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- HVAC
- Refrigeration
- Pipe, Valves & Fittings
- Building Controls
- Propane Gas Equipment & Parts
- Water Systems
- Commercial & Industrial Pumps
- Fire Protection & Fabrication
- Industrial PVF Specialties
- Thermoplastic Piping
- High Purity Process Components
- Process Controls
- Water Works
- Environmental Services

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- Commercial & Industrial Pumps
- Fire Protection & Fabrication
- Industrial PVF Specialties
- Thermoplastic Piping
- High Purity Process Components
- Process Controls
- Water Works
- Environmental Services

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<tr>
<td>Biddeford</td>
<td>207-282-7558</td>
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<tr>
<td>Caribou</td>
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<td>Winslow</td>
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A Comprehensive Directory of the State of Maine Plumbing-Heating-Cooling Contractors and Related Businesses

www.mainephcc.com

Presented by

Maine Association
Plumbing-Heating-Cooling Contractors
PO Box 6861
Portland, Maine 04103
(207) 829-5055
Fax (207) 829-5031

Published April 2021
MISSION STATEMENT

“The PHCC-National Association, of which Maine PHCC is a member, is an Association of plumbing, heating, and cooling contractors dedicated to the promotion, advancement, education, and training of the industry for the protection of the health, safety, and comfort of society and the protection of the environment.”

CODE OF ETHICS

• To consider our trade worthy as affording us distinct opportunities to serve society
• To improve ourselves, increase our efficiency and enlarge our service, and by so doing attest our faith in the fundamental principles of life, that we profit most who serve best
• To realize that we are businesspersons and ambitious to succeed; but that we are first ethical persons, and wish no success that is not founded on the highest justice and morality
• To maintain the highest ethical standards of advertising, pricing, selling, installation and service guided by the principles of honesty and integrity
• To promote the latest technological advances in the design, types and methods of installation of plumbing-heating-cooling systems; using equipment and materials complying with the standards recognized by this industry
• To enter enthusiastically into the association work— to give as well as take—and do our part in elevating the industry
• To support all progressive moves that are being carried out along the lines of trade extension, standardization and sanitation
• To conduct our affairs that others in our business will find it wise, profitable and conducive to happiness to emulate our example
• To follow and execute our work in conformity with federal, state, county and city building, safety, energy and water conservation, fire and housing codes; and refusing to be a party to any action that violates these regulations
• To promote conservation of water and energy to the public we serve through improved, adequate, safe, modern installation of energy efficient equipment

PRIDE IN OUR PAST—FAITH IN OUR FUTURE
The Maine Association of proudly dedicates the 2021 Annual Business Directory to Robert Hardina for his dedication and commitment to this industry.

Bob came to Maine in the mid 1970’s as an ordained minister teaching at Stone Hill College in Massachusetts. As a young minister he was involved in the Selma Alabama civil rights protest march, of which he was always proud. He purchased a small plumbing/heating/electrical business in Damariscotta, Maine in 1976. In the midst of the Arab oil embargo he named that company Mid-Coast Energy Systems. Early on he committed himself to learning the trades. Always a proponent of education, he acquired a Master’s License in plumbing, oil burner, electrical, solid fuel, solar and later on propane. Bob spoke about the importance of the trades, the plumber protecting the health of the nation, employee education and to paying a fair wage with exceptional family benefits. This was his mantra for his entire career.

He spoke locally to educate the public on topics like energy efficiency, heat pump technology and aging in place. He is greatly missed by the crew that worked for him and beside him. Bob was always in attendance at the Maine PHCC expo up until the very end. He will be missed by all of us that knew and respected him for all that he accomplished in this industry and in his life.
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Hunter Botto, President
128 Woodbury Rd
Hicksville, NH 11801
(516) 935-2900
bottohunter@gmail.com

Joel Long, President-Elect
PO Box 12216
Gastonia, NC 28052-0216
(704) 864-0344
joel@gastoniasheetmetal.com

Dave Frame, Vice President
2442 Jaclyn Ct
South Bend, IN 46614-3700
(574) 291-7511
dave@frameplumbing.com

Michael Copp, Executive Vice President
180 S. Washington St
Falls Church, VA 20046
(703) 750-9891/Fax (703) 237-7442
copp@naphcc.org

Jack Cawley, Zone 1 Director, New England Council President
67 Wolf Neck Rd
Stonington, CT 06378
(860) 536-2223
cawleyplumbing@comcast.net

NEW ENGLAND PHCC ASSOCIATIONS

Executive Director, Wayne Thomas
400 Washington St, Suite 401
Braintree, MA 02184
(781) 843-3800/Fax (781) 843-1178
wayne@phccma.org
www.phccma.org

Executive Director, Alice Ames
69 Rock Ridge Run
Cumberland, ME 04021
(207) 829-5055/Fax (207) 829-5031
aames2@maine.rr.com
www.maineaphcc.com

Executive Director, Corinne Riley
15 New England Way
Warwick, RI 02886
(401) 644-8435/Fax (401) 737-8869
riphcc@hotmail.com
www.riphcc.org

Executive Director, Gina Scumaci
75 Berlin Rd, Suite 102
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As a member of the PHCC community, you plug into a powerful network of valuable resources and contractors at the local, state and national level — plus our own PHCC Educational Foundation — offering the knowledge, tools, programs and services you need to succeed. PHCC means business, from protecting your interests with lawmakers and preventing over-regulation to providing huge savings when you take advantage of member discounts on products and services.

● BEST PRACTICES
  • Crisis Management and Pandemic Action Plan Template
  • Marketing & Advertising Resources
  • Find a Contractor Online Directory
  • Personalized Online Member Dashboard
  • Access to Subject Matter Experts
  • Safety & Risk Management Tools
  • PHCC Water Supply Calculator App

● ADVOCACY
  • Legislative & Regulatory Participation
  • Representation on All Code Body & Industry Coalitions
  • State Legislative & Regulatory Tracking Tool
  • Fight Against Over-Regulation
  • Reinforcement of Industry Standards that Protect Public Health & Safety
  • Regular Alerts on Laws, Regulations & Code Changes
  • Annual Legislative Conference in Washington, D.C.
  • Grassroots Network to Engage Members When Needed to Take Action

● WORKFORCE DEVELOPMENT
  • Plumbing & HVACR Apprentice & Journeyman Training
  • Pre-Apprentice Courses
  • Workforce Development Center and Resources
  • Scholarships
  • Assessment Tests
  • Career & Job Fair Materials
  • PHCC Career Center & Job Board

● EXPERT & AFFORDABLE TRAINING
  • Fast Track to Service Plumbing
  • Project Management & Foreman Training
  • Plumbing & Mechanical Codes Training
  • Business Management Programs
  • Webinars & Other Training Opportunities

● SAVINGS & DISCOUNTS
  • PHCC Industry Partners
  • PHCC Labor Unit Database Subscription
  • Online Buyers’ Guide
  • Discounts on Programs & Services
  • Member Discounts on Conferences

● NETWORKING OPPORTUNITIES
  • Access to Online Communities
  • Join PHCC Enhanced Services Groups
  • Online Business Interest Groups
  • CONNECT Conference & Tradeshow
  • Online & Print Member Directory
  • State & Local Chapter Events and Online Resources

WE MEAN BUSINESS
180 S. Washington Street, Suite 100
Falls Church, VA 22046
Phone: 703-237-8100 | 800-533-7694
Fax: 703-237-7442
Email: membership@naphec.org
phccweb.org
PHCC MEMBERSHIP PAYS FOR ITSELF

Free Resources for Members

- Plumbing and HVACR Pre-Apprentice Course: Online program gives prospective apprentices an opportunity to learn about the p-h-c trade before beginning a longer-term apprentice program.
- TechLine: Expert advice on code questions and clarifications.
- Safety Program Builder: Available from Federated Insurance, allows contractors to customize efforts that illustrate your commitment to ensuring safety in your workplace.
- Overhead and Profit Calculator: This simple software tool helps business owners calculate their real costs and find the right selling price for their company.
- Labor Unit Database: Simplify your estimating process, prepare accurate bids, and increase efficiency and profitability using this tool, available through the PHCC Online Store.
- PHCC Water Supply Calculator App: Offers a single resource to determine water supply fixture units and minimum fixture branch sizes for common plumbing fixtures, typical pressure drops in water meters, equivalent lengths of fittings, and more.
- Multi-Employer 401(k) Retirement Program: PHCC members can choose among several 401(k) retirement program options offered by Lincoln Financial Group through Certified Financial Services.
- Publications: Members receive Solutions Magazine, PHCC Online and the PHCC Advocate newsletter, chock full of valuable news and information to help run your business and stay current on industry legislation and regulations.

Member Savings and Discounts
- Exxon/Mobil: 5 cent savings per gallon of gas using Fleet National Card
- Aramark: 25% discount on uniforms
- Market Hardware: Free consultation and discount on web sites and marketing services
- Time Communications: Discounted monthly rate on call management systems
- ConsensusDocs: 20% discount on subscriptions to standard construction contracts
- Labor Unit Database: 30-day free trial and $100 discount off subscription renewal
- Monthly Webinars: $360 ($30/ea. for non-members)
- CONNECT Conference & Trade Show: $100 discount off each member registration
- Who's Who Directory: $75
- Solutions Magazine Subscription: $30
- Plumbing and HVACR Apprentice eLearning Programs: Discounts vary by chapter
- Plumbing and HVACR Textbooks: Up to 25% discount through your chapter
- Code Books: Discounts vary by chapter

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For more information please call (207) 829-5055 or visit
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Company: ________________________________________________________

Address: _________________________________________________________ Zip Code: _______________

Telephone: ______________ Fax: __________________ Email: _____________________

Mail Check Or charge to: ☐ American Express ☐ Visa ☐ Mastercard Amount $362.50

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☐ Industry Networking ☐ Industry News
☐ Workforce Development ☐ Legislation
☐ Education ☐ Benefits

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A Swan Group Company
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MARCH 25, 2022

MAINE PHCC EXPO
AUGUSTA CIVIC CENTER
MAINE’S LARGEST INDUSTRY TRADESHOW
Dear PHCC of Maine Members,

The challenges resulting from a global pandemic this past year reinforced something that those in our industry have always known... that we are better together. We adapted our businesses and continued to provide our essential services because we leaned on this association and on each other. We shared resources and recommendations, but most importantly, we shared a passion to help each other, strengthen our businesses, and elevate our industry, just as we've always done.

Together, we are a great team of member contractors, manufacturers and industry partners... and connecting the dots among all of us can be made easier through resources like this Annual Business Directory. The experts, the resources, the answers you need are right here. They are the people within these pages who will help you approach a pressing issue, evaluate your current process, discover a new supplier, adopt a new technology, recruit the best talent in your community, and more.

For more than 138 years, PHCC has positively influenced the success and advancement of our contractor members and our industry. And even during the challenging and uncertain times of this past year, one thing that we can be certain of is the importance of keeping your PHCC membership.

Because of your loyal membership, we are able to continue our good work of protecting members like you... and your employees, your families and your communities. With you, PHCC will continue to share best practices among our members, continue the momentum we've created on Capitol Hill to secure business-friendly legislation, train the next generation of workers, and safeguard the professionalism in this industry that you and I both love.

This past year is proof that we are stronger together. You are a part of a powerful and resilient association, a network of more than 3,100 contractors and state and local chapters who are here to help. I encourage you to get more involved in PHCC so that we can have even more power, more influence and more to offer each other.

It is a privilege to serve as your president for 2021. If you have any questions or concerns (or recommendations) about what is going on with the national association, please reach out to me!

Sincerely,

Hunter Botto
PHCC—National Association President
Botto Brothers
Hicksville, New York
Dear PHCC of Maine Members and Fellow Tradesmen,

As we go through these unprecedented times in all lives with uncertainty, it is important to try and return to our routines and work towards establishing some normalcy. We have all been labeled as essential workers in our industry and have continued providing services to our customers. As we finally see a shift in this pandemic, signs show we may be headed for some sense of normalcy, which we have likely taken for granted in going through this pandemic. We hope we can now make plans to reunite and reminisce. We need to work with and for our association to reach common goals to better our industry.

We look forward to getting back to some meetings and workshops. We will review trends and impacts all this has had on our businesses and personal lives and adjust, now more than ever, with the changing times. We will need to be even more focused in bringing in new talent and training to develop our workforce. In the challenges coming to our industry, many of us have already been exposed to difficult times in finding and training new apprentices and trainees. We all need to work together in improving means and methods of attracting the right individuals to our industry's growth.

We are all in this together and hope we can energize and work with one another in the coming months. Hope this note finds you all safe, healthy, and we look forward to emerging stronger and more resilient as we try to bounce back from these global impacts.

Please consider joining us as we continue to fight the causes that are in your best interest as a plumbing, heating, cooling contractor.

Kevin Purnell
PHCC of Maine, President
Heat-flo's Industry-Topping Features and Benefits

- Brass T&P Valve Factory-Installed.
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- Brass Drain Valve factory-installed.
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Heat-flo’s HF-40: 40-gallon Indirect Fired Water Heater Features and benefits of Heat-flo’s HF-40 are equal to or consistent with Heat-flo’s Buffer/Storage/Multi-Energy Tanks and Electric Water Heaters.

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- Brass T&P Valve Factory-Installed.
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- Durable Thermoplastic Jacket will not dent or corrode.
- Large anode rod to fight against harsh water environments.
- Over 2” of R-15+ Insulation.
- Large smooth-wall coil collects less lime and sediment.
- Brass Drain Valve factory-installed.

Heat-flo’s HF-40: 40-gallon Indirect Fired Water Heater

Features and benefits of Heat-flo’s HF-40 are equal to or consistent with Heat-flo’s Buffer/Storage/Multi-Energy Tanks and Electric Water Heaters.

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www.heat-flo.com  

**Phone:** 508-278-2400  
**Fax:** 508-278-2466  
**E-mail:** Sales@heat-flo.com

PROUDLY DESIGNED AND MANUFACTURED IN THE USA.
Past Presidents of the Maine Association of Plumbing, Heating, Cooling Contractors
Front (left to right): Robert Miles, Sr., Richard Waltz, Sr., Elmer (Ted) Walker
Back (left to right): Kim Girard, Sal Raia, Roland (Beef) L’Heureux, David Walker

Front (left to right): Don Dube and Executive Director Alice Ames
Back (left to right): Ron Dunsmoor, Jim Robinson, Robert Miles, Jr.
### Past Presidents of the Maine Association Since 1930

<table>
<thead>
<tr>
<th>Year</th>
<th>President</th>
<th>City</th>
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<tbody>
<tr>
<td>1930</td>
<td>*George Noyes, Presque Isle</td>
<td>1975 *Ralph E. Clarke, Rumford</td>
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<tr>
<td>1931</td>
<td>*George Noyes, Presque Isle</td>
<td>1976 *Ralph E. Clarke, Rumford</td>
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<td>*Neils Knudsen, Falmouth</td>
<td>1977 *W. Franklin Blake, Portland</td>
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<td>*Neils Knudsen, Falmouth</td>
<td>1978 *W. Franklin Blake, Portland</td>
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<td>1934</td>
<td>*John Kerrigan, Lewiston</td>
<td>1979 George Ray, Ellsworth</td>
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<td>1937</td>
<td>*Ernest R. Graham, Bar Harbor</td>
<td>1982 Thomas Kelley, Portland</td>
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<td>*Wilbur F. Blake, Portland</td>
<td>1983 Roland L'Heureux, Kennebunk</td>
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<td>1939</td>
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<td>1984 Roland L'Heureux, Kennebunk</td>
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<td>1940</td>
<td>*Charles B. Davis, Waterville</td>
<td>1985 *Kim Girard, Old Orchard</td>
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<td>1941</td>
<td>*Charles B. Davis, Waterville</td>
<td>1986 *Kim Girard, Old Orchard</td>
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<td>1942</td>
<td>*Jerry A. Cyr, Fort Fairfield</td>
<td>1987 Salvatore Raia, Portland</td>
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<tr>
<td>1943</td>
<td>*Ralph L. Clarke, Rumford</td>
<td>1988 Salvatore Raia, Portland</td>
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<td>1944</td>
<td>*Ralph L. Clarke, Rumford</td>
<td>1989 David Walker, Poland Springs</td>
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<tr>
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<td>*Ernest N. Cunningham, Portland</td>
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</tr>
</tbody>
</table>
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OFFICERS AND COMMITTEES

KEVIN PURNELL
President
Granite Corp
PO Box 370
Oakland, ME 04963
Tel: (207) 465-9220
kevin@granite-corp.com

KEVIN PURNELL
President
Granite Corp
PO Box 370
Oakland, ME 04963
Tel: (207) 465-9220
kevin@granite-corp.com

TYLER ROBINSON
Vice President
Mainely Plumbing & Heating
674 Main St
Gorham, ME 04038
Tel: (207) 615-3503
trob207@gmail.com

TYLER ROBINSON
Vice President
Mainely Plumbing & Heating
674 Main St
Gorham, ME 04038
Tel: (207) 615-3503
trob207@gmail.com

MIKE LEVENSELLER
Secretary
PO Box 370
Oakland, ME 04963
Tel: (207) 465-9220
mlevenseller@granite-corp.com

MIKE LEVENSELLER
Secretary
PO Box 370
Oakland, ME 04963
Tel: (207) 465-9220
mlevenseller@granite-corp.com

CHARLIE BURNHAM
Treasurer
Charlie Burnham Heating
PO Box 382, 4 Spring St
Freeport, ME 04032-0382
Tel: (207) 865-9010
charlie@charlieburnham.com

CHARLIE BURNHAM
Treasurer
Charlie Burnham Heating
PO Box 382, 4 Spring St
Freeport, ME 04032-0382
Tel: (207) 865-9010
charlie@charlieburnham.com

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YOUR PARTICIPATION IS NOT ONLY WELCOMED, IT IS ENCOURAGED.

Maine PHCC Members, Kevin Purnell and Mike Levenseller participated in the 2018 Legislative Conference in Washington.

WITHOUT PHCC YOU STAND ALONE.
<table>
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<th>YEAR</th>
<th>MAN/WOMAN OF THE YEAR</th>
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<td>Brian Breton</td>
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<th>Our Lines</th>
<th>Our Team</th>
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<tr>
<td><strong>Bard</strong></td>
<td><strong>Dylan Beauregard</strong></td>
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<tr>
<td>Geothermal Heat Pumps, wall mounted HVAC units, oil furnaces</td>
<td>Inside Sales/Tech Support – EXT 102</td>
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<tr>
<td></td>
<td><a href="mailto:Dylan@RSTThermal.com">Dylan@RSTThermal.com</a></td>
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<tr>
<td><strong>CRETE-HEAT</strong></td>
<td><strong>Kevin Bergeron</strong></td>
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<tr>
<td>Insulated under slab grid system for radiant</td>
<td>Sales: W, MA, CT – EXT 111</td>
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<tr>
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<td><a href="mailto:KevinB@RSTThermal.com">KevinB@RSTThermal.com</a></td>
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<tr>
<td><strong>Drake</strong></td>
<td><strong>Rich Blaiborzweski</strong></td>
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<tr>
<td>Process Chillers</td>
<td>Sales - EXT 105</td>
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<td><a href="mailto:RichB@RSTThermal.com">RichB@RSTThermal.com</a></td>
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<td><strong>LG</strong></td>
<td><strong>Maryellen Hickey</strong></td>
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<tr>
<td>Full line of ductless heating and air conditioning systems</td>
<td>Inside Support/Operations - EXT 101</td>
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<td><strong>RenewAire</strong></td>
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<td><a href="mailto:Joyce@RSTThermal.com">Joyce@RSTThermal.com</a></td>
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<tr>
<td><strong>Fans, of ALL sizes and ERV’s</strong></td>
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<td><strong>S&amp;P</strong></td>
<td><strong>Mark Toth</strong></td>
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<td>Sales: ME, NH, VT – EXT 106</td>
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<td><a href="mailto:Markt@RSTThermal.com">Markt@RSTThermal.com</a></td>
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<td><strong>THERMOLEC</strong></td>
<td><strong>Evan Trethewey</strong></td>
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<tr>
<td>Small duct, high velocity heating and air conditioning systems</td>
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<td><strong>TheUniqueSystem</strong></td>
<td><strong>Ross Trethewey</strong></td>
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<tr>
<td>Innovative zoning dampers &amp; control boards for HVAC systems</td>
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</tr>
<tr>
<td>Paul F. McClay</td>
<td>Public Member</td>
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<tr>
<td>Richard McCarthy</td>
<td>Appointed by the Commissioner of Public Safety as the Commissioner's representative</td>
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<tr>
<td>VACANT</td>
<td>Master Oil Burner Technician and Propane and Natural Gas Technician</td>
</tr>
<tr>
<td>VACANT</td>
<td>Master Oil Burner Technician with the master solid fuel authority</td>
</tr>
</tbody>
</table>

MAINE FUEL BOARD  
BOARD STAFF  
BOARD INSPECTORS GENERAL EMAIL ADDRESS: fuel.code@maine.gov  
BOARD LICENSING STAFF GENERAL EMAIL ADDRESS: fuel.board@maine.gov  
BOARD INSPECTORS GENRAL VOICEMAIL NUMBER: 207-624-8608

Peter T. Holmes, Senior Fuel Inspector (peter.t.holmes@maine.gov) (207) 446-2826  
Dale D. Hersey, Fuel Inspector (dale.d.hersey@maine.gov) (207) 592-5864  
Cecil B. Hafford, Fuel Inspector (cecil.b.hafford@maine.gov) (207) 592-5043  
Bruce Bristow, Inspector (bruce.bristow@maine.gov) (207) 592-4516  
Mary A. Lord, Licensing Supervisor & Board Clerk (mary.a.lord@maine.gov) (207) 624-8627  
Catherine M. Carroll, Administrator (catherine.m.carroll@maine.gov) (207) 624-8605
DIVISION OF ENVIRONMENTAL HEALTH
SUBSURFACE WASTEWATER TEAM AND
MAINE CDC DRINKING WATER PROGRAM
286 WATER ST, 3RD FLOOR, AUGUSTA, ME 04333
GENERAL PHONE: (207) 287-2070  FAX: (207) 287-4172

Subsurface Wastewater Team Contacts

Team Leader
David Braley, Senior Geologist
Tel: (207) 441-5324
Email: david.braley@maine.gov

State Site Evaluator
Brent Lawson, State Plumbing Inspector
Tel: (207) 592-7376
Email: brent.lawson@maine.gov

Engineered Systems
James Jacobsen, Water Operator Licensing Coordinator
Drinking Water Program, Engineering Review Team
Tel: (207) 287-5695
Email: james.jacobsen@maine.gov

Private Well Coordinator
Haig Brochu
Tel: (207) 592-3190
Email: haig.brochu@maine.gov

Maine CDC Drinking Water

Drinking Water Program Director
Amy Lachance
Tel: (207) 557-2380
Email: amy.lachance@maine.gov
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SOME USEFUL CHARTS AND GRAPHS
PLUMBING SYMBOLS

This standard has been developed by the ASA Sectional Committee on Standardization of Graphical Symbols and Abbreviations for Use on Drawings, Y32. The work of this committee is under the joint sponsorship of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers.

This standard, one of a group which will ultimately replace the present American Standard Graphical Symbols for Use on Drawings and Mechanical Engineering, Z32.2.2-1949, replaces pages 4 through 9 of Z32.2-1949.

In preparing this list of Plumbing Symbols for Use on Drawings, Architects and Engineers were contacted in Boston, Chicago, New York, Philadelphia and Pittsburgh, as well as the resources of the two largest manufacturers of plumbing goods.

Based on the information made available to the committee, the symbols shown are a minimum requirement.

Following approval of the sectional committee and sponsor organizations, the proposal was presented to the American Standards Association for approval and designation as an American Standard. This was granted on October 11, 1955.

Fitting & Valve Symbols

<table>
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<tr>
<th>Fitting</th>
<th>Screwwel</th>
<th>Bolt &amp; Screw</th>
<th>Wedge</th>
<th>Submerged</th>
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<td>Bushing</td>
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<td>Cap</td>
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<td>Reducing Cross</td>
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<tr>
<td>Straight Size Cross</td>
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<th>Flange</th>
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<tr>
<th>Crossover</th>
<th>45° Elbow</th>
<th>90° Elbow</th>
<th>Turned Down</th>
<th>Turned Up</th>
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</thead>
</table>

61
AIR CONDITIONING SYMBOLS

Immersion Cooling Unit

Low Side Float

Motor-Compressor, Enclosed Crankcase, Reciprocating, Direct Connected

Motor-Compressor, Enclosed Crankcase, Rotary, Direct Connected

Motor-Compressor, Sealed Crankcase, Reciprocating

Motor-Compressor, Sealed Crankcase, Rotary

Pressurestat

Pressure Switch

Pressure Switch with High Pressure Cut-Out

Receiver, Vertical

Scale Trap

Spray Pond

Thermal Bulb

Thermostatic (Remote Bulb)

Valve, Automatic Expansion

Valve, Compressor Suction Pressure Limiting, Throttling Type (Compressor Side)

Valve, Constant Pressure, Suction

Valve, Evaporator Pressure Regulating, Snap Action

Valve, Evaporator Pressure Regulating, Thermostatic Throttling Type

Valve, Evaporator Pressure Regulating, Thermostatic Throttling Type (Evaporator Side)

Valve, Hand Expansion

Valve, Magnetic Stop

Valve, Snap Action

Valve, Suction Vapor Regulating

Valve, Thermo Suction

Valve, Thermostatic Expansion

Valve, Water

Vibration Absorber, Line
HEATING SYMBOLS

- Lock and Shield Valve
- Reducing Pressure Valve
- Relief Valve (either pressure or vacuum)
- Vent Point

VENTILATING SYMBOLS

- Access Door
- Adjustable Blank Off: TR 20 x 12
- Adjustable Plaque: P 20 x 12 - 700 CFM
- Automatic Dampers
- Canvas Connections
- Deflecting Damper
- Direction of Flow
- Duct (1st Figure, Side Shown; 2nd Side Not Shown): 12 x 20
- Duct Section (Exhaust or Return): (E OR R 20 x 12)
- Duct Section (Supply): (S 20 x 12)
- Exhaust Inlet Ceiling (Indicate Type): CR 20 x 12 - 700 CFM CG 20 x 12 - 700 CFM
- Exhaust Inlet Wall (Indicate Type): TR - 12 x 8 700 CFM
- Fan and Motor with Belt Guard
- Inclined Drop in Respect to Air Flow
- Inclined Rise in Respect to Air Flow
- Intake Louvers on Screen
- Louver Opening: L 20 x 12 - 700 CFM
- Supply Outlet Ceiling (Indicate Type): 20" DIAM 1000 CFM
- Supply Outlet Wall (Indicate Type): TR - 12 x 8 700 CFM
- Vanes
- Volume Damper
PIPING SYMBOLS

Air Conditioning
- Brine Return
- Brine Supply
- Circulating Chilled or Hot-Water Flow
- Condenser Water Flow
- Condenser Water Return
- Drain
- Humidification Line
- Make-Up Water
- Refrigerant Discharge
- Refrigerant Liquid
- Refrigerant Suction

HEATING
- Air-Retention Line
- Boiler Blow Off
- Compressed Air
- Condensate or Vacuum Pump Discharge
- Feedwater Pump Discharge
- Fuel-Oil Flow
- Fuel-Oil Return
- Fuel-Oil Tank Vent
- High-Pressure Return
- High-Pressure Steam
- Hot-Water Heating Return
- Hot-Water Heating Supply

PLUMBING
- Acid Waste
- Cold Water
- Compressed Air
- Drinking-Water Flow
- Drinking-Water Return
- Fire Line
- Gas
- Hot Water
- Hot-Water Return
- Soil, Waste or Leader (Above Grade)
- Soil, Waste or Leader (Below Grade)

VACUUM CLEANING
- Vent

PNEUMATIC TUBES
- Tube Riser

SPRINKLERS
- Branch and Head
- Drain
- Main Supply

HEATING SYMBOLS

- Air Eliminator
- Anchor
- Hanger or Support
- Heat Exchanger
- Heat Transfer Surface, Plan (Indicate type such as: radiator)
- Pump (Indicate type such as: vacuum)
- Strainer
- Tank (designate type)
- Thermostat

- Furnace
- Boiler Return Trap
- Blast Thermostatic Trap
- Float Trap
- Float & Thermostatic Trap
- Thermostatic Trap
- Unit Heater (Centrifugal Fan), Plan
- Unit Heater (Propeller), Plan
- Unit Ventilator, Plan
7.5.4 Inspection of Chimneys.

(a) Before replacing an existing appliance or connecting a vent connector to a chimney, the chimney passageway shall be examined to ascertain that it is properly lined, clear and free of obstructions and shall be cleaned if previously used for venting solid or liquid fuel-burning appliances or fireplaces.

Exception: Where permitted by the authority having jurisdiction, existing chimneys shall be permitted to have their use continued when an appliance is replaced by an appliance of similar type, input rating, and efficiency.

(b) Cleanouts shall be examined to determine they will remain tightly closed when not in use.

(c) When inspection reveals that an existing chimney is not safe for the intended application, it shall be repaired, rebuilt, lined, relined, or replaced with a vent or chimney to conform to Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances, NFPA 211, or local building codes, and shall be suitable for the equipment to be attached.
### Table XIII  Gas Input to Burner in Cubic Feet per Hour

<table>
<thead>
<tr>
<th>Seconds for One Revolution</th>
<th>One-Half Cu Ft</th>
<th>Size of Test Meter Dial</th>
<th>One Cu Ft</th>
<th>Two Cu Ft</th>
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**NOTE:** To convert to Btu per hour, multiply by the Btu heating value of the gas used.
What Is
The **INTERNATIONAL CODE COUNCIL (ICC)**?

The International Code Council is the leading global source of model codes and standards and building safety solutions. Code Council codes, standards and solutions are used to ensure safe, affordable and sustainable communities and buildings worldwide.

- Dedicated to all aspects of building safety including fire prevention, plumbing and sanitation, property maintenance, energy efficiency and resilience.
- Mission: provide the codes, tools, and resources that members rely on, building safety professionals turn to, and manufacturers and the public trust.
- Administers the development and maintenance of 15 model codes and 8 standards used to construct residential and commercial buildings in the U.S. including schools and hospitals.
- Not for profit organization.
- 64,000 members.
- 394 state and local chapters throughout the United States.
- Founding members include the National Association of Home Builders (NAHB), the American Institute of Architects (AIA), the American Gas Association (AGA), the Building Owners and Managers Association (BOMA) and the National Multifamily Housing Council (NMHC).

The Importance of Strong, Updated Building Codes

- According to the U.S. Environmental Protection Agency, the average person spends nearly 90% of their life inside buildings.
- Model codes set minimum requirements for building design, construction and operation to protect public health, safety and the natural resources that sustain us.
- The process of updating model codes every three years is optimal to ensure new technologies, materials and methods can be incorporated into the next generation of buildings to help us build better, smarter buildings as cost effectively as possible.
- Research has shown that strong building codes are our first and best line of defense against natural disasters.
- A National Institute of Building Sciences (NIBS) study concluded, on average, every $1 spent on mitigation at the federal level saves $11 in disaster relief.

Where are the International Codes (I-Codes) Adopted?

Turn the page to find out more ➤
Where are the International Codes (I-Codes) Adopted?

- The International Building Code (IBC) is adopted in all 50 states and the District of Columbia.
- The International Fire Code (IFC) is in use in 41 states and the District of Columbia.
- The International Residential Code (IRC) is in use in 49 states and the District of Columbia.
- The International Plumbing Code (IPC) is in use in 37 states and the District of Columbia.
- The International Mechanical Code (IMC) is in use in 46 states and the District of Columbia.
- The International Codes are in use in Puerto Rico, Guam, U.S. Virgin Islands, American Samoa and the Northern Mariana Islands.

The Importance of the Code Council

- Updated codes promote safe, resilient, efficient, and cost effective construction.
- Current codes protect the building owner's investment, enhance safety and foster innovation in the marketplace.
- For consumers, updated codes mean lower maintenance costs such as lower energy and water bills, less mechanical noise, and an overall higher quality of life.
- Current building codes spur innovation and are an incentive for American manufacturers to invest in product development.
- Current building codes also create a demand for new jobs including code enforcers, technical experts, tradesmen, construction workers, quality control assessors, and building and systems commissioning agents.

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- Accreditation
- Professional Development & Training
- Software & Technology
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</table>

NOTE: To convert to Btu per hour, multiply by the Btu heating value of the gas used.
<table>
<thead>
<tr>
<th>Appliance Category†</th>
<th>Vent Pressure</th>
<th>Temperature Above/Below Defined in Relevant ANSI Standard</th>
<th>Comment</th>
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<tr>
<td>I</td>
<td>Non-Positive*</td>
<td>Above</td>
<td>Natural draft venting</td>
</tr>
<tr>
<td>II</td>
<td>Non-Positive*</td>
<td>Below</td>
<td>Materials must be corrosion resistant. Condensate must be drained.</td>
</tr>
<tr>
<td>III</td>
<td>Positive**</td>
<td>Above</td>
<td>Vent must be gastight.</td>
</tr>
<tr>
<td>IV</td>
<td>Positive**</td>
<td>Below</td>
<td>Vent must be liquid and gastight. Condensate must be drained.</td>
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</table>

*Non-positive vent pressure means that even if fans or blowers are used in the appliance or vent systems, venting is accomplished by natural draft. (The vent pressure is lower than the atmospheric pressure.)

**Positive vent pressure means that fans, blowers, or other means are used to propel vent gases through the vent at above atmospheric pressure.

†The newer models of appliances will be identified as Category I, II, III, or IV on the name-plate on the appliance and will be stated as such in the manufacturers’ installation instructions.

### 7.4.2 Plastic Piping

Approved plastic piping shall be permitted to be used for venting equipment listed for use with such venting materials.

Prior to the introduction of high efficiency gas utilization equipment, plastic was prohibited as a vent material. High efficiency appliances reduced vent temperatures resulting in condensate formation, and as accumulation of condensate became a problem, plastic became the preferred material. Note that plastic vent materials can be used for listed gas utilization equipment only when specified in the manufacturers’ instructions.

### 7.4.3 Special Gas Vent

Special gas vent shall be listed and installed in accordance with the terms of the special gas vent listing and the manufacturers’ instructions.

Special gas vents are listed in accordance with UL 1738, *Standard for Safe Venting Systems for Gas-Burning Appliances*. Special gas vents will include in their installation instructions limitations on operating temperature, categories of appliance to be used with, clearance to combustible materials, and requirements for a vent cap, if any. All special gas vents are listed.
Figure A.7.8. Exit Terminals of Mechanical Draft and Direct Vent Venting Systems.
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from the NATIONAL FUEL GAS CODE HANDBOOK
Information About LP-Gas *

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<td>Lbs. per Gallon of Liquid at 60 °F</td>
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<td>Cu. Ft. of Vapor at 60 °F/Gal. of Liquid at 60 °F</td>
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<td>Cu. Ft. of Vapor at 60 °F/Lb. of Liquid at 60 °F</td>
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* Commercial quality. Figures shown in this chart represent average values.

Location of DOT Cylinders
From NFPA 58, Appendix G

Federal, state, and local ordinances and regulations should be observed at all times.

Notes: 1) 5 foot minimum between relief valve discharge and external source of ignition (air conditioner), direct vent, or mechanical ventilation system (attic fan).

2) If the DOT cylinder is filled on-site from a bulk truck, the filling connection and vent valve must be at least 10 feet from any external source of ignition, direct vent, or mechanical ventilation system.
# TANKS
HOT WATER STORAGE TANKS AND GENERATORS

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# FUEL OIL TANKS (UL-LABEL)

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<th>Weight Pounds</th>
<th>Size Inches</th>
<th>Capacity Gallons</th>
<th>Weight Pounds</th>
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<td>BY</td>
<td>TO OBTAIN</td>
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</table>

Circumference = 2πr = πd

Area = πr² = (πd²)/4
## CONTENTS IN CUBIC FEET U.S. GALLONS OF PIPES AND CYLINDERS

<table>
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<th>Diam. in Inches</th>
<th>For 1 Foot in Length</th>
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<th>For 1 Foot in Length</th>
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</table>

One cubic foot of air at 32 degrees F., atmospheric pressure, weighs 0.08073 pound.
One pound of water at 32 degrees F., a volume of 0.01662 cubic foot.
One pound of air at 32 degrees F., atmospheric pressure, has a volume of 12.347 cubic feet.
One gallon of water at 62 degrees F., weighs 8.336 pounds.
One pound of air at 32 degrees F., has a volume of 0.1199 U.S. gallon.
ZONING MADE EASY
RULES OF THUMB

FLOW RATE
\[
\frac{\text{Net Btuh Load}}{10,000} = \text{Flow Rate}
\]

MAXIMUM FLOW RATE

<table>
<thead>
<tr>
<th>Pipe Size (Copper)</th>
<th>Maximum Flow Rate</th>
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<tbody>
<tr>
<td>½&quot;</td>
<td>1½ gpm</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>4 gpm</td>
</tr>
<tr>
<td>1&quot;</td>
<td>8 gpm</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>14 gpm</td>
</tr>
</tbody>
</table>

MAXIMUM FLOW RATE & HEAT CARRYING CAPACITY

<table>
<thead>
<tr>
<th>Pipe Size (Copper)</th>
<th>Maximum Flow Rate</th>
<th>Heat Carrying Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot;</td>
<td>1½ gpm</td>
<td>15,000 Btuh</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>4 gpm</td>
<td>40,000 Btuh</td>
</tr>
<tr>
<td>1&quot;</td>
<td>8 gpm</td>
<td>80,000 Btuh</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>14 gpm</td>
<td>140,000 Btuh</td>
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</table>

(Based on a 20-degree temperature drop across the system)

MAXIMUM LENGTH OF FIN-TUBE BASEBOARD LOOP

<table>
<thead>
<tr>
<th>Baseboard Size (Copper)</th>
<th>Typical Btuh Per Linear Foot</th>
<th>Maximum Length of Baseboard Loop</th>
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<tbody>
<tr>
<td>½&quot;</td>
<td>600</td>
<td>25 feet</td>
</tr>
<tr>
<td>¾&quot;</td>
<td>600</td>
<td>67 feet</td>
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<tr>
<td>1&quot;</td>
<td>770</td>
<td>104 feet</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>790</td>
<td>177 feet</td>
</tr>
</tbody>
</table>

(Based on 180-degree average water temperature and a 20-degree temperature drop across the system)

“PUMP HEAD”

1. Measure the longest run in feet.
2. Add 50% to this.
3. Multiply that by .04, and
4. That’s the pump head!
### Heat Losses from Bare Steel Pipe

**Based On 70° Surrounding Air**

<table>
<thead>
<tr>
<th>Diameter of Pipe, Inches</th>
<th>100</th>
<th>120</th>
<th>150</th>
<th>180</th>
<th>210</th>
<th>240</th>
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<tbody>
<tr>
<td>Heat Loss per Lineal Foot of Pipe, BTU per Hour</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>23</td>
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<td>75</td>
<td>111</td>
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<td>27</td>
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### Heat Losses from Bare Tarnished Copper Tube

**Based On 70° Surrounding Air**

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<th>Diameter of Pipe, Inches</th>
<th>100</th>
<th>120</th>
<th>150</th>
<th>180</th>
<th>210</th>
<th>240</th>
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<td>Heat Loss per Lineal Foot of Pipe, BTU per Hour</td>
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</table>
RADIATOR RATINGS

The output of a radiator is measured in square feet of direct radiation. To determine the number of square feet of direct radiation in a radiator:
1. Identify the style of radiator—See Fig. 1 below.
2. Measure the height and width of the radiator.
3. Count the number of tubes in a section.
4. Count the number of sections.
5. Determine the square feet of radiation per section from the appropriate table and multiply by the number of sections.

Fig. 1 shows the relative sizes of radiator styles. All are four tube, eight section radiators but each rating is different.

EXAMPLE

Fig. 2 shows a tube type radiator, 20" high by 7" wide. There are four tubes per section and eight sections. The table on page four shows this size radiator has 2¼ square feet of radiation per section. 2¼ times 8 (the number of sections) equals 18 square feet of direct radiation in the radiator.

NOTE: All radiator dimensions and ratings in this booklet are approximate. Ratings should be used for checking the total radiation connected to an existing boiler.

OLD STYLE COLUMN RADIATORS

<table>
<thead>
<tr>
<th>Width</th>
<th>4⅛&quot;</th>
<th>7⅜&quot;</th>
<th>9&quot;</th>
<th>11½&quot;</th>
<th>12½&quot;</th>
<th>12½&quot;</th>
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<tbody>
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<td>Height In.</td>
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<td>3½</td>
<td>4½</td>
<td>5⅓</td>
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<td>2½</td>
<td>3¼</td>
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<td></td>
<td>23&quot;</td>
<td>1½</td>
<td>2½</td>
<td>3¼</td>
<td>4½</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>22&quot;</td>
<td>1½</td>
<td>2¼</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>20&quot;</td>
<td>1½</td>
<td>2</td>
<td>2¼</td>
<td>3½</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>18&quot;</td>
<td>1½</td>
<td>1¼</td>
<td>2¼</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>17&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>16&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>15&quot;</td>
<td>—</td>
<td>1½</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>14&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4</td>
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<td></td>
<td>13&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3</td>
</tr>
</tbody>
</table>
## TUBE TYPE RADIATORS

**SQ. FT. OF RADIATION PER SECTION**

<table>
<thead>
<tr>
<th>NO. OF TUBES</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Width</strong></td>
<td>5”</td>
<td>7”</td>
<td>8⅜”</td>
<td>9⅜”</td>
<td>12½”</td>
</tr>
<tr>
<td><strong>Height In.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38”</td>
<td>3½</td>
<td>4¼</td>
<td>5</td>
<td>6</td>
<td>—</td>
</tr>
<tr>
<td>36”</td>
<td>3½</td>
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</tr>
<tr>
<td>32”</td>
<td>3</td>
<td>3½</td>
<td>4⅜</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>26”</td>
<td>2½</td>
<td>2¾</td>
<td>3½</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23”</td>
<td>2</td>
<td>2½</td>
<td>3</td>
<td>3½</td>
<td>4½</td>
</tr>
<tr>
<td>22”</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4½</td>
</tr>
<tr>
<td>20”</td>
<td>1¾</td>
<td>2¼</td>
<td>2½</td>
<td>3</td>
<td>3½</td>
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<tr>
<td>18”</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3½</td>
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<tr>
<td>17”</td>
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<tr>
<td>14”</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2½</td>
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</table>

## THIN TUBE RADIATORS

**SQ. FT. OF RADIATION PER SECTION**

<table>
<thead>
<tr>
<th>NO. OF TUBES</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Width</strong></td>
<td>3½”</td>
<td>4”</td>
<td>4⅜”</td>
<td>6”</td>
<td>7⅞”</td>
</tr>
<tr>
<td><strong>Height In.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38”</td>
<td>2.5</td>
<td>2.6</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>32”</td>
<td>2.0</td>
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<td>—</td>
<td>—</td>
<td>3.7</td>
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<tr>
<td>26”</td>
<td>—</td>
<td>2.4</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>25”</td>
<td>1.6</td>
<td>1.6</td>
<td>2.0</td>
<td>—</td>
<td>3.0</td>
</tr>
<tr>
<td>23”</td>
<td>—</td>
<td>—</td>
<td>2.1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>22”</td>
<td>1.3</td>
<td>1.4</td>
<td>1.8</td>
<td>—</td>
<td>—</td>
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<tr>
<td>20”</td>
<td>—</td>
<td>—</td>
<td>1.8</td>
<td>—</td>
<td>2.3</td>
</tr>
<tr>
<td>19”</td>
<td>1.1</td>
<td>1.2</td>
<td>1.6</td>
<td>—</td>
<td>2.3</td>
</tr>
<tr>
<td>17”</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>—</td>
</tr>
</tbody>
</table>
### WALL TYPE RADIATORS

<table>
<thead>
<tr>
<th>Size</th>
<th>Sq. Ft. Per Radiator</th>
</tr>
</thead>
<tbody>
<tr>
<td>13½&quot; x 17&quot; x 3&quot;</td>
<td>5</td>
</tr>
<tr>
<td>13½&quot; x 21&quot; x 3&quot;</td>
<td>6</td>
</tr>
<tr>
<td>13½&quot; x 22&quot; x 3&quot;</td>
<td>7</td>
</tr>
<tr>
<td>13½&quot; x 29&quot; x 3&quot;</td>
<td>9</td>
</tr>
</tbody>
</table>

### SECTIONAL WALL TYPE RADIATORS

<table>
<thead>
<tr>
<th>Height</th>
<th>Sq. Ft.</th>
<th>Radiation</th>
<th>Per Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>37&quot;</td>
<td>2½</td>
<td>1½</td>
<td>1</td>
</tr>
<tr>
<td>26½&quot;</td>
<td>21½</td>
<td>15&quot;</td>
<td>13¾&quot;</td>
</tr>
</tbody>
</table>

### RADIATOR RATING STANDARDS

A SQUARE FOOT OF STEAM RADIATION is based on a heat emission of 240 BTU per hour per square foot, with standard 70°F air temperature and 215°F steam temperature in the radiator.

A SQUARE FOOT OF WATER RADIATION is based on a heat emission of 150 BTU per hour per square foot, with standard 70°F air temperature and an average water temperature in the radiator of 170°F.

A different rate of heat emission will be obtained when the average water temperature in the radiator is higher or lower than 170°F. See table below.

**EXAMPLE:** A structure has a calculated heat loss of 63,000 BTU and an average water temperature in the radiators of 200°F. As shown in the heat emission table, with 200°F average water temperature, the heat emission is 210 BTU per square foot of radiation. Therefore, the footage which must be used in selecting radiators is 300 sq. ft. (63,000 ÷ 210 = 300). Select the boiler on 63,000 BTU net rating.

### HEAT EMISSION based on Room Temperature of 70°F.

<table>
<thead>
<tr>
<th>AVERAGE WATER TEMP. IN RADIATORS °F</th>
<th>HEAT EMISSION BTU PER HOUR SQ. FT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>160</td>
</tr>
<tr>
<td>160</td>
<td>170</td>
</tr>
<tr>
<td>180</td>
<td>190</td>
</tr>
<tr>
<td>200</td>
<td>210</td>
</tr>
<tr>
<td>210</td>
<td>215</td>
</tr>
<tr>
<td>110</td>
<td>130</td>
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<tr>
<td>150</td>
<td>170</td>
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<td>190</td>
<td>210</td>
</tr>
<tr>
<td>210</td>
<td>230</td>
</tr>
<tr>
<td>240</td>
<td></td>
</tr>
</tbody>
</table>

### WEIL-McCLAIN BASEBOARD RADIATION RATINGS

Capacities per Lineal Foot in BTU/Hr. with 85°F F. Entering Air

#### CAST IRON BASEBOARD

<table>
<thead>
<tr>
<th>MODEL</th>
<th>STEAM RATING SQ. FT. STEAM @ 215° F.</th>
<th>WATER FLOW RATE — 500 LBS./HR. OR 1 GPM</th>
<th>AVERAGE WATER TEMPERATURE BETWEEN INLET AND OUTLET — °F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 9</td>
<td>3.35</td>
<td>390</td>
<td>150 160 170 180 190 200 210</td>
</tr>
</tbody>
</table>

#### CONVECTOR BASEBOARD

<table>
<thead>
<tr>
<th>MODEL</th>
<th>WATER FLOW RATE — 500 LBS./HR. OR 1 GPM</th>
<th>AVERAGE WATER TEMPERATURE BETWEEN INLET AND OUTLET — °F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 75 WL-3 (¾&quot; Tube)</td>
<td>THERMA TRIM 530 600 670 740 810 870 — —</td>
<td></td>
</tr>
<tr>
<td>Model 75 H (¾&quot; Tube)</td>
<td>HIGH TRIM 680 760 850 940 1,030 1,110 1,200 1,290</td>
<td></td>
</tr>
</tbody>
</table>

85
# CHAPTER 5 - WATER CONTENT
## EXISTING RADIATION/PIPING
### A. RADIATION:

<table>
<thead>
<tr>
<th>based on Sq. Ft. Rating</th>
<th>Water Content/Gal.</th>
<th>Weight/Lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slenderized Radiators</td>
<td>0.066</td>
<td>4.5</td>
</tr>
<tr>
<td>Large Tube Radiators</td>
<td>0.103</td>
<td>5.25</td>
</tr>
<tr>
<td>Column Radiators</td>
<td>0.188</td>
<td>7.0</td>
</tr>
<tr>
<td>Convectors (Non-Ferrous)</td>
<td>0.004</td>
<td>1.5</td>
</tr>
<tr>
<td>Convectors (Cast Iron)</td>
<td>0.04</td>
<td>3.4</td>
</tr>
<tr>
<td>Radiant Radiators</td>
<td>0.066</td>
<td>5.0</td>
</tr>
<tr>
<td>Base-Ray (Cast Iron Baseboard)</td>
<td>0.066</td>
<td>4.4</td>
</tr>
</tbody>
</table>

### B. STEEL AND WROUGHT IRON PIPE (STD. WGT.)

<table>
<thead>
<tr>
<th>Nominal Size: Inches</th>
<th>Based On Lineal Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water Content/Gal.</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>.016</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>.028</td>
</tr>
<tr>
<td>1&quot;</td>
<td>.045</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>.078</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>.106</td>
</tr>
<tr>
<td>2&quot;</td>
<td>.174</td>
</tr>
<tr>
<td>2¼&quot;</td>
<td>.249</td>
</tr>
<tr>
<td>3&quot;</td>
<td>.384</td>
</tr>
<tr>
<td>4&quot;</td>
<td>.661</td>
</tr>
<tr>
<td>5&quot;</td>
<td>1.039</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1.501</td>
</tr>
</tbody>
</table>

### C. COPPER TUBING (TYPE L)

<table>
<thead>
<tr>
<th>Nominal Size: Inches</th>
<th>Based on Lineal Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water Content/Gal.</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>.007</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>.012</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>.018</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>.025</td>
</tr>
<tr>
<td>1&quot;</td>
<td>.043</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>.065</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>.092</td>
</tr>
<tr>
<td>2&quot;</td>
<td>.161</td>
</tr>
</tbody>
</table>

### D. WATER CONVERSION FACTORS

- Lbs. of Water x 0.12 = Gallons
- Gallons of Water x 8.33 = Lbs.
- Lbs. of Water x 27.68 = Cubic Inches
- Gallons of Water x 231 = Cubic Inches
- Cubic Inches + 1728 = Cubic Feet
CHAPTER 7 - FUEL CONSUMPTION AND ENERGY COST

There are several ways to calculate the operational cost of a specific boiler in a particular location. The accuracy of each will depend on the attention one gives the many variables.

Two popular methods are the "bin" and "degree-day". Though the "bin" method has the potential to be more accurate, it is more complicated and necessary weather data is not readily available. Discussion will be limited to the "Degree-Day" method.

The "Degree-Day" method is not without controversy. Historically, the reference temperature is 65°. This assumes that a building with average insulation and a thermostat set at 70° will cause a boiler to begin operation when outdoor temperature falls below 65°. Overlooked variables could be sunshine, wind, heavier insulation, different thermostat setting.

WHAT IS A DEGREE DAY?

When the outside temperature falls below 65°F, heat will be required to maintain the temperature within the building. The average outside temperature is estimated by adding the high and low temperature for a given day and dividing by two. (Example: A high of 40°F and a low of 20°F would be equivalent to a 30°F average temperature.) "Degree Days" are defined as the difference between the average temperature and the 65°F reference temperature. Therefore, 65°F minus 30°F equals 35 "Degree Days".

Degree Days = 65 - (high + low)/2

FUEL CONSUMPTION

In order to determine fuel usage the D.D. is used in the following equation:

\[
F = \frac{HL \times 24 \times DD}{E \times P \times T.D.}
\]

| HL = Heating Load (Btuh) |
| DD = Degree Day          |
| 24 = Hours in a day      |
| E  = Boiler Efficiency (AFUE) |
| P  = Heating value of fuel (Btu) |
| T.D. = Design temperature difference (inside-outside) |
| F  = Annual fuel consumption |
### TYPICAL DEGREE DAY FOR A FEW LOCATIONS:

<table>
<thead>
<tr>
<th>Location</th>
<th>2010 Heating Degree Days</th>
<th>2011 Heating Degree Days</th>
<th>2012 Heating Degree Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangor 04401</td>
<td>8055</td>
<td>8825</td>
<td>8572</td>
</tr>
<tr>
<td>Portland 04112</td>
<td>7686</td>
<td>8040</td>
<td>7683</td>
</tr>
<tr>
<td>Presque Isle 04769</td>
<td>9565</td>
<td>10382</td>
<td>10083</td>
</tr>
<tr>
<td>Waterville 04901</td>
<td>8172</td>
<td>8662</td>
<td>8551</td>
</tr>
<tr>
<td>Wells 04090</td>
<td>7958</td>
<td>8293</td>
<td>7813</td>
</tr>
</tbody>
</table>


**BTU PER GALLON HEATING #2 HEATING OIL 138,690 BTU/GALLON**

**BTU PER GALLON PROPANE 91,333 BTU/GALLON**

**OUTDOOR DESIGN TEMPERATURES 97.5%**

Bangor -6, Portland -1, Waterville -4, Presque Isle -9, Wells 0
The Wind Chill Factor

Simple air temperature is not a reliable indicator of how we may feel outdoors. Other weather elements such as humidity, sunshine and wind speed all influence the “real” temperature. How do you measure wind speed without an instrument? Roughly, a wind speed up to 12 mph puts leaves in motion and can just be felt on the face . . . 13-24 mph moves small branches, raises dust, etc. . . . 25-30 mph makes wires whistle and moves large branches . . . 30-40 mph makes whole trees move and is difficult to walk against. This chart shows you must never underestimate the effect of the wind on outside temperatures. Obviously, winds also have relative effects on inside temperatures.

Wind Chill Chart

<table>
<thead>
<tr>
<th>Current Temperature</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
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</thead>
<tbody>
<tr>
<td>35</td>
<td>33</td>
<td>21</td>
<td>16</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>27</td>
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<td>11</td>
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<td>0</td>
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<td>-4</td>
<td>-4</td>
<td>-6</td>
<td>-7</td>
</tr>
<tr>
<td>25</td>
<td>21</td>
<td>9</td>
<td>1</td>
<td>-4</td>
<td>-7</td>
<td>-11</td>
<td>-13</td>
<td>-15</td>
<td>-17</td>
<td>-17</td>
</tr>
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<td>-6</td>
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<td>-22</td>
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<td>-24</td>
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<tr>
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<td>-11</td>
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<td>-31</td>
<td>-31</td>
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<tr>
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<td>-123</td>
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<td>-128</td>
</tr>
</tbody>
</table>
Radiant Panel Association
QUICK REFERENCE SHEET
to RPA Guidelines for Hydronic Radiant Floor Heating

Special Insulation Considerations:

<table>
<thead>
<tr>
<th>Application</th>
<th>Min. R-Value</th>
<th>Coverage/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slab on Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate #1</td>
<td>*(T-T) 0.125</td>
<td>perimeter to below frost line</td>
</tr>
<tr>
<td>Alternate #2</td>
<td>R-10</td>
<td>4' horizontal or vertical at perimeter</td>
</tr>
<tr>
<td>Conductive Soil</td>
<td>R-10</td>
<td>under entire slab</td>
</tr>
<tr>
<td>Suspended Floors</td>
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<td>Over Heated Space</td>
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<td>Hard Surface</td>
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<td>Carpeted Surface</td>
<td>R-13</td>
<td>under entire floor w/ 2&quot; air gap</td>
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<tr>
<td>Over Unheated Space</td>
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<td>Hard Surface</td>
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<td>under entire floor w/ 2&quot; air gap</td>
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<td>Carpeted Surface</td>
<td>R-19</td>
<td>under entire floor w/ 2&quot; air gap</td>
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<td>Walls With Panels</td>
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<tr>
<td>outside wall</td>
<td>R-13</td>
<td>entire wall</td>
</tr>
<tr>
<td>inside wall</td>
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<td>Ceiling With Panels</td>
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<tr>
<td>inside ceiling</td>
<td>R-11</td>
<td>entire ceiling above panel</td>
</tr>
<tr>
<td>outside ceiling</td>
<td>R-30</td>
<td>entire ceiling above panel</td>
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</tbody>
</table>

*R-value = Inside Temperature - Outdoor Temperature x 0.125

Pressure Testing Embedded Tubing - 100 PSI for at least 30 minutes

Floor Surface Temperatures - 85°F max. in prolonged foot contact areas
90°F max. other than prolonged foot contact areas
85°F max. on solid or laminated hardwood flooring

Fluid Temperatures - 140° max. in gypsum based thermal mass
160° max. underside of wood subfloor
180° max. underside of wood subfloor when approved by tubing manufacturer’s design methods

Floor Covering - R-value not to exceed design requirement

Tube Placement -
 Structural Slab 2" min. below surface, no tube joints in slab, sleeved a min. of 4” either side of expansion joint
 Non-structural 3/4” underlayment over highest point in tube
 1/8” min. gap between butt ends of aluminum plates
 no inaccessible tube joints
 Joist Space 1/8” min. gap between butt ends of aluminum plates
 2” air gap below tube except where aluminum plates are used

Tube Length -

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<thead>
<tr>
<th>Tube Size</th>
<th>Recommended</th>
<th>Maximum</th>
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<tr>
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<td>125 ft.</td>
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<tr>
<td>3/8” I.D. tubing</td>
<td>200 ft.</td>
<td>250 ft.</td>
</tr>
<tr>
<td>1/2” I.D. tubing</td>
<td>250 ft.</td>
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</tr>
<tr>
<td>5/8” I.D. tubing</td>
<td>400 ft.</td>
<td>500 ft.</td>
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<td>3/4” I.D. tubing</td>
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<tr>
<td>1” I.D. tubing</td>
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Oxygen Permeation - Three options
Oxygen barrier tube, less than 0.1 gram/m3/day at 40°
Heat Exchanger to isolate non-oxygen barrier tube
Water treatment to inhibit corrosion due to oxygen

RPA Proposed Guideline for review only
Location of ASME Containers
From NFPA 58, Appendix G

Federal, state, and local ordinances and regulations should be observed at all times.

Notes:
1) Regardless of its size, any ASME tank filled on-site must be located so that the filling connection and fixed liquid level gauge are at least 10 feet from external source of ignition (e.g., open flame, window A/C, compressor, etc.), intake to direct vented gas appliance or intake to a mechanical ventilation system.
2) May be reduced to 10 feet minimum for a single container of 1200 gallons water capacity or less if it is located at least 25 feet from any other LP-Gas container of more than 125 gallons water capacity.
3) Minimum distances from underground containers shall be measured from the relief valve and filling or level gauge vent connection at the container, except that no part of an underground container shall be less than 10 feet from a building or line of adjoining property which may be built upon.
4) Where the container may be subject to abrasive action or physical damage due to vehicular traffic or other causes, it must be either a) placed not less than 2 feet below grade; b) otherwise protected against such physical damage.

Table 4 — Second, Single, or Integral Twin Stage Pipe Sizing
11 Inches Water Column inlet with a 1/2 Inch Water Column Drop
Maximum capacity of pipe or tubing in thousands of BTU/hr of LP-Gas

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* Total length of piping from outlet of regulator to appliance furthest away.

Data Calculated per NFPA #54 & 58.
Table 12.14 Maximum Capacity of CSST in Thousands of Btu per Hour of Undiluted
Liquefied Petroleum Gases at a Pressure of 11-in. Water Column and a Pressure Drop of 0.5-in.
Water Column (based on a 1.52 specific gravity gas)

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</table>

Note: Table includes losses for four 90-degree bends and two end fittings. Tubing runs with larger numbers of bends or fittings shall be increased by an equivalent length of tubing to the following equation: \( L = 1.3n \) where \( L \) is additional length (ft) of tubing and \( n \) is the number of additional fittings or bends.

*EHD — equivalent hydraulic diameter — a measure of the relative hydraulic efficiency between different tubing sizes. The greater the value of EHD, the greater the gas capacity of the tubing.

307.2 Cutting, notching or bored holes. A framing member shall not be cut, notched or bored in excess of limitations specified in the International Building Code.

♦ Cutting, notching or hole boring of structural members should be avoided whenever possible. The code recognizes that it is occasionally necessary to cut, notch or bore through studs, joists, beams, rafters or other structural members to install pipes, plumbing fixtures and appliances (see Figures 307.2(1) and 307.2(2)). In order to maintain the integrity and load-carrying capacity of these structural members, the IBC is referenced to regulate the size and location of holes, notches, and other such modifications (see IBC Sections 2308.8.2 and 2308.9.10). If a structural member is to be modified beyond what is specifically permitted by the IBC, a structural analysis performed by a registered design professional and approved by the code official would be necessary to determine the effect that an alteration has had or will have on the load-carrying capacity of that structural member. Clearly, this should be considered before such alteration is made. Thoughtless cutting can result in an unnecessary hazard and expensive repair or replacement of improperly modified structural members.

![Diagram of notches or holes in wood studs](image)
307.3 Penetrations of floor/ceiling assemblies and fire-resistance-rated assemblies. Penetrations of floor/ceiling assemblies and assemblies required to have a fire-resistance rating shall be protected in accordance with the International Building Code.

This section provides the requirement for the protection of penetrations and openings necessary for plumbing pipe in building assemblies that are required to be fire-resistance rated. In addition to maintaining the structural integrity of walls, floors, ceilings and roofs when these elements are penetrated by the plumbing pipe, the penetrations must also be protected to prevent the passage of fire and other products of combustion through the fire-resistance-rated assembly because of the pipe penetrating the assembly. These penetrations must be protected in accordance with the IBC [see Sections 711 and 712 of the IBC and Figures 307.3(1) through 307.3(4)].

[B] 307.4 Alterations to trusses. Truss members and components shall not be cut, drilled, notched, spliced or otherwise altered in any way without written concurrence and approval of a registered design professional. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, water heater) shall be permitted without verification that the truss is capable of supporting such additional loading.

Trusses are engineered products, and any alteration to specific elements may prevent the truss from performing as intended. The code does not permit drilling and notching of truss members and components without documentation that the design has taken this possibility into account. Additionally, trusses are designed to resist specific loads; changing the loading on the truss or on any of its members should not be done without approval of a registered design professional.
Figure 307.3(1) COMBUSTIBLE PIPE PENETRATION OF FIRE WALL

Figure 307.3(2) ANNULAR SPACE PROTECTION

Figure 307.3(3) PIPE PENETRATION OF FIRE-RESISTANCE-RATED ROOF/CEILING ASSEMBLY
## HTX & SXHT Series
Hydronic Expansion Tanks

### QUICK SIZING GUIDE

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<th>Type of Radiation</th>
<th>Convector &amp; Unit Heaters</th>
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Sizing recommendations based on average size systems.
Fill pressure 12 PSI. Relief valve 30 PSI.
Average system water temperature 200°F.
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Hydronic Expansion Tanks

HTX & SXHT Series

FLEXCON Industries

Plumbing & Heating Division
# PH, WH & WHV Series
Potable Water Thermal Expansion Tanks

## Quick Sizing Guide

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Based on total water heater recovery from 40°F.
Based on water supply pressure of 60 PSIG.
Relief valve set at 150 PSIG.
Adjust tank precharge to equal incoming water pressure.

300 Pond Street, Randolph, Massachusetts 02368
Call 1.781.986.2424 • Fax 1.781.986.2029
www.flexconind.com
<table>
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<tr>
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**Competitive Cross-Reference Guide**

**Thermal Expansion Tanks**

**PH, WH & WHY Series Portable Water**
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**For greater accuracy use formula below:**

To convert from Celsius to Fahrenheit:

\[ °F = \left( \frac{9}{5} \right) °C + 32 \]

To convert from Fahrenheit to Celsius:

\[ °C = \left( \frac{5}{9} \right) (°F - 32) \]

°C = temperature in degrees Celsius
°F = temperature in degrees Fahrenheit
Maine Home Construction Contracts

The Maine Home Construction Contracts Act requires you use a written contract with specific provisions whenever the construction or repair contract is for more than $3,000. For example, the contract must limit any down payment to no more than one third (1/3) of the total price and the contract must include an express warranty of good workmanship. A sample contract can be found at www.maine.gov/ag at chapter 18. Another important feature of this statute is that you are now required to attach a copy of the AG’s “consumer protection information on home construction and repair, which includes information on contractors successfully sued by the State” and the Statute also requires a clear and conspicuous notice on your contract strongly advising the consumer to visit the AG website at www.maine.gov/ag or telephone the AG at 1-800-436-2131.

§ 1487. Home Construction Contracts Any home construction contract for more than $3,000 in materials or labor must be in writing and must be signed by both the home construction contractor and the homeowner or lessee. Both the contractor and the homeowner or lessee shall receive a copy of the executed contract prior to any work performance. This basic contract must contain the entire agreement between the homeowner or lessee and the home construction contractor and must contain at least the following parts:

1. Names of parties. The name, address and phone number of both the home construction contractor and the homeowner or lessee;
2. Location. The location of the property upon which the construction work is to be done;
3. Work dates. Both the estimated date of commencement of work and the estimated date when the work will be substantially completed. The estimated date of commencement of work and the completion date may be changed if work cannot begin or end due to circumstances beyond the control of the contractor, including, but not limited to, the lack of readiness of the job site or the unavailability of building materials;
4. Contract price. The total contract price, including all costs to be incurred in the proper performance of the work, or, if the work is priced according to a "cost-plus" formula, the agreed-upon price and an estimate of the cost of labor and materials;
5. Payment. The method of payment, with the initial down payment being limited to no more than one-third of the total contract price;
6. Description of the work. A general description of the work and materials to be used;
7. Warranty. A warranty statement which reads: In addition to any additional warranties agreed to by the parties, the contractor warrants that the work will be free from faulty materials; constructed according to the standards of the building code applicable for this location; constructed in a skillful manner and fit for habitation or appropriate use. The warranty rights and remedies set forth in the Maine Uniform Commercial Code apply to this contract;
8. Resolution of disputes. A statement allowing the parties the option to adopt one of 3 methods of resolving contract disputes. At a minimum, this statement must provide the following information:
If a dispute arises concerning the provisions of this contract or the performance by the parties, then the parties agree to settle this dispute by jointly paying for one of the following (check only one):

Binding arbitration as regulated by the Maine Uniform Arbitration Act, with the parties agreeing to accept as final the arbitrator's decision (_____);

1. Nonbinding arbitration, with the parties free to not accept the arbitrator's decision and to seek satisfaction through other means, including a lawsuit (_____);
2. Mediation, with the parties agreeing to enter into good faith negotiations through a neutral mediator in order to attempt to resolve their differences (_____);

9. Change orders. A change order statement which reads: Any alteration or deviation from the above contractual specifications that result in a revision of the contract price will be executed only upon the parties entering into a written change order;

10. Door-to-door sales. If the contract is being used for sales regulated by the consumer solicitation sales law, Title 32, chapter 69, subchapter V or the home solicitation sales law, Title 9-A, Part 5, a description of the consumer's rights to avoid the contract, as set forth in these laws;

11. Residential insulation. If the construction includes installation of insulation in an existing residence, any disclosures required by chapter 219, Insulation Contractors; and

12. Energy standards. A statement by the contractor that chapter 214 establishes minimum energy efficient building standards for new residential construction, and whether the new building or an addition to an existing building will meet or exceed those standards.

§ 1488. Change Orders Each change order to a home construction contract must be in writing and becomes a part of and is in conformance with the existing contract. All work shall be performed under the same terms and conditions as specified in the original contract unless otherwise stipulated. The change order must detail all changes to the original contract that result in a revision of the contract price. The previous contract price must be stated and the revised price shall also be stated. Both parties must sign the change order.

§ 1489. Exemption Parties to a home construction contract may exempt themselves from the requirements of this chapter only if the contractor specifically informs the homeowner or lessee of his rights under this chapter and the parties then mutually agree to a contract or change order that does not contain the parts set forth in sections 1487 and 1488
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ACTON
Mike Gilpatrick
35 H Rd
Acton, ME 04001
Office: (207) 636-3497 ext 409
ceo@actonmaine.org

ADDISON
Judy Rolfe
PO Box 142
Addison, ME 04606
Office: (207) 546-6031

ALBION
Crystal Nichols
Home: (207) 716-6338
ceoalbion@uninets.net

ALEXANDER
Allan Sutherland
Phone: (207) 904-8891
sutherlandallan952@yahoo.com

ALFRED
James Allaire
Phone: (207) 324-5872 ext 206
jallaire@alfredme.gov

AMITY
Clarissa Porter
Phone: (207) 538-5467

ANDOVER
Richard Coulombe
17 Stillman Rd
Andover, ME 04216
Office: (207) 392-3302

ANSON
Leo Mayo
PO Box 297
Anson, ME 04911
Office: (207) 696-3979
lem4749@gmail.com

APPLETON
David Schofield
Phone: (207) 332-7365
mschof@uninets.net

ARROWSIC
Chris Wilcoxson
58 Iron Mine Rd
Arrowsic, ME 04530
Phone: (207) 650-2920
chris.wilcoxson@arrowsic.org

ARUNDEL
James Nagle
PO Box 263
Long Island, ME 04050
Office: (207) 985-4201 ext 107
ceo@arundelmaine.org

ASHLAND
Margaret Pierce
73 Fox Hill Rd
Portage Lake, ME 04768
Office: (207) 554-0289
mpierce17@aol.com

ATHENS
Kenneth A Hogate
Phone: (207) 674-3471

AUBURN
Mark Stambach
60 Court St, Ste 104
Auburn, ME 04210
Office: (207) 333-6601 ext 1160
mstambach@auburnmaine.gov

AUGUSTA
Keegan Ballard
16 Cony St City Center
Augusta, ME 04330
Office: (207) 333-6600
keegen.ballard@augustamaine.gov

Robert Overton
Office: (207) 626-2365
robert.overton@augustamaine.gov

AVON
Stephen Ochmanski
1116 Rangeley Rd
PO Box 330
Phillips, ME 04966
Office: (207) 639-5326
Home: (207) 268-4721

BAILEYVILLE
Andrew Snowman
PO Box 370
Baileyville, ME 04694
Phone: (207) 427-3442
codeenforcementplanning@baileyville.org
<table>
<thead>
<tr>
<th>BALDWIN</th>
<th>Wes Sunderland</th>
<th>534 Pequawket Trail</th>
<th>West Baldwin, ME 04091</th>
<th>Phone: (207) 625-7000</th>
<th><a href="mailto:wssunderland@roadrunner.com">wssunderland@roadrunner.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>BANGOR</td>
<td>Jeff Wallace</td>
<td>City Hall 73 Harlow St</td>
<td>Bangor, ME 04401</td>
<td>Phone: (207) 992-4230</td>
<td><a href="mailto:code.enf@bangormaine.gov">code.enf@bangormaine.gov</a></td>
</tr>
<tr>
<td>BAR HARBOR</td>
<td>Angela Chamberlain</td>
<td>93 Cottage St</td>
<td>Bar Harbor, ME 04609</td>
<td>Office: (207) 288-3329</td>
<td><a href="mailto:ceo@barhARBORMaine.gov">ceo@barhARBORMaine.gov</a></td>
</tr>
<tr>
<td>BATH</td>
<td>Scott Davis</td>
<td>55 Front St</td>
<td>Bath, ME 04530</td>
<td>Office: (207) 443-8334</td>
<td><a href="mailto:sdavis@cityofbath.com">sdavis@cityofbath.com</a></td>
</tr>
<tr>
<td>BEAVER COVE</td>
<td>Brian Turner</td>
<td>Phone: (207) 997-3287</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BELFAST</td>
<td>Steve Wilson</td>
<td>131 Church St</td>
<td>Belfast, ME 04915</td>
<td>Phone: (207) 338-3370 ext 133</td>
<td><a href="mailto:ceo@cityofBELFAST.org">ceo@cityofBELFAST.org</a></td>
</tr>
<tr>
<td>BELGRADE</td>
<td>Gary A Fuller</td>
<td>16 Cony St City Center</td>
<td>Augusta, ME 04330</td>
<td>Office: (207) 495-2258</td>
<td>Cell: (207) 441-5302</td>
</tr>
<tr>
<td>BELMONT</td>
<td>Toupie Rooney</td>
<td>613 Back Belmont Rd</td>
<td>Belmont, ME 04952</td>
<td>Office: (207) 342-5722</td>
<td>Cell: (207) 322-2436</td>
</tr>
<tr>
<td>BERWICK</td>
<td>Jenifer McCabe</td>
<td>11 Sullivan St</td>
<td>Berwick, ME 03901</td>
<td>Phone: (207) 698-1101 ext 122</td>
<td><a href="mailto:jmccabe@berwickmaine.org">jmccabe@berwickmaine.org</a></td>
</tr>
<tr>
<td>BETHEL</td>
<td>Toby Walker</td>
<td>19 Main St</td>
<td>Bethel, ME 04217</td>
<td>Office: (207) 824-2669</td>
<td><a href="mailto:ceo@bethelmaine.org">ceo@bethelmaine.org</a></td>
</tr>
<tr>
<td>BIDDEFORD</td>
<td>Roby Fecteau</td>
<td>205 Main St</td>
<td>Biddeford, ME 04005</td>
<td>Office: (207) 284-9236</td>
<td><a href="mailto:roby.fecteau@biddefordmaine.org">roby.fecteau@biddefordmaine.org</a></td>
</tr>
<tr>
<td>BINGHAM</td>
<td>Timothy Andrews</td>
<td>PO Box 652</td>
<td>Bingham, ME 04920</td>
<td>Phone: (207) 592-5638</td>
<td></td>
</tr>
<tr>
<td>BLUE HILL</td>
<td>Judy Jenkins</td>
<td>PO Box 144</td>
<td>Penobscot, ME 04476</td>
<td>Office: (207) 374-5192</td>
<td><a href="mailto:judybluehill@yahoo.com">judybluehill@yahoo.com</a></td>
</tr>
<tr>
<td>BOOTHBAY</td>
<td>Corey Lane</td>
<td>PO Box 106</td>
<td>Boothbay, ME 04537</td>
<td>Office: (207) 633-2051 ext 19</td>
<td><a href="mailto:jlorrain@townofboothbay.org">jlorrain@townofboothbay.org</a></td>
</tr>
<tr>
<td>BOOTHBAY HARBOR</td>
<td>Geoff Smith</td>
<td>11 Howard St</td>
<td>Boothbay Harbor, ME 04538</td>
<td>Office: (207) 633-3671</td>
<td><a href="mailto:gsmith@boothbayharbor.org">gsmith@boothbayharbor.org</a></td>
</tr>
<tr>
<td>BOWDOIN</td>
<td>Dennis Douglass</td>
<td>23 Cornish Dr</td>
<td>Bowdoin, ME 04287</td>
<td>Phone: (207) 353-6949</td>
<td>Cell: (207) 751-6778</td>
</tr>
<tr>
<td>BOWDOINHAM</td>
<td>Darren Carey</td>
<td>13 School St</td>
<td>Bowdoinham, ME 04008</td>
<td>Office: (207) 666-5531</td>
<td><a href="mailto:dcarey@bowdoinham.com">dcarey@bowdoinham.com</a></td>
</tr>
<tr>
<td>BOWERBANK</td>
<td>Brian Turner</td>
<td>PO Box 41</td>
<td>Monson, ME 04464</td>
<td>Phone: (207) 343-1669</td>
<td><a href="mailto:townofbowerbank@gmail.com">townofbowerbank@gmail.com</a></td>
</tr>
<tr>
<td>BRADFORD</td>
<td>Luke Ahmed</td>
<td>345 East Rd</td>
<td>Bradford, ME 04410</td>
<td>Phone: (207) 327-2121</td>
<td><a href="mailto:manager@bradfordmaine.org">manager@bradfordmaine.org</a></td>
</tr>
<tr>
<td>BRADLEY</td>
<td>Dean Bennett-CEO</td>
<td><a href="mailto:dbennett@townofbradley.net">dbennett@townofbradley.net</a></td>
<td></td>
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<tr>
<td>BREMEN</td>
<td>Stanley Waltz</td>
<td>133 Eugley Hill Rd</td>
<td>Nobleboro, ME 04555</td>
<td>Office: (207) 832-7351</td>
<td>Cell: (207) 380-9873</td>
</tr>
<tr>
<td>BREWER</td>
<td>Stuart Brooks</td>
<td>30 North Main St</td>
<td>Brewer, ME 04412</td>
<td>Office: (207) 989-7790</td>
<td></td>
</tr>
<tr>
<td>BRULE</td>
<td>Mike Lee</td>
<td>30 North Main St</td>
<td>Brewer, ME 04412</td>
<td>Office: (207) 989-7790</td>
<td></td>
</tr>
</tbody>
</table>
BRIDGTON
Brenda Day
Office: (207) 647-8786
Cell: (207) 803-9963
bday@bridgtonmaine.org

BRISTOL
Joseph R Rose
1268 Bristol Rd
Bristol, ME 04539
Office: (207) 563-5270 ext 303
Cell: (207) 380-9873
bristolceo@tidewater.net

BROOKLIN
Judy Jenkins
Phone: (207) 266-0785

BROOKS
Randy Hall
15 Purple Heart
Brooks, ME 04921
Office: (207) 722-3254
Cell: (207) 234-4006
randy_006@msn.com

BROOKSVILLE
Phone: (207) 326-4518
jdevlin@brooksvillemaine.org

BROWNFIELD
Michael Vane
Phone: (207) 935-2007 ext 202
Cell: (207) 205-1169
townceo@fairpoint.net

BROWNVILLE
Daniel Gilbert
586 Main Rd
Brownville, ME 04414
Office: (207) 965-2561
Home: (207) 938-3866
moosedan@tdstelme.net

BRUNSWICK
Mike Pindell
Town Ofc / 28 Federal St
Brunswick, ME 04011-1583
Office: (207) 725-6660 ext 4024
mpindell@brunswickme.org

Carl Adams
Twn Ofc / 28 Federal St
Brunswick, ME 04011
Office: (207) 725-6660 ext 4026
cadams@brunswickme.org

BUCKFIELD
John Andrews
34 Turner St
PO Box 179
Buckfield, ME 04220
Phone: (207) 336-2521
tmbuckfield@gmail.com

BUCKSPORT
Luke Chiavelli
50 Main St
PO Box X
Bucksport, ME 04414
Office: (207) 469-7368
cEO@bucksportmaine.gov

BURNHAM
Randy Hall
37 South Rd
Dixmont, ME 04932
Office: (207) 991-0117
Cell: (207) 234-4006
randy_006@msn.com

BUXTON
Peter Gordon
185 Portland Rd
Buxton, ME 04093
Phone: (207) 929-3046
cEObuxton@saconver.net

CALAIS
Andrea Walton
PO Box 413
Calais, ME 04619
Phone: (207) 454-2521 ext 1006
assessor@calaismaine.org

CAMBRIDGE
Brian Turner
202 Ripley Rd
Cambridge, ME 04923
Phone: (207) 277-3241
Cell: (207) 997-3287
copalt@myfairpoint.net

CAMDEN
Rosie Curtis
29 Elm St
PO Box 1207
Camden, ME 04843
Office: (207) 236-3353 ext 7114
codes@camdenmaine.gov

CANAAN
Randy Gray
277 Main St
PO Box 68
Canaan, ME 04924
Phone: (207) 474-6883

CAPE ELIZABETH
Benjamin Mcdougal
320 Ocean House Rd
Cape Elizabeth, ME 04116
Office: (207) 799-1619
benjamin.mcdougal@capeelizabeth.org

CARIBOU
Ken Murchison
25 High St
Caribou, ME 04736
Office: (207) 493-5967
kmurchison@cariboumaine.org

CARMEL
Kevin Howell
PO Box 114
Carmel, ME 04419
Office: (207) 848-3361
CEO@TOWNOFCARMEL.ORG

CARRABASSET VALLEY
Christopher Parks
cvcEO@roadrunner.com

CASCO
John Wiesemann
635 Meadow Rd
Casco, ME 04015
Office: (207) 627-1346
cEOadmin@cascomaine.org

CASTINE
Peter Vogell
PO Box 17
Castine, ME 04421
Office: (207) 326-4502
Home: (207) 326-9334
Dale Abernethy
PO Box 204
Castine, ME 04421
Office: (207) 326-4502
CENTREVILLE
Charles S. Peterson
1 East Main St
RR1 Box 12
Harrington, ME 04643
Office: (207) 483-2398
Home: (207) 483-2398

CHEBEAGUE ISLAND
Jim Butler
192 North Rd
Chebeague Island, ME 04017
Falmouth, ME 04105
Office: (207) 846-3148
Cell: (207) 357-2551
codeoffice@townofchebeagueisland.org

CHELSEA
Jarod Pinkham
560 Togus Rd
Chelsea, ME 04330
Office: (207) 582-4802
Cell: (207) 380-7042
chelseaceo@chelseamaine.org

CHESTER
Jerry Davis
184 Transalpine Rd
Lincoln, ME 04457
Office: (207) 794-3372
Home: (207) 794-3202
codeofficer@lincolnmaine.org

CHESTERVILLE
Matthew Drost
409 Dutch Gap
Chesterville, ME 04938
Phone: (207) 558-2569
chestivalvilles@comcast.net

CHINA
Jaime Hanson
571 Lakeview Dr
China, ME 04358
Office: (207) 445-2014
Cell: (207) 660-5865
ceo@chinamaine.org

CLIFTON
Richard Leavitt
135 Airline Rd
Clifton, ME 04428
Home: (207) 843-0709
Cell: (207) 949-6775

CLINTON
Frank Gioffre
27 Baker St
Clinton, ME 04927
Office: (207) 426-8511
gioffre@clinton-me.gov

COOPER
James Slowe
19 Church St
P.O. Box 150
Vanceboro, ME 04491
Phone: (207) 788-3877
slowe@hotmail.com

CORINNA
Albert Tempesta
8 Levi Stewart Dr
Corinna, ME 04928
Office: (207) 278-4183
corinnaceo@roadrunner.com

CORINTH
Phil Stevens
P.O. Box 309
Corinth, ME 04427
Phone: (207) 285-3271
ceo@townofcorinth.com

CORNISH
Wes Sunderland
17 Maple St
Cornish, ME 04020
Office: (207) 625-4324
Cell: (207) 625-7000

CRANBERRY ISLE
Dennis Dever
P.O. Box 248
Northeast Harbor, ME 04662
Phone: (207) 664-3680
dysonsys@twc.com

CUMBERLAND
William C Longley
200 Main St
Yarmouth, ME 04096
Office: (207) 829-2207

CUSHING
Scott E Bickford
P.O. Box 186
W. Rockport, ME 04865
Office: (207) 354-2375
Pager: (207) 818-0161
codecushingme@roadrunner.com

CUTLER
Judy Rolfe
2655 Cutler Rd
PO Box 236
Cutler, ME 04626
Phone: (207) 259-3693

DAMARISCOTTA
Stanley Waltz
21 School St
Damariscotta, ME 04543
Office: (207) 563-5168
Cell: (207) 380-9873

DANFORTH
Michael Noble
871 Enfield Rd
Lincoln, ME 04457
Home: (207) 794-2528

DAYTON
James Roberts
249 Hight Rd
Dayton, ME 04005
Office: (207) 499-3034
ceo@dayton-me.gov

DEDHAM
Richard Leavitt
22 Thompson Rd
Dedham, ME 04429
Home: (207) 843-6217
Cell: (207) 949-6775
rik43@aol.com

DEER ISLE
Robert Brown
70 Church St
PO Box 46
Deer Isle, ME 04627
Office: (207) 348-6060
Cell: (207) 479-1405

Judy Jenkins
70 Church St
PO Box 46
Deer Isle, ME 04627
Office: (207) 348-6060
Cell: (207) 266-0785
judybluehill@yahoo.com

DEER ISLE
Robert Brown
70 Church St
PO Box 46
Deer Isle, ME 04627
Office: (207) 348-6060
Cell: (207) 479-1405

Judy Jenkins
70 Church St
PO Box 46
Deer Isle, ME 04627
Office: (207) 348-6060
Cell: (207) 266-0785
judybluehill@yahoo.com
DENMARK
Michael Lee
62 East Main St
Denmark, ME 04022
Office: (207) 452-2207
Phone: (207) 890-8057
mlee@denmarkmaine.org

DEXTER
Albert Tempesta
Twn Ofc / 23 Water St
Newport, ME 04953
Phone: (207) 924-7620
townceo@dextermaine.org

DIXFIELD
Ryan Glover
46 Main St
PO Box 808
Dixfield, ME 04224
Office: (207) 562-8151
Cell: (207) 418-5026

dixfield

DIXMONT
Randy Hall
37 South Rd
Dixmont, ME 04932
Office: (207) 991-0117
Home: (207) 234-4006
randy_006@msn.com

dixmont

DOVER-FOXCROFT
Brian Gaudet
48 Morton Ave, Ste A
Dover-Foxcroft, ME 04426
Office: (207) 564-3318 ext 1025
bgaudet@dover-foxcroft.org

dover

DRESDEN
534 Gardiner Rd
PO Box 30
Dresden, ME 04428
Phone: (207) 732-4270
townofdresden.com

EAST MACHIAS
James Bradley
PO Box 521
E. Machias, ME 04630
Office: (207) 255-8874
Home: (207) 255-8874

EAST MILLINOCKET
Dale Hayes
53 Main St
E Millinocket, ME 04430
Phone: (207) 746-3551
coeemill@hotmail.com

EASTBROOK
959 Eastbrook Rd
Eastbrook, ME 04634
Phone: (207) 460-1044

EASTON
Tony Levesque
18 Community Center Dr
Fort Fairfield, ME 04742
Office: (207) 472-3805

defft

EDDINGTON
Dean Bennett
906 Main Rd
Eddington, ME 04428
Home: (207) 843-5233

ejr

EDGECOMB
Jarrod Pinkham
PO Box 139
Edgecomb, ME 04556
Phone: (207) 380-7042

ELIOT
Shelly Bishop
1333 State Rd
Eliot, ME 03903
Office: (207) 439-1813 ext 110

ELLSWORTH
Dwight Tilton
1 City Hall Plaza
Ellsworth, ME 04605
Office: (207) 667-2563
dtilton@ellsworthmaine.gov

Lori Roberts
1 City Hall Plaza
Ellsworth, ME 04605
Office: (207) 667-4910
lroberts@ellsworthmaine.gov

dwight

EMBDE
Terriann Lamontagne
809 Emden Pond Rd
Embden, ME 04958
Office: (207) 566-5551 ext 4
demb-ceo@embden.org

ENFIELD
789 Hammett Rd
Enfield, ME 04493
Phone: (207) 732-4270
townofenfield.com

ETNA
Randy Hall
37 South Rd
Dixmont, ME 04932
Office: (207) 234-4006
Home: (207) 234-4006
randy_006@msn.com

dixmont

eustis

EUSTIS
Peter Farnsworth
88 Main St
PO Box 350
Stratton, ME 04698
Phone: (207) 246-4401

EXETER
Phil Stevens
Phone: (774) 276-0854
outdoors017@yahoo.com

FAIRFIELD
Nicolle Martin
19 Lawrence Ave
PO Box 149
Fairfield, ME 04937
Office: (207) 453-7765
Cell: (207) 861-2400
nmartin@fairfieldme.com

FALMOUTH
Justin Brown
271 Falmouth Rd
Falmouth, ME 04105
Office: (207) 699-5306
jbrown@town.falmouth.me.us

Craig Jones
271 Falmouth Rd
Falmouth, ME 04105
Home: (207) 699-5334
cjones@town.falmouth.me.us

FAIRFIELD
LOCAL PLUMBING INSPECTORS

FARMINGDALE
Greg Lambert
289 Maine Ave
Farmingdale, ME 04344
Phone: (207) 592-7073
farmingdalemelpi@gmail.com

FARMINGTON
Andrew Marble
870 Holley Rd
Farmington, ME 04938
Phone: (207) 799-4858
maine.inspector@gmail.com

FAYETTE
Brenda Medcoff
2589 Main St
Fayette, ME 04349
Phone: (207) 685-4373
brendamedcoff@myfairpoint.net

FORT FAIRFIELD
Richard Levesque Jr
18 Community Center Dr
Fort Fairfield, ME 04742
Office: (207) 472-3805

FORT KENT
Steve Pelletier
416 West Main St
Fort Kent, ME 04743
Office: (207) 834-3507
steve.pelletier@fortkent.org

FRANKFORT
Randy Hall
37 South Rd
Dixmont, ME 04932
Office: (207) 991-0117
randy_006@msn.com

C Timothy Schoppe
455 Clark Rd
Hermon, ME 04401
Office: (207) 848-3043
Home: (207) 848-2679

FRANKLIN
Millard Billings
34 Main St
Franklin, ME 04634
Home: (207) 565-3663
franklinceo.lpi@gmail.com

FREEDOM
David Schofield
10 Patterson Ridge Rd
Knox, ME 04986
Home: (207) 568-3547

FREEPORT
Nick Adams
30 Main St
Freeport, ME 04032
Office: (207) 865-4743 ext 102

Jeffrey Hutchinson
Town Ofc / 28 Federal St
Brunswick, ME 04011-1583
Home: (207) 725-0764

FRIENDSHIP
David Studer
PO Box 218
Friendship, ME 04438
Office: (207) 832-8224
cEOfriendship@roadrunner.com

FRYE ISLAND
Phone: (207) 655-4551

FRYEBURG
Christopher Walton
16 Lovewell Pond Rd
Fryeburg, ME 04037
Office: (207) 935-2805

GARDINER
Kris McNeill
6 Church St
Gardiner, ME 04345
Office: (207) 582-6892
ceo@gardinermaine.com

GARLAND
PO Box 36
108 Corinth Rd
Corinth, ME 04939
Phone: (207) 924-3163

GEORGETOWN
Chris Wilcoxson
Phone: (207) 650-2920

GLENBURN
Michael Falvey
Office: (207) 942-2905
Phone: (207) 659-7026
ceo@glenburn.net

GORHAM
Freeman Abbott
75 South St, Ste 1
Gorham, ME 04038
Office: (207-222-1605
fabbott@gorham.me.us

GRAY
Scott Dvorak
24 Main St
Gray, ME 04039
Phone: (207) 657-3112

GREENBUSH
Jerry Davis
PO Box 230
Greenbush, ME 04418
Phone: (207) 826-2050
greenbh@midmaine.org

GREENE
Kenneth Pratt
220 Main St
Greene, ME 04236
Office: (207) 946-5146
Cell: (207) 576-1413

GREENVILLE
Brian Turner
PO Box 41
Monson, ME 04464
Office: (207) 997-3641
Cell: (207) 997-3287

GREENWOOD
Joelle Corey-Whitman
593 Gore Rd
Greenwood, ME 04255
Office: (207) 875-2773
Phone: (207) 393-7705
ceojoe@roadrunner.com

GUILFORD
Keith Doore
PO Box 355
Guilford, ME 04443
Office: (207) 876-2202

HALLOWELL
Douglas Ide
1 Winthrop St
Hallowell, ME 04347
Office: (207) 623-4021 ext 205
ceo-lpi@hallowellmaine.org
HAMPDEN
Ryan Carey
106 Western Ave
Hampden, ME 04444
Office: (207) 862-4500
code@hampdenmaine.gov

HANCOCK
Don Baker
18 Pt Rd
PO Box 68
Hancock, ME 04640
Office: (207) 422-3393
hancockceo@hancocktownoffice.com

HANOVER
Richard Coulombe
Phone: (207) 364-8200

HARMONY
Peter Rebar
Rfd 1 Box 2276
Harmony, ME 04942
Home: (207) 683-5794
Office: (207) 683-5681

HARPSWELL
William Wells
PO Box 39
Harpswell, ME 04079
Office: (207) 833-5771
bwells@town.harpswell.me.us

HARRISBURY
John Wentworth
PO Box 300
Harrison, ME 04040
Office: (207) 583-0923

HARTLAND
Rick Thibodeau
Twn Ofc / PO Box 280
Hartland, ME 04943
Phone: (207) 478-8799
hartlandcode@gmail.com

HARTSFORD
Fred Collins
Phone: (207) 890-6256

HEBRON
Kingston Brown
PO Box 304
Hebron, ME 04238
Phone: (207) 595-4555
kingston.brown@gmail.com

HERMON
Annette Merrithew
333 Billings Rd
Hermon, ME 04401
Phone: (207) 848-1042
ceo@hermon.net

HERSEY
Barry Higgins
1121 Dyer Brook Rd
Dyer Brook, ME 04747
Home: (207) 757-8556

HIRAM
Guy Lehouiller
16 Nasons Way
Hiram, ME 04041
Office: (207) 625-4463
Cell: (207) 256-2410
hiramceo@townofhiram.org

HOLDEN
Benjamin Breadmore
570 Main Rd
Holden, ME 04429
Office: (207) 843-5151
ceo@holdenmaine.org

HOLLY
Tammy Munson
34 Town Farm Rd
Hollis, ME 04042
Office: (207) 929-2251
ceo@hollismaine.org

HOPE
Samantha Mank
441 Camden Rd
Hope, ME 04847
Office: (207) 763-3528
smank@hopemaine.org

JACKMAN
Jason Bennett
369 Main St
Jackman, ME 04945
Phone: (207) 668-2111
Cell: (207) 399-8179
code.enforcement@jackmanme.net

JACKSON
Bill Murphy
Office: (207) 341-1184

JAY
Ronda Palmer
340 Main St
Jay, ME 04239
Phone: (207) 897-6785
jceo@jay-maine.org

JEFFERSON
Jarrod Pinkham
PO Box 77
Jefferson, ME 04348
Office: (207) 549-7401

JONESTOWN
Elizabeth Fitzgerald
70 Snare Creek Lane
Jonesport, ME 04649
Phone: (207) 497-5926

KENNEBUNK
Brian Paul
1 Summer St
Kennebunk, ME 04043
Office: (207) 985-2102 ext 1303

KENNEBUNKPORT
Gregory Reid
6 Elm St
Kennebunkport, ME 04046
Office: (207) 967-1617
Cell: (207) 468-1161
LOCAL PLUMBING INSPECTORS

Werner Gilliam  
Office: (207) 967-1604  
wgilliam@kennebunkportme.gov

KINGFIELD  
Thomas Marcotte  
Phone: (207) 684-4111  
(207) 265-4637  
codeofficer@kingfieldmaine.org

KITTERY  
Craig Alfis  
Twn Ofc / PO Box 808  
Kittery, ME 03904  
Office: (207) 475-1308

KNOX  
David Schofield  
10 Abbott Rd  
Knox, ME 04986  
Cell: (207) 322-7365  
mschofield@uninets.net

LAGRANGE  
Dwight Tilton  
Rfd 1 Box 680  
Lincoln, ME 04457  
Home: (207) 732-3164

LAKEVILLE  
Dwight Tilton  
Phone: (207) 794-4434

LAMOINE  
Rebecca Albright  
606 Douglas Hwy  
Lamoine, ME 04605  
Office: (207) 667-2242

LEBANON  
Dave Salvatore  
15 Upper Guinea Rd  
Lebanon, ME 04027  
Office: (207) 457-6082

LEEDS  
Larry Grant  
8 Community Dr  
PO Box 206  
Leeds, ME 04263  
Phone: (207) 524-2754  
leedsceo19@gmail.com

LEVANT  
Scott Pullen  
PO Box 220  
691 Town House Rd  
Levant, ME 04456  
townoflevant@roadrunner.com  
Phone: (207) 884-7660

LEWISTON  
Steve LeBrun  
27 Pine St  
Lewiston, ME 04240  
Phone: (207) 513-3000 ext 3226  
Tom Maynard  
27 Pine St  
Lewiston, ME 04240  
Phone: (207) 513-3000 ext 3225  
tmaynard@lewistonmaine.gov

LIMERICK  
Michael Gilpatrick  
55 Washington St  
Limerick, ME 04048  
Office: (207) 793-2166

LIMESTONE  
Brandon Sauzier  
322 Main St  
Limestone, ME 04750  
Office: (207) 325-4704 ext 104  
code@limestonemaine.org

LIMINGTON  
Norman Hutchins  
425 Sokokis Ave  
Limington, ME 04049  
Office: (207) 637-3566  
limington@roadrunner.com

LISBON  
Dennis Douglass  
Twn Ofc / 300 Lisbon St  
Lisbon, ME 04250  
Office: (207) 353-3000 ext 111  
Cell: (207) 751-6778  
ddouglass@lisbonme.org

LITCHFIELD  
Stephen Ochmanski  
16 Pleasant St  
Phillips, ME 04966  
Home: (207) 268-4721

LIVERMORE  
Terry Pinkham  
10 Crash Rd  
Livermore, ME 04253  
Phone: (207) 897-3207  
livemorecodeofficer@gmail.com

LIVERMORE FALLS  
Robert Overton  
2 Main St  
Livermore Falls, ME 04254  
Office: (207) 897-3321  
ceo@lfme.org

LONG ISLAND  
James Nagle  
PO Box 263  
Long Island, ME 04050  
Office: (207) 985-4201  
Phone: (207) 284-6857  
ceo@townoflongisland.us

LOYELL  
Alan Broyer  
1069 Main St  
Lovell, ME 04051  
Office: (207) 925-6272  
ceo@lovellmaine.org

LUBEC  
Gary Rhoades  
40 School St  
Lubec, ME 04652  
Office: (207) 733-2341

LYMAN  
Patti Mckenna  
24 Townhouse Rd  
E. Waterboro, ME 04030  
Office: (207) 247-0647  
ceo@lyman-me.gov
Thomas Markley  
14 Autumn Way  
Falmouth, ME 04105  
Office: (207) 874-8705  
Home: (207) 797-9878

MACHIASPORT  
James Bradley  
PO Box 521  
E. Machias, ME 04630  
Office: (207) 255-8874  
Home: (207) 255-8874

MADAWASKA  
328 Saint Thomas St Ste 101  
Madawaska, ME 04756  
Office: (207) 728-6351 ext 105  
gmpicard@madawaska.me

MADISON  
Susan Hathaway  
26 Weston Ave  
PO Box 190  
Madison, ME 04950  
Phone: (207) 696-3971  
code@madisonmaine.com

MANCHESTER  
Brad Luker  
12 Readfield Rd  
PO Box 18  
Manchester, ME 04351  
Office: (207) 622-1894  
ceo@manchesterme.org

MARIAVILLE  
Stephen Salsbury  
Phone: (207) 537-2107  
Cell: (207) 266-0106  
code04605@gmail.com

MARS HILL  
Bruce Hussey  
PO Box 449  
Mars Hill, ME 04758  
Phone: (207) 554-9051

MARSHFIELD  
James Bradley  
PO Box 521  
E. Machias, ME 04630  
Office: (207) 255-8874  
Home: (207) 255-8874

MECHANIC FALLS  
Alan Plummer  
108 Lewiston St  
Mechanic Falls, ME 04256  
Phone: (207) 345-2221  
aplummer@mechanicfalls.org

MEDWAY  
Dwight Tilton  
4 School St  
Medway, ME 04460  
Phone: (207) 746-0531

MEXICO  
David Errington  
PO Box 251  
Mexico, ME 04257  
Office: (207) 364-7971  
Cell: (207) 357-9848

MILFORD  
Michael Falvey  
62 Davenport St  
Milford, ME 04461  
Phone: (207) 827-2072  
ceo@milfordmaine.org

MILLINOCKET  
Richard Angotti  
871 Enfield Rd  
Lincoln, ME 04457  
Phone: (207) 723-7005  
code@millinocket.org

MILO  
Steven Quist  
6 Pleasant St  
Milo, ME 04463  
Phone: (774) 535-1041  
codeofmilo.org

MINOT  
Scott McElravy  
329 Woodman Hill Rd  
Minot, ME 04258  
Cell: (207) 754-6881  
codeofficer@minotme.org

MONMOUTH  
Daniel Swain  
859 Main St  
PO Box 270  
Monmouth, ME 04259  
Phone: (207) 933-2206 ext 105  
dswain@monmouthme.org

MONROE  
Randy Hall  
37 South Rd  
Dixmont, ME 04932  
Office: (207) 991-0117  
Cell: (207) 234-4006  
randy_006@msn.com

MONSON  
Brian Turner  
PO Box 41  
Monson, ME 04464  
Office: (207) 997-3641  
Phone: (207) 997-3287  
copalt@myfairpoint.net

MONTVILLE  
Jackie Robbins  
Phone: (207) 852-1840  
bonaire4@myfairpoint.net

MORRILL  
44 Weymouth Rd  
PO Box 59  
Morrill, ME 04952  
Phone: (207) 342-3300  
btcdecodecompliance@gmail.com

MOSCOW  
Kenneth Hogate  
161 West Ridge Rd  
Cornville, ME 04976  
Office: (207) 474-8865

MOUNT DESERT  
Kimberly Keene  
21 Sea St  
PO Box 248  
Northeast Harbor, ME 04662  
Office: (207) 276-5531  
Phone: (207) 288-4024  
ceo@mtdesert.org

MOUNT VERNON  
Richard Marble  
1997 North Rd  
Farmington, ME 04432  
Phone: (207) 293-2636  
ttownofmilo.org

NAPLES  
Catherine Renee Carter  
15 Village Green Ln  
PO Box 1757  
Naples, ME 04055  
Office: (207) 693-6364 ext 105  
naplesceo@townofnaples.org
NEW GLoucester
Debra Parks
385 Intervale Rd
New Gloucester, ME 04260-0082
Office: (207) 926-4126 ext 3
Cell: (207) 650-7283
dparks@newgloucester.com

NEW SHarOn
Jim Fleming
11 School Ln
New Sharon, ME 04955
Phone: (207) 592-1642
newsharong.odeenforcement@gmail.com

NEW VINEYARD
Andrew Marble
20 Lake St
New Vineyard, ME 04956
Phone: (207) 652-2222
townofnewvineyard@gmail.com

NEWCASTLe
4 Pump St
PO Box 386
Newcastle, ME 04553
Office: (207) 563-3441
ceo@newcastlemaine.us

NEWFIELD
637 Water St
West Newfield, ME 04095
Phone: (207) 793-4348
(207) 606-2544
newfield CEO@metrocast.net

NEWPORT
Albert Tempesta
Twn Ofc / 23 Water St
Newport, ME 04953
Phone: (207) 368-4410
info@newportmaine.net

NEWRY
David Bonney
422 Bear River Rd
Newry, ME 04261
Office: (207) 824-4817
Cell: (207) 357-7886

NOBLEBoro
Stanley Waltz
133 Eueley Hill Rd
Nobleboro, ME 04555
Office: (207) 832-7351
Cell: (207) 634-5735
nobelboroceo@gmail.com

Norridgewock
David Savage
16 Perkins St
Norridgewock, ME 04957
Office: (207) 634-2252

NORTH BERICk
Roger Frechette
40 Beech Ridge
Scarborough, ME 04074
Phone: (207) 676-3353

NORTH HAVEN
Paul Quinn
PO Box 400
North Haven, ME 04853
Office: (207) 867-4433

NORTH YARMOUTH
Ryan Keith
10 Village Square
North Yarmouth, ME 04097
Office: (207) 829-3705 apt 1

NORTHFIELD
Elizabeth Fitzgerald
177 Pettegren Point Rd
Machiasport, ME 04655
Office: (207) 263-4539
Home: (207) 255-3127

NORTHPORT
C. Toupie Rooney
60 Flanders Rd
Northport, ME 04849
Office: (207) 338-3819
Cell: (207) 322-2436
northport CEO@metrocast.net

Norway
Scott Tabb
19 Danforth St
Norway, ME 04268
Office: (207) 743-6651
ceo@norway.com

OAKFIELD
Torry Lane
Phone: (207) 694-2370

OAKLAND
David Savage
PO Box 187
Oakland, ME 04963
Phone: (207) 465-2842
d savage@oaklandmaine.us

OGUNQUIT
Scott Heyland
23 School St
PO Box 875
Ogunquit, ME 03907
Phone: (207) 646-9326
ceoOgt@townofogunquit.org

OLD ORCHARD BEACH
1 Portland Ave
Old Orchard Beach, ME 04064
Office: (207) 937-5615

OLD TOWN
David Russell
265 Main St
Old Town, ME 04468
Office: (207) 827-3965 ext 205

ORLAND
Luke Chiavelli
PO Box 67
Orland, ME 04472
Office: (207) 735-6428
lchiavelli@rdrunner.com

ORONO
Patrick Estey
59 Main St
Old Town, ME 04468
Office: (207) 866-5051
estey@orono.org

ORRINGTON
1 Municipal Way
Orrington, ME 04474
Office: (207) 825-3745
Home: (207) 942-8009

OTIS
Richard Leavitt
132 Otis Rd
Otis, ME 04605
Office: (207) 537-2211
Cell: (207) 949-6775
rk43@aol.com
OTISFIELD
Fred Collins
403 State Rte 121
Otisfield, ME 04270
Office: (207) 539-2664 ext 3
ceofotisfield@myfairpoint.net

OWLS HEAD
Scott E Bickford
224 Ash Point Rd
Owls Head, ME 04854
Office: (207) 594-7598
Pager: (207) 818-0161

OXFORD
Joelle Corey-Whitman
126 King St
Oxford, ME 04270
Office: (207) 539-4431
ceo@oxfordmaine.org

PALERMO
Darryl McKenney
Office: (207) 993-2467

PALMYRA
Travis Gould
4 Madawaska Rd
PO Box 6
Palmyra, ME 04965
Phone: (207) 924-4057

PANAMA
Joanna Miller
125 Main St
Panama, ME 04965
Office: (207) 924-4057

PENOBSCOT
Don Baker
1 Southern Bay Rd
Penobscot, ME 04476
Office: (207) 356-2309
dbx1050@gmail.com

PORTLAND
Doug Morin
389 Congress St
Portland, ME 04101
Office: (207) 874-8705
drm@portlandmaine.gov

POWNAL
Alan Hill
136 Libby Rd
Pownal, ME 04069
Office: (207) 688-4431
Phone: (207) 576-9211
ceo@pownalmaine.org

PROSPECT
Luke Chiavelli
958 Bangor Rd
Prospect, ME 04981
Office: (207) 735-6428
lchiavelli@roadrunner.com

RANDOLPH
Greg Lumbert
121 Kinderhook St
Randolph, ME 04346
Home: (207) 592-7073
randolphceo@roadrunner.com

RANGELEY
Bailey Beers
15 School St
Rangleley, ME 04970
Home: (207) 864-3188
ceo@rangeley.me.org
RAYMOND
Alex Sirois
401 Webbs Mills Rd
Raymond, ME 04071
Office: (207) 655-4742
dems@raymondmaine.org

READFIELD
Cliff Buuck
8 Old Kents Rd
Readfield, ME 04355
Phone: (207) 685-3290
dems@readfieldme.org

RICHMOND
James Valley
26 Gardiner St
Richmond, ME 04357
Phone: (207) 284-9145

ROCKLAND
Adam Ackor
270 Pleasant St
Rockland, ME 04841
Office: (207) 907-8333

ROCKPORT
Scott E Bickford
PO Box 186
W. Rockport, ME 04865
Office: (207) 441-5302

ROME
Andrew Marble
8 Mercer Rd
Rome, ME 04963
Office: (207) 397-3293

ROXBURY
Richard Coulombe
145 Congress St
Rumford, ME 04276
Office: (207) 364-4576
rcoulombe@rumfordme.org

RUMFORD
Richard Coulombe
145 Congress St
Rumford, ME 04276
Office: (207) 364-4577
rcoulombe@rumfordme.org

SABATTUS
Dennis Douglass
190 Middle Rd
Sabattus, ME 04280
Phone: (207) 751-6778
dems@sabattusmaine.org

SACO
David Twomey
City Hall / 300 Main St
Saco, ME 04072
Office: (207) 284-6983
dtwomey@sacomaine.org

SANFORD
Jamie Cole
917 Main St, Ste 300
Sanford, ME 04073
Office: (207) 324-9145

SANGERVILLE
George Tozier
PO Box 66
Guilford, ME 04443
Office: (207) 876-9798
Cell: (207) 907-8333
gtozier@myfairpoint.net

SCARBOROUGH
Town Ofc / PO Box 360
Scarborough, ME 04074
Office: (207) 730-4040

SEBEC
Brian Turner
PO Box 41
Monson, ME 04464
Office: (207) 997-3287
copalt@myfairpoint.net

SEBAGO
Brandon Wooley
406 Bridgton Rd
Sebago, ME 04029
Office: (207) 787-2457

SEBAGO
Brandon Wooley
406 Bridgton Rd
Sebago, ME 04029
Office: (207) 787-2457

SECO
Brian Turner
PO Box 147
Shirley, ME 04485
Home: (207) 997-3287
townofshirley@myfairpoint.net

SHIRLEY
Brian Turner
PO Box 147
Shirley, ME 04485
Home: (207) 997-3287
townofshirley@myfairpoint.net

SIDNEY
Gary Fuller
2986 Middle Rd
Sidney, ME 04330
Phone: (207) 547-3340
(207) 441-5302
gfuller@sidnemaine.org

SKOWHEGAN
Brian Belliveau
225 Water St
Skowhegan, ME 04976
Phone: (207) 474-6900
skowcode@skowhegan.org

SMITHFIELD
Andy Marble
926 Village Rd
Smithfield, ME 04978
Phone: (207) 362-4772
smithfieldceo@gmail.com

SOMERVILLE
Thomas McKenzie
72 Sand Hill Rd
Somerville, ME 04348
Office: (207) 549-3828
Cell: (434) 466-6944
mctomas@gmail.com
Directory of

SOUTH BERWICK
Joseph Rousselle
Twn Ofc / 180 Main St
S. Berwick, ME 03908
Office: (207) 384-3011
jrousselle@sbmaine.us

SOUTH BRISTOL
Joseph Rose
1268 Bristol Rd
Bristol, ME 04539
Phone: (207) 563-5270 ext 303

SOUTH PORTLAND
Tim Nelson
PO Box 9422
S. Portland, ME 04106
Office: (207) 767-7603
tnelson@southportland.org

SOUTH THOMASTON
PO Box 147
S. Thomaston, ME 04911
Phone: (207) 696-8069
townofstarks@gmail.com

STANDISH
James Paul
175 Northeast Rd
Standish, ME 04084
Office: (207) 642-4571
jppaul@standish.org

STARKS
57 Anson Rd
Starks, ME 04911
Phone: (207) 696-8069
townofstarks@gmail.com

STOCKTON SPRINGS
John Larson
217 Main St
Stockton Springs, ME 04981
Office: (207) 567-3404
codes@stocktonsprings.org

STONEHAM
Prentiss Kimball
22 Butters Hill Rd
PO Box 91
Stoneham, ME 04231
Office: (207) 928-2155
Cell: (207) 583-2229
parnemann@aol.com

STONINGTON
Judy Jenkins
Twn Ofc / PO Box 9
Stonington, ME 04681
Office: (207) 367-2351 ext 11
Cell: (207) 266-0785
judybluehill@yahoo.com

STOW
710 Stow Rd
Stow, ME 04037
Office: (207) 697-2007
townofstow@fairpoint.net

STRONG
Thomas Marcotte
PO Box 806
Farmington, ME 04938
Home: (207) 684-4111

SULLIVAN
Rebecca Albright
Phone: (207) 537-3263

SUMNER
Phone: (207) 388-2866

SURRY
Tim Ferrell
Phone: (207) 667-5912
ceo@townofsurrymaine.com

SWANS ISLAND
Caitlin Trafton
PO Box 11
Swan's Island, ME 04685
Phone: (207) 951-4562
caitlintrafton@yahoo.com

SWEDEN
Arthur Dunlap
147 Bridgton Rd
Sweden, ME 04040
Phone: (207) 647-3944

THOMASTON
William Wasson
Twn Ofc / 170 Main St
Thomaston, ME 04861
Office: (207) 354-6107 ext 110
Home: (207) 691-0226
bwasson@thomastonmaine.gov

THROCKMORTON
Wayne Pitre
PO Box 10
Thorndike, ME 04986
Phone: (207) 660-5664

TOPSHAM
Thomas Lister
100 Main St
Topsham, ME 04086
Office: (207) 725-1723
tlister@topshammaine.com

TREMONT
Jesse Dunbar
20 Harbor Dr
PO Box 159
Bernard, ME 04612
Office: (207) 244-7204
codeenforcementofficer@tremont.maine.gov

TRENTON
Angela Chamberlin
59 Oak Pt Rd
Trenton, ME 04605
Office: (207) 667-7207

ST ALBANS
Travis Gould
7 Water St
St. Albans, ME 04971
Phone: (207) 938-4568

ST GEORGE
Terry Brackett
3 School St
Tenants Harbor, ME 04860
Phone: (207) 372-6363

STOCKTON SPRINGS
John Larson
217 Main St
Stockton Springs, ME 04981
Office: (207) 567-3404
codes@stocktonsprings.org

STONEHAM
Prentiss Kimball
22 Butters Hill Rd
PO Box 91
Stoneham, ME 04231
Office: (207) 928-2155
Cell: (207) 583-2229
parnemann@aol.com

STONINGTON
Judy Jenkins
Twn Ofc / PO Box 9
Stonington, ME 04681
Office: (207) 367-2351 ext 11
Cell: (207) 266-0785
judybluehill@yahoo.com

STOW
710 Stow Rd
Stow, ME 04037
Office: (207) 697-2007
townofstow@fairpoint.net

STRONG
Thomas Marcotte
PO Box 806
Farmington, ME 04938
Home: (207) 684-4111

SULLIVAN
Rebecca Albright
Phone: (207) 537-3263

SUMNER
Phone: (207) 388-2866

SURRY
Tim Ferrell
Phone: (207) 667-5912
ceo@townofsurrymaine.com

SWANS ISLAND
Caitlin Trafton
PO Box 11
Swan's Island, ME 04685
Phone: (207) 951-4562
caitlintrafton@yahoo.com

SWEDEN
Arthur Dunlap
147 Bridgton Rd
Sweden, ME 04040
Phone: (207) 647-3944

THOMASTON
William Wasson
Twn Ofc / 170 Main St
Thomaston, ME 04861
Office: (207) 354-6107 ext 110
Home: (207) 691-0226
bwasson@thomastonmaine.gov

THROCKMORTON
Wayne Pitre
PO Box 10
Thorndike, ME 04986
Phone: (207) 660-5664

TOPSHAM
Thomas Lister
100 Main St
Topsham, ME 04086
Office: (207) 725-1723
tlister@topshammaine.com

TREMONT
Jesse Dunbar
20 Harbor Dr
PO Box 159
Bernard, ME 04612
Office: (207) 244-7204
codeenforcementofficer@tremont.maine.gov

TRENTON
Angela Chamberlin
59 Oak Pt Rd
Trenton, ME 04605
Office: (207) 667-7207
LOCAL PLUMBING INSPECTORS

TROY
Charlie Porter
Office: (207) 948-6325

TURNER
Ross Gagne
11 Turner Center Rd
Turner, ME 04282
Office: (207) 225-3414

UNION
Grant Watmough
567 Common Rd
Union, ME 04862
Office: (207) 785-3658
codeenforcement@union.maine.gov

UNITY
David Schofield
10 Patterson Ridge Rd
Knox, ME 04986
Office: (207) 568-3547

VASSALBORO
Paul Mitnik
Phone: (207) 872-2826
pmitnik@vassalboro.net

VEAZIE
1084 Main St
Veazie, ME 04401
Office: (207) 947-2781

VERONA ISLAND
Luke Chiavelli
16 School St
PO Box 1940
Verona Island, ME 04416
Office: (207) 735-6428

VINALHAVEN
Faye Grant
19 Washington School Rd
Vinalhaven, ME 04863
Phone: (207) 863-2168

WALDO
Robert Temple
629 Waldo Station Rd
Waldo, ME 04915
Phone: (207) 649-3049

WALDOBORO
Stanley Waltz
1600 Atlantic Hwy
Waldoboro, ME 04572
Office: (207) 832-5369 ext 310
Cell: (207) 380-9873
ceo@waldoboromaine.org

WALES
Arthur Dunlap
175 Centre Rd
Wales, ME 04280
Office: (207) 375-8881
walesceolpi@roadrunner.com

WASHBURN
Adam Doody
Twn Ofc / 1287 Main St
Washburn, ME 04786
Phone: (207) 455-8485

WASHINGTON
Robert Temple
134 Temple's Way
Palermo, ME 04354
Home: (207) 993-2512
btcodecompliance@gmail.com

WATERBORO
Glenn Charette
24 Townhouse Rd
East Waterboro, ME 04030
Office: (207) 247-6166 ext 120
ceo@waterboro-me.gov

WATERFORD
John Bell
366 Valley Rd
Waterford, ME 04088
Office: (207) 583-4403
Cell: (207) 595-4660
ceo@waterfordme.org

WATERVILLE
Daniel Bradstreet
1 Common St
Waterville, ME 04901
Office: (207) 680-4231
dbradstreet@waterville-me.gov

WAYNE
Richard Green
48 Pond Rd
Wayne, ME 04284
Office: (207) 685-4983
ceolpi@waynemaine.org

WELD
David Errington
148 Auburn Rd
Peru, ME 04290
Office: (207) 562-8081

WELLS
Jodine Adams
208 Sanford Rd
Wells, ME 04090
Office: (207) 646-5187

david johnson
Office: (207) 646-5187
codewaterboro@sacoriver.net

WEST BATH
Johnathan Beane
219 Foster's Point Rd
West Bath, ME 04530
Phone: (207) 443-4342
codes@westbathmaine.gov

WEST GARDINER
Casey Peacock
318 Spears Corner Rd
West Gardiner, ME 04345
Phone: (207) 441-6864

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Brian Stetson
2 York St
Westbrook, ME 04092
Office: (207) 854-0638
Cell: (207) 653-1189
bstetson@westbrook.me.us

Westport
David Finocchietti
2 York St
Westbrook, ME 04092
Office: (207) 854-0638
Cell: (207) 210-2688
dfinocchietti@westbrook.me.us

WESTPORT
Gary Richardson
6 Fowles Point Rd
Westport, ME 04578
Office: (207) 882-6357
g Richardson1595@gmail.com
WHITEFIELD
Arthur C Strout
36 Town House Rd
Whitefield, ME 04353
Office: (207) 458-2154
Phone: (207) 445-3263

WHITING
James Bradley
PO Box 521
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Office: (207) 255-8874

WHITNEYVILLE
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PO Box 521
E. Machias, ME 04630
Office: (207) 255-8874

WILTON
Charlie Lavin
158 Weld Rd
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Office: (207) 645-4961
cel@wiltonmaine.org

WINDHAM
Christopher Hanson
Town Ofc / 8 School Rd
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Office: (207) 894-5900 ext. 6111
cshanson@windhammaine.us

WINDSOR
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PO Box 57
Windsor, ME 04363
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Home: (207) 441-9885

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Lincoln, ME 04457
Home: (207) 732-3164

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114 Benton Ave
Winslow, ME 04901
Phone: (207) 872-2776 ext 5207
abradstreet@winslow-me.gov

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Office: (207) 223-5055

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17 Highland Ave
Winthrop, ME 04364
Phone: (207) 377-7200 ext 7

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51 Bath Rd
Wiscasset, ME 04578
Office: (207) 882-8200 ext 7
codes@wiscasset.org

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25 High St
Caribou, ME 04736
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WOODSTOCK
Kingston Brown
kingston.brown@gmail.com

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Cell: (207) 350-5282
codes@woolwich.us

YARMOUTH
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200 Main St
Yarmouth, ME 04096
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nciarimboli@yarmouth.me.us

YORK
Leslie Hinz
186 York St
York, ME 03909
Office: (207) 363-1002

Kathryn Newell
186 York St
York, ME 03909
Office: (207) 363-1002
Cell: (207) 451-5082
knewell@yorkmaine.org

Luke Vigue
186 York St
York, ME 03909
Office: (207) 363-1002

TOWNSHIPS:
You can locate an LPI for Townships at http://www.maine.gov/dhhs/mecdc/environmental-health/plumb/lists.htm

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BUYERS GUIDE
(Listed in Alphabetical order)

BANGOR PIPE & SUPPLY INC.
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American Standard, Oasis, Pex, Suntemp
Baseboard, Granby, Myers Pumps, Charlotte Pipe &
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Design & Layout, Smith CI Boilers, Biassi Radiant
Panels, Pennotti Panel Radiators, Riobel IBC Indirect
Tanks, Dayton SS Sinks, Sloan, Taco Pump, Apollo
Press Fittings, Grunfo Pumps
Inside Sales Bangor: Don Armstrong, Ron Bridges
Inside Sales Ellsworth: Ron Lyshon
Commercial Estimator: Gary Mickalowski
Outside Sales: Chris Grover
69 Farm Rd, Bangor 55 Foster St / Ellsworth
Tel: (800) 439-7473 Bangor
Tel: (800) 540-5346 Ellsworth
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Tanks, Amtrol, Rheem Heaters, Well Mcclain Boilers,
Haydon Baseboard, Ruud Residential & Commercial
Products.
62 Academy St / Auburn, ME 04211
Tel: (800) 437-8468 • Fax: (207) 786-2462
358 Washington St / Auburn, ME 04210
Tel: (800) 438-4745 • Fax: (207) 786-0928
470 Odlin Rd / Bangor, ME 04401
Tel: (800) 438-4756 • Fax: (207) 947-1539
29 Landry St / Biddeford, ME 04005
Tel: (800) 437-8506 • Fax: (207) 284-9038
97 Parker St / Brewer, ME 04412
Tel: (800) 437-8469 • Fax: (207) 989-6265
75 Wyman Rd / Hancock, ME 04640
Tel: 297-664-1904 • Fax: (207) 664-1907
373 Riverside Industrial Pkwy / Portland, ME 04103
Tel: (800) 438-4757 • Fax: (207) 797-7147
87 River Rd / Sanford, ME 04073
Tel: (800) 437-8475 • Fax: (207) 490-2299
56 Airport Rd / Waterville, ME 04901
Tel: (800) 437-8466 • Fax: (207) 872-2418
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Domestic Hot Water, Geothermal, Hydronics,
Industrial Boiler Rooms, Waste Water Water
Systems, Water Treatment
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wayne.adams@blakeequip.com
Sales and Technical Support: (207) 797-9104 or
sales@blakeequip.com

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Axiom, Reimers, Columbia, Myson
Paul Levesque, Mike Levesque, Evan Levesque
PO Box 567 / Springvale, ME 04083
Tel: (800) 410-8700
Fax: (207) 324-2217
Email: info@dandavissales.com
Tech Support: (800) 410-8700
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403 Hogan Rd / Bangor, ME 04401
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Email: tim.seymour@darlings.com
www.darlings.com
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Billy Forcier, Ryan Davenport, Steve Lally
75 Parker St / Wallingford CT, 06492
Tel: (203) 265-2389
Email: billy@davenportassociates.com; slally@davenportassociates.com; ryan@davenportassociates.com
www.davenportassociates.com
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Manufacturer’s Representative
NIBCO, Navien
173 Spark St / Brockton, MA 02302
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Tech Support: (800) 836-3441
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Tel: (877) 890-2983
(Howard Dyson): (860) 305-3714
Fax: (860) 225-9268
Email: howard@dysonassoc.com
www.dysonassoc.com
Tech Support: andrew@dysonassoc.com (401) 601-5128
After Hours Emergency Contact: Howard Dyson (860) 305-3714
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Cell: (207) 233-7363
Email: anthony@edosonline.com

Heating: Darren Webber
8B W State St / Granby, MA 01033
Cell: (207) 409-5787
Fax: (207) 929-3617
Email: darren@edosonline.com

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Email: info@emersonswan.com
www.emersonswan.com

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Program Manager yer@efficiencymaine.com
efficiencymaine@efficiencymaine.com
www.efficiencymaine.com

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Jim Pike, Territory Manager
jpike@energykinetics.com
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Fax: (800) 735-2068
www.energykinetics.com

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After Hours Emergency Contact: (207) 841-5722
22 Landry St / Biddeford, ME 04005
Tel: (207) 282-7558
Fax: (207) 282-0299
After Hours Emergency Contact: (207) 776-1662
420 Main St / Caribou, ME 04736
Tel: (207) 498-2526
Fax: (207) 498-2137
After Hours Emergency Contact: (207) 551-6391
9 Buttermilk Rd / Ellsworth, ME 04605
Tel: (207) 667-9322
Fax: (207) 644-0201
After Hours Emergency Contact: (207) 904-7585
20 Webb Dr / Hampden, ME 04444
Tel: (207) 947-6905
Fax: (207) 947-8211
After Hours Emergency Contact: (207) 286-4569
9 Forestall St / Lewiston, ME 04240
Tel: (207) 784-4575
Fax: (207) 784-4205
After Hours Emergency Contact: (207) 402-1988
22 Merrill Dr / Rockland, ME 04530
Tel: (207) 594-6200
Fax: (207) 594-9185
After Hours Emergency Contact: (207) 975-3092
6 Highland Dr / Oakland, ME 04963
Tel: (207) 716-1456
Fax: (207) 872-0010
After Hours Emergency Contact: (207) 692-3778
150 Postal Service Way / South Portland, ME 04106
Tel: (207) 722-8364
After Hours Emergency Contact: (207) 756-5719
Bull Rock Bridge Rd / PO Box 612
West Bath, ME 04530
Tel: (207) 442-7990
Fax: (207) 442-8377
After Hours Emergency Contact: (207) 402-1988
3 Danielle Dr / Windham, ME 04062
Tel: (207) 892-5504
Fax: (207) 892-5507
After Hours Emergency Contact: (207) 332-9325
46 Heywood Rd / Winslow, ME 04605
Tel: (207) 872-5522
Fax: (207) 872-8207
After Hours Emergency Contact: (207) 314-4213
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Client Contact Center (888) 333-4949
Email: hwmchugh@fedins.com
www.federatedinsurance.com
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Wholesaler
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Fax: (207) 772-2957
9 Redlon Rd / Bath, ME 04530
Tel: (800) 442-6720 / (207) 443-5592
Fax: (207) 443-1651
5 Sposedo Rd / Windham, ME 04062
Tel: (207) 892-0290
Fax: (207) 892-0354
293 Abby Rd / Manchester, NH 03103
Tel: (603) 669-8100 / (800) 258-9746
Fax: (603) 669-4723
118 Northeastern Blvd / Nashua, NH 03062
Tel: (603) 589-7580
Fax: (603) 518-1896
126 Bridge St / Portsmouth, NH 03801
Tel: (800) 582-0860 / (603) 436-3550
Fax: (603) 436-4460
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Manufacturer’s Representative
MARK CUNNIF, (339) 227-0472
Kim Garrant, (603) 540-5624
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Tel: (781) 938-8900
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Chip O’Brien, Outside Sales (207) 245-8719
331 Warren Ave / Portland, ME 04103
Tel: (207) 871-1441
Email: jcurry@thegranitegroup.com
After Hours Emergency Phone: (207) 321-6219
Jeremy Hebert, General Mgr.
Laddie Stevens, Outside Sales (207) 400-1266
660 Minot Ave / Auburn, ME
Tel: (207) 514-1280
Fax: (207) 753-0009
Email: jhebert@thegranitegroup.com
After Hours Emergency Phone: (207) 514-1289
Kevin Spaulding, Branch Mgr.
Frank Foss, Outside Sales (207) 852-4274
68 Darin Dr / Augusta, ME
Tel: (207) 405-2010
Email: kspaulding@thegranitegroup.com
Nick Handville, Branch Mgr.
Charles Denbow, Outside Sales (207) 631-6191
Timothy Holmes, Outside Sales (207) 852-4275
Gregg Jones, Outside Sales (207) 852-4273
32 Thatcher St / Bangor, ME
Tel: (207) 300-2310
nhandville@thegranitegroup.com
Michael Doyon, Branch Mgr.
Joshua Metivier, Outside Sales (207) 478-9534
380 Lincoln St / Lewiston, ME
Tel: (207) 333-4340
Email: mdoyon@thegranitegroup.com
Todd Miller, Branch Mgr.
John Tammaro, Outside Sales (207) 838-8728
Steve Metivier, Outside Sales (207) 578-2759
155 Rumery St South Portland, ME
Tel: (207) 321-0080
tmiller@thegranitegroup.com
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HARMON & CO., INC.
Manufacturer’s Representative
Manufacturers’ rep in the water well, wastewater,
and plumbing industries
Greg Harmon
211 White Oak Hill Rd / Poland, ME 04274
Tel: (207) 998-8100
Email: greg.harmonco@gmail.com

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HEAT-FLO Indirect Water Heaters, Hot Water Booster
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Ben Bruns, Ron Cripps
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Chuck Torrey, Kevin McCormick, Caton Tompkins
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Fax: (202)783-2348
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Fax: (603) 625-2842
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PLUMBMASTER / WOLVERINE BRASS
Manufacturer/Wholesaler
Quality Manufacturer of Faucets, Valves, Tubular Brass tools and chemicals
Wanda Capps, Sales Administrator
Tim Ashe, Sales Representative
51 Lacrue Ave / Glens Mills, PA 19342
Tel: (800) 523-5130
Fax: (800) 945-9292
Email: wanda.capps@ppg-inc.com; tim.ashe@ppg-inc.com
www.wolverinebrass.com
Tech Support: (800) 422-4489
Associate Member PHCC of Maine

THE PORTLAND GROUP
Wholesaler
Jeff Golojuch, Br. Manager; Kevin Brady, Outside Sales; Greg Mooers, Outside Sales; Ingrid Gerena and Andrea Wood, Showroom
91 Industrial Park Rd / Saco, Maine 04072
Tel: (207) 283-8787
Fax: (207) 283-4848
www.theportlandgroup.com
Tech Support: Dick Mailhot, (603) 647-6090; Joe Valley, (401) 273-3045
Alphabetical Listing of

After Hours Emergency Contact:
Jeff Golajuch, (207) 400-9729; Greg Mooers, (207) 468-2998
Associate Member PHCC of Maine

PROFESSIONAL DYNAMIC SALES CORP.
Manufacturer’s Representative

Michael Jaffa
PO Box 8497 / Warwick, RI 02888
Tel: (401) 461-0652
Fax: (401) 461-0654
Email: pdscompanyonline.com
Associate Member PHCC of Maine

QHT, INC.
Manufacturer
Biassi Boilers, Firebird Boilers, Ecostyle Radiant Panels

Jim Quincy, President; Keith Hnatow, Technical Director
3560 Lafayette Rd, Building 2, Unit A
Portsmouth, NH 03801
Tel: (603) 334-6400
Fax: (877) 334-6401
Email: info@qhtinc.com
www.qhtinc.com
Tech Support: (800) 501-7697
Associate Member PHCC of Maine

R.W. BECKETT
Manufacturer
Conversion Gas Burners, Oil Burners, Safety Controls, Oil Tank Equipment, Commercial and Residential

Frank Fitzpatrick
43 Technology Dr, Unit 1151
Bedford, NH 03110
Tel: (800) 645-2876 (Main Office)
Cell: (781) 910-4148
Email: fitzpatrick@beckettcorp.com
Tech Support: (800) 645-2876
After Hours: (781) 910-4148
Associate Member PHCC of Maine

REHAU
Manufacturer
Heating and plumbing - Pexa, Controls, Fittings, Manifolds, etc.

Mike Norris, Northeast Sales Manager
mike.norris@rehau.com

Timothy Lovell, Sales Rep
Cell: (603) 952-1768, timothy.lovell@rehau.com
14 Lances Lane / Danville, NH 03819
Home Office:
1501 Edward Ferry Rd NE / Leesburg, VA 21076
www.rehau.com
Tech Support: Sales, Marketing & Service, Inc.

RHEEM WATER HEATING
Manufacturer
1100 Abernathy Rd Suite 1700 / Atlanta GA 30328
Tel: (800) 621-5622
Email: www.rheem.com/contact
www.rheem.com
Tech Support: (800) 432-8373

RIDGID
Manufacturer
Drain cleaning tools, diagnostics, locating, press tools

John Rutberg
400 Clark St / Elyria, OH 44035
Tel: 1 (800)-4-RIDGID
Email: rttcustomerservice@emerson.com
www.ridgid.com
Tech Support: (800) 519-3456

ROTH INDUSTRIES
Manufacturer
Double-Wall Oil Tanks, Radiant, Solar, Septic, Plumbing

Justin Spaulding
PO Box 245 / Syracuse, NY 13211
Tel: (888) 266-7684
Email: justins@roth-usa.com
www.roth-america.com
RST THERMAL
Manufacturer's Representative
Unico, Crete-Heat, Axiom, RenewAire, ZoneFirst, Drake AIC, Bard, S&P, LG, Thermolec
372 University Ave / Westwood, MA 02090
Tel: (781) 320-9910
Fax: (781) 320-9906
Email: mehickey@rstthermal.com
www.rstthermal.com
After Hours Emergency Contact: (781) 320-9910
(listen to instructions)
Associate Member PHCC of Maine

RUNTAL NORTH AMERICA
Manufacturer
Runtal Radiators and towel warmers
Jon Wiberg
187 Neck Rd / Ward Hill, MA 01835
Tel: (800) 526-2621
Fax: (978) 372-7140
www.runtalnorthamerica.com
Tech Support: Jon Wiberg, (603) 770-2078
After Hours Emergency Contact: Jon Wiberg, (603) 770-2078
Associate Member PHCC of Maine

S.G. TORRICE
Wholesaler
Trane equipment and parts, ductwork, supplies, grilles and registers
Chris Jankowski, Store Mgr Westbrook
Tel: (207) 560-6780
After Hours: (207) 387-5492
Tech Support: (978) 657-4768
Associate Member PHCC of Maine

SPECIFICATIONS SALES AGENCY, INC.
Manufacturer's Representative
28 Sycamore Ave / Medford, MA 02155
Tel: (781) 396-0842
Fax: (781) 395-6856
Satellite Office: Jay Pinard
43 W Bare Hill Rd / Harvard, MA 01451
Tel: (978) 456-9582
Email: jayp@specsalesinc.com
www.specsalesinc.com

SUMMIT NATURAL GAS OF MAINE
Energy Supplier
Natural gas provider to homes and businesses
Matt Jacobson, Director of Sales & Marketing
Erika Bennett, Manager of Conversions & Trades ebennett@summitnaturalgas.com
442 Civic Center Dr, Suite 425 / Augusta, ME 04330
Tel: (800) 909-7642 / Fax: (207) 621-8000 ext 6
Tech Support: (207) 621-8000 ext 6
solutions@summitnaturalgas.com
www.summitnaturalgas.com
After Hours Emergency Contact:
1 (800) 883-3181
Associate Member PHCC of Maine

SWEENEY ROGERS GERAGHTY, INC.
Manufacturer's Representative
Weil McLain, Rinnai, Fujitsu, Tjernlund, Adey, Detroit Radiant Products, Danfoss Heating
Brian Kelly, Territory Manager
Chris Tommila, Commercial Territory Manager
250 Richmond St / Raynham, MA 02767
Tel: (508) 822-3939
Fax: (508) 822-0553
Email: sales@srgirep.com
www.srgirep.com
Tech Support: (888) 746-6247 (Rinnai), (973) 575-0381 (Fujitsu)
Associate Member PHCC of Maine

SYMMONS
Manufacturer
Shower Valves, Faucets and Thermostatic Mixing Valves
Dale Emerson
31 Brooks Dr / Braintree, MA 02184
Tel: (603)491-6666
Fax: (781) 843-3849
Email: demerson@symmons.com
www.symmons.com
Tech Support: (800) SYMMONS / (781) 848-2250
Alphabetical Listing of

After Hours Emergency Contact:
(800) SYMMONS / (781) 848-2250
Associate Member PHCC of Maine

TOWER HILL SALES ASSOCIATES
Manufacturer's Representative
American Valve, Anaco Husky, Cinco Solar, E/Bl, Lawler, Oasis, PVI, Procenter, Riverside, Speakman, Thermon Tmepipe

Tyler Pope, Wade Willoughby, Eric Corum
PO Box 457 / Auburn, NH 03032
Tel: (603) 644-5554
Fax: (603) 644-3338
Email: sales@towerhillsales.com
www.towerhillsales.com
Associate Member PHCC of Maine

UNITED INSURANCE
Service Provider
Business Insurance, General, Liability, Property, Auto, Workers Compensation, Professional, Benefits

Erik N. Casparius
470 Forest Ave / Portland, ME 04101
Tel: (207) 619-9012
Email: erik.casparius@unitedinsurance.net
After Hours Emergency Contact:
Erik Casparius (207) 619-9012
Associate Member PHCC of Maine

URELL, INC.
Manufacturer's Representative

Bob Thompson, Dillon Douglass
86 Coolidge Ave / PO Box 321
Watertown, MA 02471
Tel: (617) 923-9500
Fax: (617) 926-9414
Email: info@urell.com
www.urell.com
Associate Member PHCC of Maine

VIEGA
Manufacturer
ProPress; MegaPress; ProPress Stainless; ProRadiant; Pureflow

Tom Keefe
17 Elaine Dr / Nashua, NH 03062
Tel: (603) 494-5723
Email: tom.keeve@viega.us www.viega.net
Tech Support: (877) 843-4262 ext 350
After Hours Emergency Contact: Inside Sales
(800) 976-9819
Associate Member PHCC of Maine

VIESSMANN MANUFACTURING CO.
Manufacturer

Jim Bolduc
Tel: (207) 532-8500
Fax: (401) 732-0590
Email: bolj@viessmann.com
www.viessmann-us.com
Tech Support: (888) 484-8643
After Hours Emergency Contact:
Jim Bolduc (207) 532-8500
Associate Member PHCC of Maine

W.P. HANEY CO.
Manufacturer's Representative
Watts Regulator Co.

Roger Boucher
51 Norfolk Ave / S. Easton, MA 02375
Cell: (207) 329-9247
Tech Support: (508) 238-2030
Associate Member PHCC of Maine

W.S. EMERSON
Service Provider
Promotional Products

John Vickery, Jr.
15 Acme Rd / Brewer, ME 04412
Tel: (800) 789-6120
Email: johnjr@wsemerson.com
www.wsemersononline.com
WALTER F. MORRIS CO.
Manufacturer’s Representative
77 Green St / Foxboro, MA 02035
Tel: (800) 888-1922
Fax: (800) 888-1942
Email: customerservice@morrismerchants.com
www.morrismerchants.com
Associate Member PHCC of Maine

WINSUPPLY OF PORTLAND
Wholesaler
Nathan Bassett, President; Tom Lavin, Andy Gervais
177 Cash St / South Portland, ME 04106
Tel: (207) 773-WINN (9466) / (866) 378-9466
Fax (207) 773-1533
nbassett@winnelson.com
www.portlandwinnelson.com
Associate Member PHCC of Maine
The Maine PHCC and National Education Foundation offers plumbing apprentice e-learning courses for apprentices who need a non-traditional method of receiving their apprenticeship-related instruction. This program is recognized by the U.S. DOL, and the Maine Department of Labor, Office of Apprenticeship.

On-the-job training must be coordinated with a participating employer.

Each course is equivalent to one year of classroom instruction.

For more information on enrollment or to enter the e-Learning Academy, please contact us at aames2@maine.rr.com or 829-5055
Maine PHCC Scholarships

Scholarships with Simple Application to bring new people into the trade.

Maine PHCC has updated their scholarship eligibility for all Members and Associate Members and their employees.

To build workforce and help to bring new people into the trade it was decided that the scholarships would be given to unlicensed applicants or apprentices. Anyone with a journeyman licensee or higher would not be eligible.

- Maine PHCC Scholarship - Up to $500 per member per year.
- MEMA has generously offered to charge the membership rate for anyone receiving a scholarship.
- $500 reimbursement from the State of Maine for apprentices completing Plumbing 101 of the PHCC Academy e-learning.

Courses or Programs for plumbing, oil, gas, hvac offered through PHCC, MEMA, Community Colleges or NTI.

More scholarship information is available on the next page.
**National PHCC Scholarships**

**Access 56 scholarships worth up to $150,000 - all with one application!**

The PHCC Educational Foundation and its industry partners are teaming up to provide financial assistance to students pursuing a career in the p-h-c industry.

Contractors, be sure to have your apprentices apply! Even if your company pays for apprenticeship training, a scholarship win will help offset your training costs and build a sense of accomplishment for the apprentice who wins. Please limit applications to a **max of four per company** and tap your best set of apprentices to send in their applications.


Under a separate program: National Auxiliary Scholarships: include general and industry-related scholarships

[https://www.phccnationalauziliary.org/scholarships **Deadline: July 15, 2021**](https://www.phccnationalauziliary.org/scholarships)

*NEW CHANGES FOR 2021 PROGRAM YEAR*

The Foundation Scholarship Committee approved these new adjustments to the scholarship program.

- Plumbing and HVAC apprentices may use scholarship funds toward their required apprenticeship program textbook expenses (does not apply to college or trade schools).

- Scholarships may be used toward the PHCC Educational Foundation’s online apprenticeship training program or Fast Track to Service Plumbing course. The apprentice or technician must be employed by a PHCC–National Association contractor member company.

For the 2021 scholarship program only:

- An applicant who has previously won a Foundation scholarship may apply for another scholarship in 2021, as long as they continue to meet all other eligibility requirements. Past winners who have been awarded more than one past scholarship may apply, but a small deductive score modifier will be applied.

AND

- Apprentices working part-time (not just full-time) for a PHCC member company may also apply for the Foundation scholarships.
PHCC PREFERRED SERVICE PROVIDERS

We’ve partnered with companies across various industries to provide our members with substantial services and discounts. Questions or concerns? Contact customercare@naphcc.org.

ARAMARK
Outfit your employees for comfort and style while you build your business with custom-embroidered clothing. Build relationships with your customers by displaying employee names and your company logo on work apparel. Add the PHCC logo to give your customers the confidence and security of using a contractor they can depend on.

ExxonMobil
Take your ExxonMobil Fleet Card to more than 14,000 ExxonMobil stations nationwide and save $.05 per gallon on gasoline. Sign up for customized online reports to better manage your fleet costs. Extra bonus: The one-time enrollment fee of $50 is waived for PHCC members. And when you purchase more than 1,200 gallons per month the $10 accounting fee is also waived.

GreenSky
Helping its members close more sales and grow their businesses, the Plumbing-Heating-Cooling Contractors National Association (PHCC) has partnered with the GreenSky® Loan Program, a leader in home improvement financing. GreenSky gives PHCC members the opportunity to offer their customers flexible financing plans, such as no down payment/no interest promotions, as well as deferred interest, low interest and fixed payment options.

Hudson, Ink
Hudson, Ink is a leading provider of marketing services for contractors offering customer retention newsletters, lead-generating yellow page ads and turn-key marketing packages.

Market Hardware, Inc
Market Hardware is the preferred website and internet marketing provider for PHCC. As a member, you have access to free monthly Social Media Tips and discounts on websites, SEO, social media and more. Watch your inbox for monthly Web Marketing Best Practice Alerts, where you can download sample posts for your website, social media platforms and customer newsletters.

Time Communications
Don’t miss your customers’ calls! Time Communications answers your phones when you can’t … and treats your customers just like you would. Services include 24/7/365 call answering, paging and dispatch services, emergency response, appointment scheduling, on-call scheduling, and dedicated operators. Time Communications will develop a call management plan that works for your business – and deliver its award-winning customer service to your customers – all at a discounted monthly rate.
# CALENDAR YEAR 2021

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## JULY
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## AUGUST
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## HOLIDAYS & OBSERVANCES

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<th>Date</th>
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<tr>
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<td>Martin Luther King Day</td>
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<tr>
<td>Feb 15</td>
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<td>Apr 2</td>
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<td>Jun 20</td>
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<td>Jul 4</td>
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<td>Sep 6</td>
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## CALENDAR YEAR 2022

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### HOLIDAYS & OBSERVANCES

- **Jan 1**: New Year’s Day
- **Jan 17**: Martin Luther King Day
- **Feb 21**: Presidents’ Day
- **Apr 15**: Good Friday
- **Apr 17**: Easter Sunday
- **Apr 18**: Easter Monday
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- **May 30**: Memorial Day
- **Jun 19**: Father’s Day
- **Jul 4**: Independence Day
- **Sep 5**: Labor Day
- **Oct 10**: Columbus Day
- **Nov 11**: Veterans Day
- **Nov 24**: Thanksgiving Day
- **Dec 25**: Christmas Day
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  207-716-1456
- Rockland
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