

C.L. THOMPSON CO.

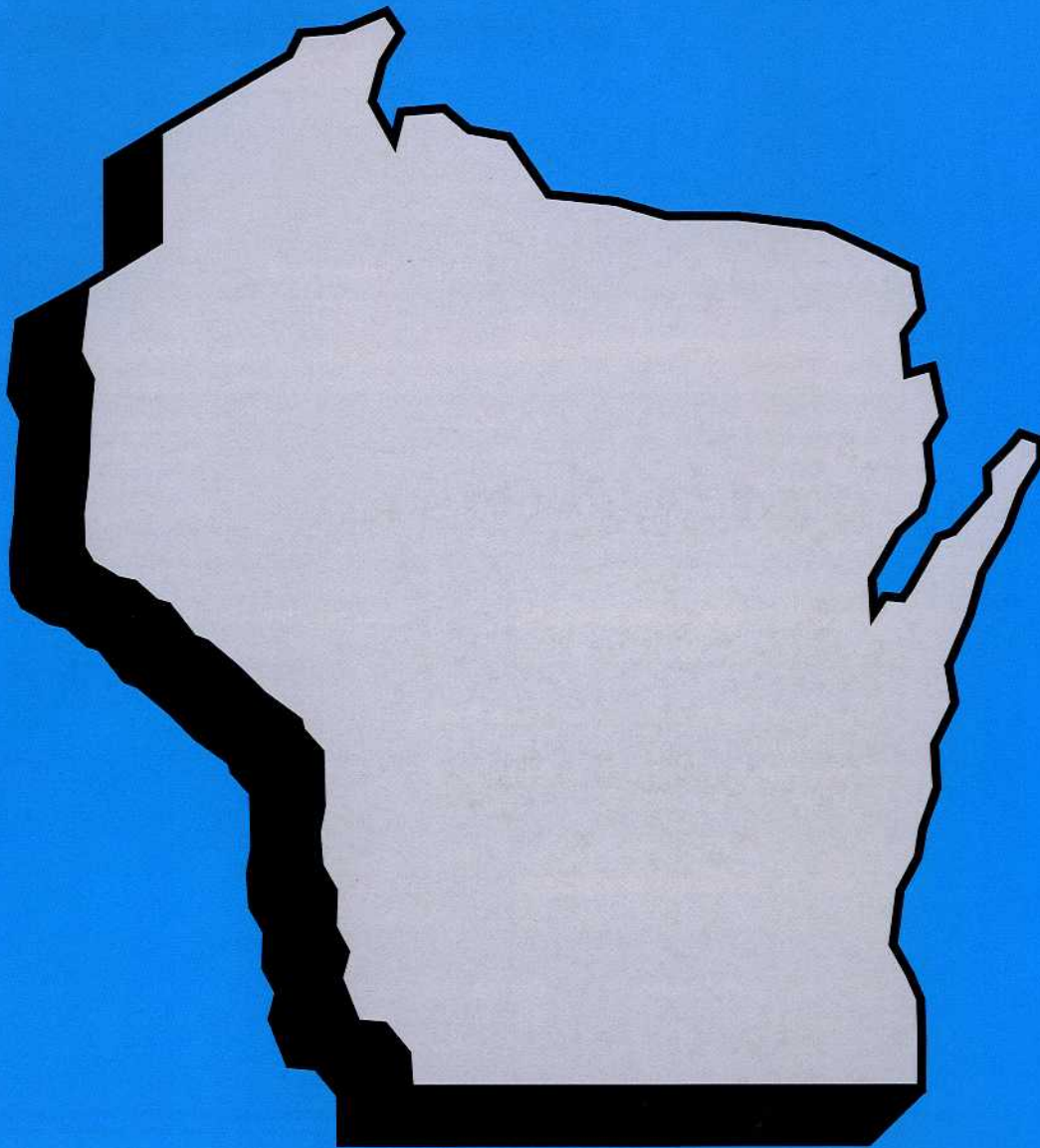
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Since 1942

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**Phone 262/250-4400 to call for
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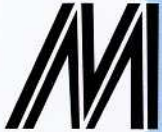


NORGREN

Modular Filters
Regulators
Lubricators
Valves
Push-In Tube Fittings

Cylinders
Electropneumatic
Products
Exhaust
Mufflers/Reclassifiers

Compressed Air Dryers
Pneumatic Control
Accessories
Miscellaneous Products



Mindman

Modular Filters
Regulators
Lubricators
Valves
Push-In Tube Fittings

Cylinders
Electropneumatic
Products
Exhaust
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Compressed Air Dryers
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NFPA Air or Hydraulic
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Custom Cylinders
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Valves Air Hoists



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Suction Filters

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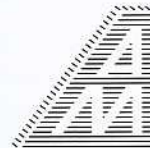
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Transmitters
Thermometers
Needle Valves
Diaphragm Seal
Snubbers

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Power Units
Assembled Pneumatic
Systems

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*Engineered Controls
International, Inc.*

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TOMCO
Quick Couplers

Quick Connect Couplings
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Accessories



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Power Units



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Four Way Valves
Poppet Valves
Shuttle Valves



Drilling Units
Hand Tools
Accessories



Fittings
Valves
Cylinders



Valves
Cylinders
Pneumatic
Accessories

C.L. THOMPSON CO.

Serving Wisconsin Industry Since 1942



FORMULA FOR:	BASIC FORMULAS	LETTER FORMULA
FLUID PRESSURE <i>In pounds/Square Inch</i>	PRESSURE = $\frac{\text{FORCE (pounds)}}{\text{UNIT AREA (Square Inches)}}$	$P = \frac{F}{A}$ or $\text{psi} = \frac{F}{A}$
FLUID FLOW RATE <i>In Gallons/Minute</i>	FLOW RATE = $\frac{\text{VOLUME (Gallons)}}{\text{UNIT TIME (Minute)}}$	$Q = \frac{V}{T}$
FLUID POWER IN HORSEPOWER	HORSEPOWER = $\frac{\text{PRESSURE (PSI)} \times \text{FLOW (GPM)}}{1714}$	$HP = \frac{PQ}{1714}$

FLUID FORMULAS		
VELOCITY THROUGH PIPING <i>(In Feet/Second Velocity)</i>	VELOCITY = $\frac{.3208 \times \text{FLOW RATE through I.D. (GPM)}}{\text{Inside Area of Pipe}}$	$V = \frac{.32080 \times \text{GPM}}{A}$
COMPRESSIBILITY OF OIL <i>In Additional Required Oil To Reach Pressure</i>	ADDITIONAL VOLUME = $\frac{\text{PRESSURE (psi)} \times \text{VOLUME of Oil Under Pressure}}{250,000 \text{ (Approximate)}}$	$V_A = \frac{PV^*}{250,000}$ (*approximately 1/2 % per 1000 psi) (approximant)
COMPRESSIBILITY OF A FLUID	COMPRESSIBILITY = $\frac{1}{\text{Bulk Modulus of the Fluid}}$	$C(B) = \frac{1}{BM}$
SPECIFIC GRAVITY OF A FLUID	SPECIFIC GRAVITY = $\frac{\text{Weight of one cubic foot of fluid}}{\text{Weight of one cubic foot of water}}$	$SG = \frac{W}{62.4283}$
VALVE (C_v) FLOW FACTOR	VALVE FACTOR (C_v) = $\frac{\text{Flow Rate (GPM)} \times \sqrt{\text{Specific Gravity}}}{\sqrt{\text{Pressure Drop (PSI)}}$	$C_v = \frac{Q\sqrt{SG}}{\sqrt{\Delta P}}$

PUMP FORMULAS		
PUMP OUTLET FLOW <i>In Gallons/Minute</i>	FLOW = $\frac{\text{RPM} \times \text{Pump Displacement (Cu. In./Rev.)}}{231}$	$Q = \frac{nd}{231}$
PUMP INPUT POWER <i>In Horsepower Required</i>	HORSEPOWER INPUT = $\frac{\text{Flow Rate Output (GPM)} \times \text{Pressure (PSI)}}{1714 \times \text{Efficiency (Overall)}}$	$HP_{in} = \frac{QP}{1714 \text{ Eff.}} \text{ or } \frac{\text{GPM} \times \text{psi}}{1714 \text{ Eff.}}$
PUMP EFFICIENCY <i>Overall In Percent</i>	OVERALL EFFICIENCY = $\frac{\text{Output Horsepower}}{\text{Input Horsepower}} \times 100$ OVERALL EFFICIENCY = $\text{Volumetric Eff.} \times \text{Mechanical Eff.}$	$Eff_{ov} = \frac{HP_{out}}{HP_{in}} \times 100$ $Eff_{ov} = Eff_{vol} \times Eff_{mech}$
PUMP EFFICIENCY <i>Volumetric In Percent</i>	VOLUMETRIC EFFICIENCY = $\frac{\text{Actual Flow Rate Output (GPM)}}{\text{Theoretical Flow Rate Output (GPM)}} \times 100$	$Eff_{vol} = \frac{Q_{act}}{Q_{theo}} \times 100$
PUMP EFFICIENCY <i>Mechanical In Percent</i>	MECHANICAL EFFICIENCY = $\frac{\text{Theoretical Torque to Drive}}{\text{Actual Torque to Drive}} \times 100$	$Eff_{mech} = \frac{T_{theo}}{T_{act.}} \times 100$
PUMP LIFE <i>B₁₀ Bearing Life</i>	B₁₀ HRS of Bearing Life = Rated Life HRS = $\frac{\text{Rated Speed (RPM)}}{\text{New Speed (RPM)}} \times \left(\frac{\text{Rated Pressure (PSI)}}{\text{New Pressure (PSI)}} \right)^3$	$B_{10} = \text{Rated HRS} \times \frac{RPM_r}{RPM_n} \times \left(\frac{P_r}{P_n} \right)^3$

ACTUATOR FORMULAS		
CYLINDER AREA	AREA = $\pi \times \text{Radius}^2 \text{ (Inches)}$	$A = \pi r^2$
IN SQUARE INCHES	AREA = $\frac{\pi}{4} \times \text{Diameter}^2 \text{ (Inches)}$	$A = \frac{\pi D^2}{4}$ or $A = .785D^2$
CYLINDER FORCE <i>In Pounds, Push or Pull</i>	FORCE = $\text{Pressure (psi)} \times \text{Net Area (Square Inches)}$	$F = \text{psi} \times A$ or $F = PA$

Call one of C.L. Thompson's application engineers to help with any of your questions.

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C.L. THOMPSON Company

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1942 - 2003

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Hose, Hose assemblies, stainless steel & brass, JIC, SAE, Metric & NPT fittings. Parker

Aeroquip

Hose, Hose assemblies, Quick disconnects, JIC, SAE & NPT fittings.

Air Logic

Modular subminiature pressure regulators, pressure & vacuum switches & fittings.

Alkon

Pneumatic spool valves, manual & solenoid operated. Flow controls, needle & check valves. Safety lockout & Push-in fittings.

Bijur

Lubricating components & systems for oil or grease, control units, injectors & monitors.

Brauer

Manual & automatic clamps Air movers, nozzles & drum pumps.

Canfield

Electrical connectors, sensors & timers.

Chicago Pneumatics

Torque wrenches, hand drills & grinders, Electric torque wrenches, Atlas Copco air product & Desoutter drilling & hand tools.

CL Thomson Systems

Assemble hydraulic & pneumatic systems.

Continental Hydraulics

Directional control valves, Piston & Vane pumps, cartridges, Power Units, manifolds, Inline pressure, flow & check valves.

Damon Products

Manifold & Cartridge blocks.

ECH/Rego

Needle, check & slide valves, flow control & relief valves. Both air & hyd.

Exair

Compressed air products, cooling & amplification, air knives, nozzles, vortex tubes & static eliminators.

Farval

Lubricating pumps, hose reels, grease guns, regulators, gauges & lubricating systems.

Fast-Lok

Hose clamps.

Fastest

High pressure test connectors, internal & external, pilot pressure booster, twistmate & newjaws grip & seal.

Gems Sensors

Transmitters, Transducers, Liquid sensors, Level sensors & ultrasonic switches.

Hedland

Flow & pressure monitors for oil and air.

Hosetract

Hose reels, manual or motor driven, oil, oxygen/acetylene, overhead cabinets, mini series, stack frames & light cords.

HPI

Hydraulic gear pump & motors, multi-stage pumps, micro power packs, directional control valves & cartridge poppet valves.

Hyd. Cyl. & Valves

Welded cylinders, cross tube and clevis, mobil pumps, mono and 3 spool valves, flow controls, filters and telescopic cylinders.

Hydrocraft

Filler/breathers, filters, strainers, sight gauges, pressure gauges & reservoirs. Flanges, couplings, tube & hose clamps.

Kuhnke Pneumatic

General purpose pneumatic cylinders & valves. Miniature electric relays & access.

La-Man

Extractor/Dryers, electronic drains, Micro filter, safety valves, air & membrane dryers.

Legend

Ball valves, full port, for steam, water, oil or gas, forged brass.

Lenz

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Lynair

Cylinders hydraulic & pneumatic.

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Hydraulic & pneumatic manifolds both custom & standard.

Mazzer

Pneumatic tubing & ball valves.

Mead Fluid Dynamics

Pneumatic cylinders, control valves, air & electric two hands tie down controls.

Midland Metal Mfg.

Fittings, Brass, Metric, air brake, DOT, JIC. Pipe, Valves, Clamps & Drain cocks.

Mindman

Pneumatic cylinders, control valves, gauges filter, regulators, lubricators, solenoid valves, jaw grippers, shock absorber & tubing.

MP Products

Hydraulic filters for return & suction, filter elements, pressure gauges.

Norgren & Mosier

Pneumatic cylinders, control valves, filter, regulators, lubricators, mufflers, vacuum valves & gauges, air dryers. Push-in fittings.

Nopak

NFPA cylinders, hydraulic & air, solenoid valves, Non-round rods, & boosters.

Noshok

Gauges, transducers, thermometers, needle valves & snubbers.

Nycoil Air Products

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Peninsular Cylinders

Hydraulic & pneumatic cylinders, NFPA metric & NPT available. Die lifters & slides.

Peter Paul

Two & three way solenoid valves, FDA approved, explosion proof & submersible.

PTI Filters

Hydraulic filters, elements, strainers, breathers & Spin-on filters.

Rectus

Quick connect couplings for pneumatics & low-pressure fluid, coiled tubing & blowguns.

Sempress

Pneumatic indexing & dividing tables, air & Hydrem check cylinder, pressure regulators.

Snap-tite

Hydraulic Quick disconnects, Directional & inline valves, Hose guard & panel coupling.

Superflex

Flexible reinforced hoses & tubing.

Teknocraft

Vacuum generators, switches, gauges, suction cups, position, vacuum & jet sensors, mini proportional flow controls.

Thermal Transfer Products

Heat exchangers & Aftercoolers, air to oil, water to oil, Mobile & industrial applications. Water strainers & thermostats.

Tomco

Quick couplers, self-coiling hoses, blow guns.

Tompkins

Hydraulic fittings, steel & brass, JIC, pipe & metric adapters, flanges, hose wrap, hose barb fittings, poly push-in fitting.

Trident

Hydraulic fittings, JIC, NPT, Face seal o-ring, Metric fittings & ball valves.

Tridon

Hose clamps, wiper blades & signal flashers.

UCI

Stainless steel pressure gauges, liquid & dry, sintered & speed control mufflers, In-line & nipple filters. Ball & butterfly valves.

Uni-Flex

Special hoses & ducting material, neoprene, acrylic, nylon & fiber glass, bridge clamps.

Webster Instruments

Potable flow, temperature & pressure monitors for oil and water.

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