminum plate. Four predrilled holes allow flush or surface mounting on a control panel or console. These units can be supplied with an optional air filter connected to the air loader inlet.



Temperature Regulators

GTK, GTRK, GTB and GTS Eventemp Regulators for Large Volume Heating or Cooling Applications

- 1/2 - 4" Valve Sizes
- End Conn.: THD, RF
- ANSI CL 125 - 300
- Body Mat'l: Cast Iron (GT(R)K), WCB (GTS), Bronze (GTB)

Leslie Eventemp temperature regulators use a self-contained, liquid-filled thermal system that is completely independent of external power sources such as air or electricity. They use only the flowing medium as the means to operate, resulting in lower initial cost and lower operating cost.

These high gain regulators are especially suited for storage-type heating or cooling service, where they provide close control of the cooling medium. They find widespread use in semi-instantaneous type coolers such as

compressors or engine water jackets, vat cooling, etc.

All Leslie Eventemp regulators are available with an optional calibrated dial (in your choice of °F or °C) for quick, easy and dependable temperature settings. The dial eliminates waiting for equipment to heat up before the proper setting can be determined and avoids overheating due to "guess" setting. It is suited for production line use where frequent readjustments are necessary for process work. The calibrated dial replaces the standard adjusting sleeve.

LTC Duo-Matic Regulators for both Temperature and Pressure Regulation

- 1/2 - 3" Valve Sizes
- End Conn.: THD, RF
- ANSI CL 125 - 600
- Body Mat'l: Cast Iron (LTCPK), WCB (LTCPs), Bronze (LTCP)

Leslie Series LTC Duo-Matic Regulator design combines both temperature and pressure regulation in a single, self-contained regulator. Ideal for both instantaneous and storage heating where a maximum pressure limitation is mandatory and compressed air is not available.

Because the Leslie Duo-Matic responds to pressure changes as well as temperature changes, and because the two parameters are interdependent, these regulators actually anticipate a change in controlled temperature by sensing a pressure shift.

M Series Regulators For Small Flow Applications

- 1/2 - 1" Valve Sizes
- End Conn.: THD
- ANSI CL 200
- Body Mat'l: Cast Iron (MK), Bronze (M)

The larger G Series regulators described above are most useful in storage applications where on/off operation is satisfactory. The M Series provides a throttling function that is ideal for instantaneous heating and cooling situations, and for applications

where over-range protection is desired. One additional feature is the ability to change an M Series valve from a heating regulator to a cooling regulator with a simple rotation of the regulator body. This feature is standard in sizes 3/4 and 1 inch.



Steam-Water Heaters

Constantemp® Feedforward System

Obvious though it seems, many facilities with steam-generating capability overlook the economy and convenience of using some of that steam to heat water or other liquids.

Leslie Constantemp® heaters use a tightly-coiled circulating exchanger to transfer heat energy from the isolated steam flow to the desired liquid. These systems can take advantage of very low steam pressures and can deliver liquids at precisely defined temperatures.

Leslie Constantemp® steam heaters are available in two steam inlet pressure ranges: 2-15 or 15-200 psig. Heating is instant on demand with capacities up to 7,200 gallons per hour. Temperature variation is a maximum of $\pm 3^{\circ}\text{F}$. The standard coil material is copper but Admiralty and cupro-nickel coils are available as special-service options.

The heart of the Leslie Constantemp® steam water heater is the feedforward blending device. The hot and cold water blend ratio is accurately proportioned to maintain the set temperature for all flow demands. Water is blended instantly; automatically; with virtually no lag in response time.

Should movement of the blending valve be restricted by foreign matter carried in the water flow a yielding spring arrangement allows the diaphragm and stem to move up uncovering a heat damper, the characterized blending valve. This damper allows more cold water to enter the blended mix eliminating the possibility of overheating or scalding.

Available sizes include 15, 30, 45, 60, 75, 90, 105 and 120 GPM models with adjustable ranges from 105°F to 180°F.

Constantemp® Skidded Heater Systems

As installation costs increase and manpower availability decreases, it is more important than ever to find the most economical method of installing equipment. In most cases, installing yourself would cost less than hiring an outside contractor, if you have the manpower, the time, and the expertise. (When installing even the simplest piece of equipment, it takes time to read the instructions, determine the materials needed, purchase the materials, and complete the installation.)

The Skidded Concept

The skidded Constantemp® water heating system solves this problem by placing the entire system complete with steam traps, strainers, gauges and interconnecting piping on a frame or skid. Connect the steam, water, and condensate piping, and the unit is ready to use.

All the guess work and preparation time is eliminated, and Leslie assumes full system responsibility. There is never a question as to pipe size, distance to the steam reducing valve, or proper trap installation. All the work is done for you except the utility connections themselves. The standard package has everything necessary to operate the heater. Optional equipment available includes recirculation pumps, pumping traps, steam reducing valves, and redundant safety shutdown devices. All connections are flanged and are placed at the edge of the assembly. Even the largest unit will fit through a standard doorway. Or, we can custom design a complete system to suit your unique requirements. Everything you need to get yourself in hot water—FAST—engineered, manufactured, and assembled by the steam management experts at Leslie Controls.



LES Series Packaged, Steam-fired Water Heater

The LES Series steam-fired water heater is a high quality system which provides an economical, high capacity output using steam or hot water as the heating medium. The LES Series water heater is designed to handle a broad range of capacities and is ideal for most domestic and process hot water applications.

Compact, Easy to Install

The LES Series water heater is designed to fit in tight areas where space is at a premium and is narrow enough to fit through most doorways. Units are offered in vertical or horizontal designs, the vertical requiring only 7½ square feet (0.7 m²), the horizontal only 15 square feet (1.4 m²). The LES Series water heater is a completely pre-piped system. All components are sized, mounted and piped prior to shipment and require only hot and cold water lines, connections of steam, condensate and electric.

Efficient Design

LES Series water heaters respond instantly to fluctuating demand, delivering accuracy to ±5°F (±2.8°C) of preset temperature and a maximum hot water output of 330 GPM (1,249 LPM).

The tank of the water heater is insulated with two inches of foam which helps retain heat and reduce operating costs.

Safety Engineered

The LES Series water heater has digital electronic temperature limit control with LCD readout and is field programmable. This safety system eliminates the possibility of overheating or getting live steam. By utilizing an adjustable electric thermostat, the system is designed to close the main control valve upon an over-temperature condition. If an over-temperature condition is detected, the electric thermostat sends a signal to the valve, thereby closing it.

An optional double safety system is available. This system features a double solenoid system which, in addition to closing the main valve, opens a solenoid valve at the top of the vessel allowing the over heated water to drain out of the vessel.

Both the standard safety system and the double-solenoid system require a 120 volt, 5 amp circuit to operate.

Quality

The LES Series water heater is designed with quality in mind. ASME Code stamping and registration offers the assurance of quality controlled construction. The packaged water heater is constructed with a virtually rustproof 316L stainless steel tank and pre-threaded pipe connections. A 20 gauge steel jacket protects the insulation and its hammertone enamel painted exterior provides a neat, finished appearance.

Condensate Pump on Skidded Heater Systems

A gas or steam powered condensate pump is available as part of any Skidded Heater System. Where electricity is not available or condensate head is greater than steam pressure to the heater, the condensate pump can be used to remove condensate.

As the condensate pump tank is filled with condensate, the inlet is closed and high pressure steam or gas enters the chamber, forcing the condensate out. Condensate pumps are available on all size Skidded Heater Systems.



Fabrication, Service & Repair



Remanufacturing, Testing and Fabrication

Steam is tough on regulators and controls. The combination of high temperatures, high velocity fluid streams and occasional contaminants makes for a finite service life, after which the product should be disassembled, cleaned, checked for surface quality and critical dimensions, reassembled with required new OEM manufactured parts, and fully tested for the service in which it is installed.

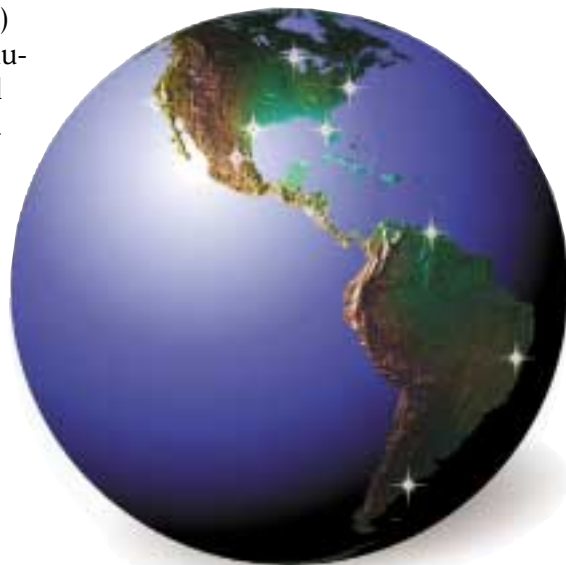
Many machine shops and repair facilities will attempt to service steam regulators and control valves. Unfortunately, not all of those shops are capable of returning a given component to full factory specifications. Circor International operates three service centers

(New Jersey, Virginia and Florida) where valves of many major manufacturers are returned to original factory specifications and given a new service warranty at a fraction of the original purchase cost. We also have an international network of Leslie licensed and trained "Red Seal" Service Centers capable of performing the same quality of work as our service centers.

Circor Service Centers are also authorized to service valves manufactured by K&M, R.G. Laurence, CPC-Cryolab, Spence Engineering, Nicholson, KF, Circle Seal, SSI Equipment, Hoke, Aerodyne Controls, SKVC, Watts ACV, Go Regulator, Pibiviesse, Telford, Chas. M. Bailey, and Contromatics. In addition to handling factory repairs, each service center has available factory trained Field Service Technicians to provide on-site repairs for equipment which cannot be readily removed from the system.

Another service provided at the Circor Service Centers is panel board fabrication. Whenever it is not practical to assemble components on-site, our experts can design, build, and ship or deliver and install a unit customized to suit your needs.

Service is a fundamental part of the Leslie operating philosophy and we urge you to request additional documentation and descriptive material.



Worldwide Remanufacturing,

Customer Training

Training is another part of the Circor Service Center commitment to total service. In-depth training programs are designed to provide hands-on training in operation, instrumentation, and maintenance of all supported equipment. Standard or custom tailored programs are available for any size group and can be scheduled to meet your requirements. Training is conducted at one of our



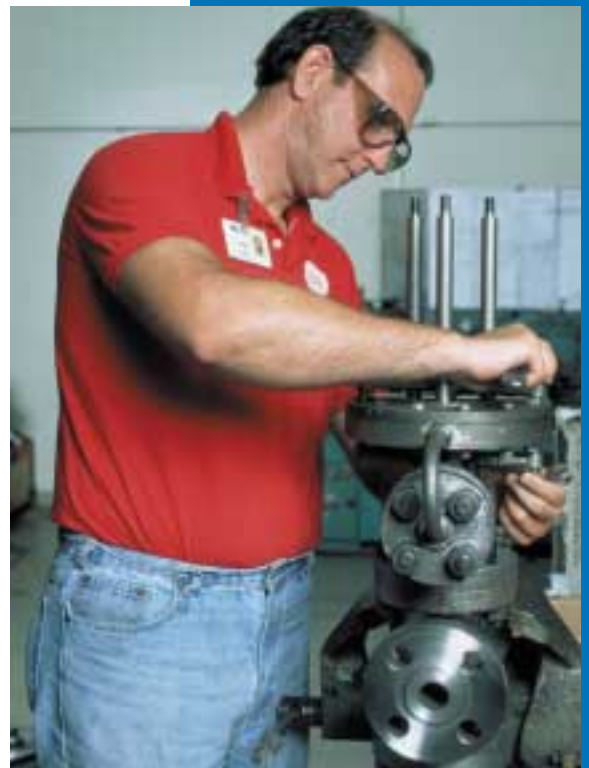
specially designed, fully equipped repair facilities, or if you prefer, can be performed at your location using your own equipment.

Preventive Maintenance and Turnaround Programs

A regularly scheduled maintenance program can result in maximum system performance, significant cost savings, and reduced downtime. Your Circor Field Service Technician will work closely with you to establish a planned schedule of control equipment overhaul. Can't afford to shut your system down for an extended period? Our Turn-around program minimized downtime for your critical systems.

Our Field Service Technicians will assist you in removing equipment needing repair at a time that is convenient for you, and replace it with a fully rebuilt, reconditioned unit from our stock. These replacement units carry the same "like new" guarantee provided with all units we rebuild.

In most cases, your system will be on line and back to normal in a matter of hours.



Service & Repair Network

Commitment to Excellence



ISO 9001 CERTIFIED

Product Support and Documentation

The quality standards maintained by Leslie Controls are among the most rigorous in the industry. All Leslie valves are 100% tested utilizing calibrated equipment which conforms to the requirements of most quality specifications. Our Quality Assurance System has been certified to ISO 9001*.

Every product we sell is supported by extensive technical data that provides all of the engineering and applications information required for making a proper selection. These detailed data sheets are provided upon request without cost or obligation.

In addition to the published material, our factory trained representatives are always willing to discuss your application. If the situation warrants, we will visit your site and survey your requirements.

Now, as always, throughout our century year old business history, we are committed to unconditional customer satisfaction. Our products carry clear warranty statements and we will never knowingly attempt to apply a product that is wrong for your application. If any dissatisfaction develops in the course of your dealings with Leslie Controls, *we will make things right.*

* Assessed and certified by ABS Quality Evaluations, Inc., Houston, Texas

Since LESLIE CONTROLS was founded in 1900, we have been an industry leader in quality fluid control equipment. We have developed a full line of engineered products to suit your requirements, including diaphragm control valves, control instrumentation, pressure and temperature regulators and steam water heaters.



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