



DuraMAC™ Tanks

Pump Tanks | Expansion Tanks



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How to Order DuraMAC™ Tanks

Order by Model Number Example: 16002-V3M

| | | | | | | | |
|-----------|--|--------------------------|--------------------------------|--|----------------------------------|---|--|
| 16 | 002 | - | V | 3 | M | P | X |
| Class # | Gallons | Base | Position | Connection | Male or | Expansion | Expansion |
| | 2, 5, 7, 20, 32, 36, 52, 86, 96, 119 | M = Metal - = No Base | V = Vertical H = Horizontal | Size 3 = 3/4" 4 = 1" 5 = 1 1/4" | Female M = Male F = Female | Tanks Only P = Potable H = Hydronic | Tanks Only X = Five Year Limited Warranty |

No "X" on *Expansion Tanks Only* have One Year Limited Warranty



Features & Benefits

When pump and tank are in different locations, the pressure switch should be at the tank location. Or, compensating adjustment must be made for pressure loss due to head of water. For example, one PSI for every two feet of elevation.

FEATURES

- ◆ Free Standing and In-line Models
- ◆ Diaphragm Pump Tanks
- ◆ Sizes 2 thru 119 gallons
- ◆ Pressure to 100 PSI

AIR CHARGE VALVE

- ◆ Conveniently-located for easy pressure adjustment
- ◆ Metal in metal bases
- ◆ Flexible rubber in plastic bases (replaceable on plastic)

DESIGNER FINISH

- ◆ An attractive addition to any home
- ◆ Provides positive protection against corrosion
- ◆ Two-part electrostatic finish
- ◆ Ideal for outside use

INSIDE FINISH

- ◆ Two-layer epoxy coating inside to protect against corrosion

DURABLE BUTYL DIAPHRAGM

- ◆ Strong and flexible, for smooth operation and long life

PLASTIC LINING

- ◆ Permanently bonded to the shell in two coat base on epoxy lining
- ◆ Proven protection against internal rust or corrosion

TANK CONSTRUCTION

- ◆ Pre-pressurized @ 38 PSI
- ◆ Lightweight drawn-steel construction
- ◆ Maximum working pressure 100 PSI
- ◆ Slotted and notched for air flow, reduces condensation build-up



How McDonald Diaphragm Tanks Operate



Start-Up Cycle

With water chamber empty, diaphragm is pressed against bottom of chamber.



Fill Cycle

As water is pumped into water chamber, diaphragm is forced upward into air chamber.



Hold Cycle

When pressure in air chamber reaches pump cut-off point, diaphragm is in uppermost position, water chamber is filled to rated capacity.



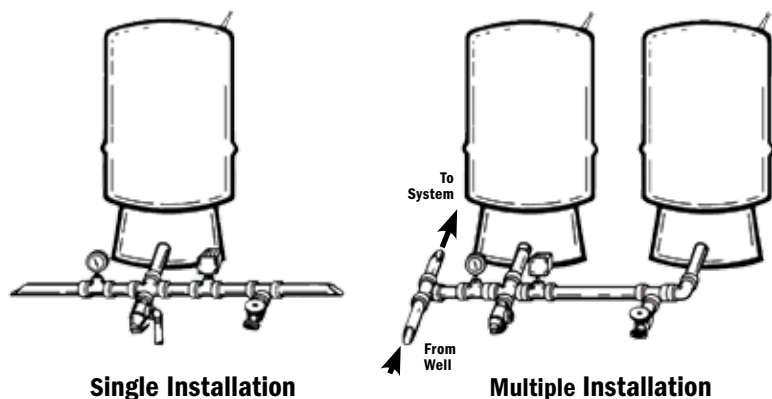
Delivery Cycle

When water is delivered to system, pump remains shut off. Air pressure in top chamber forces diaphragm downward.

Installations

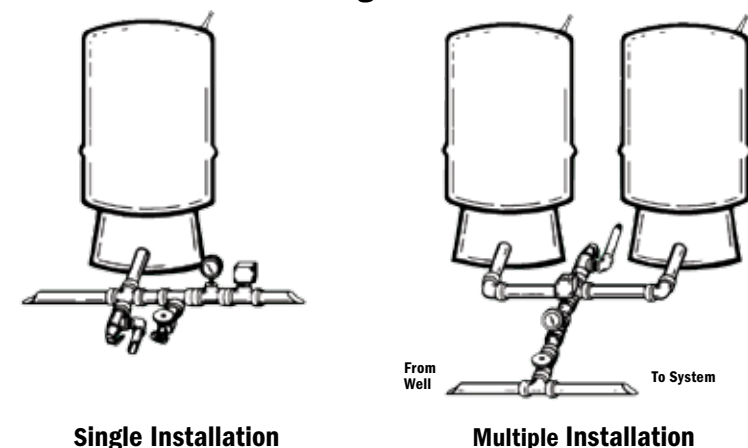
Typical Installations

DuraMAC™ Free-Standing Series



The standard rear-entry installation. Gauge, relief valve, and pressure switch are installed in rear of tank. The piping is run behind the tank and the connection is made to standard tee.

DuraMAC™ Free-Standing Series



The standard front-entry installation. Gauge, relief valve, and pressure switch are installed in front of tank.

Engineering Data

| Volume, Dimension and Weight Specifications | | | | | |
|---|----------------|--------------------------|------------------------------------|--------------------|---------------|
| Model Number | Volume Gallons | "A" Overall Height (IN.) | "B" to Center of Water Inlet (IN.) | "C" Diameter (IN.) | Weight (LBS.) |
| DuraMAC™ Series (Free-Standing) | | | | | |
| 16020MV4F | 20.0 | 32-3/4 | 2-1/4 | 15-3/8 | 30 |
| 16032MV4F | 32.0 | 45-1/2 | 2-1/4 | 15-3/8 | 40 |
| 16036MV4F | 36.0 | 32-5/8 | 2-1/4 | 20 | 45 |
| 16052MV5F | 52.0 | 38-5/8 | 2-1/4 | 23-3/8 | 77 |
| 16086MV5F | 86.0 | 59 | 2-1/4 | 23-3/8 | 105 |
| 16096MV5F | 96.0 | 63-3/8 | 2-1/4 | 23-3/8 | 111 |
| 16119MV5F | 119.5 | 61-1/4 | 2-1/4 | 26 | 165 |
| DuraMAC™ Series (In-Line) No Base | | | | | |
| 16002-V3M | 2.0 | 12-9/16 | - | 8-3/8 | 4.5 |
| 16005-V3M | 4.6 | 14-11/16 | - | 11-3/8 | 7.5 |
| 16007-V3M | 7.3 | 21-1/8 | - | 11-3/8 | 10.5 |
| DuraMAC™ Series Horizontal | | | | | |
| 16014-H4M | 14.0 | 17-3/8 | 21-3/4 | 15-3/8 | 23 |
| 16020-H4M | 20.0 | 17-3/8 | 27-1/8 | 15-3/8 | 30 |

16020-H3M, 16020MV4F, 16032MV4F and 16036MV4F—connection is 1" Female.

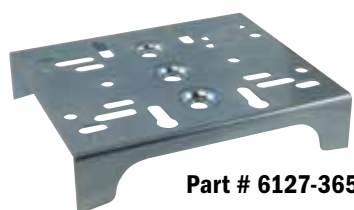
16052MV5F, 16086MV5F, 16096MV5F, 16119MV5F—connection is 1-1/4" Female.

16002-V3M, 16005-V3M, 16007-V3M—connection is 3/4" Male.

16014-H4M, 16020-H4M—connection is 1" Male.

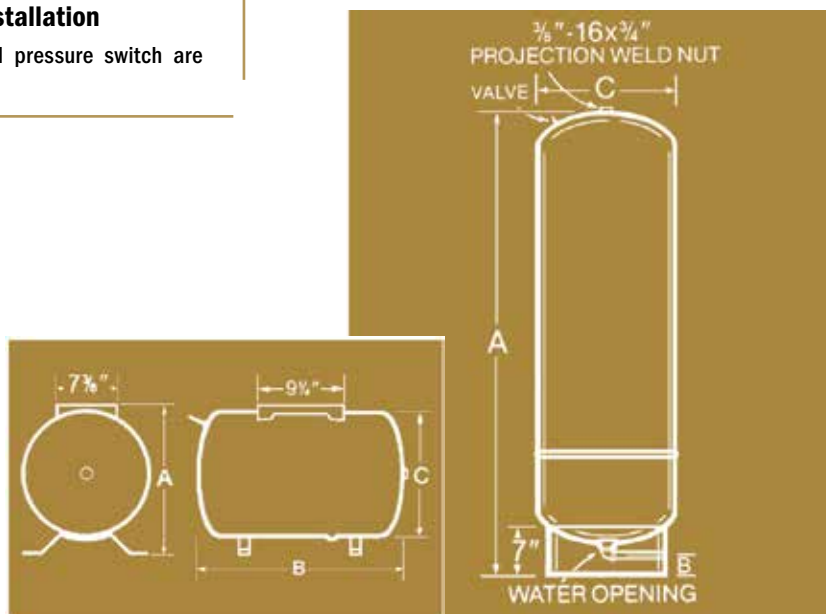
Plastic bases, Glass lined, and Galvanized tanks are available in truckload quantities

Universal pump mounting bracket



Part # 6127-365

Standard on DuraMAC™ Horizontal models and optional on DuraMAC™ In-Line Series and DuraMAC™ Vertical models.



Tank Sizing

The charts below allow you to easily select the right DuraMAC™ Series tank for standard-size pumps between 2 1/2 and 30 gallons in capacity, and for 20-40 PSI, 30-50 PSI and 40-60 PSI pressure ranges. Minimum run times shown (from start-up) are one minute, one and a half minutes and two minutes. For example, for a system that delivers ten gpm at 30-50 PSI, with a minimum run time of one minute, Chart 1 indicates that the proper tank is the 16036MV4F.

Chart 1 | DuraMAC™ Series Free-Standing Tank Selection Chart

| Pump GPM | System Pressure Ranges-PSI | | | | | | | | |
|-------------|-----------------------------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|
| | 20-40 | | | 30-50 | | | 40-60 | | |
| | Minimum Run Times (Minutes) | | | | | | | | |
| | 1 | 1 1/2 | 2 | 1 | 1 1/2 | 2 | 1 | 1 1/2 | 2 |
| 2.5 | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F | 16020MV4F |
| 5 | 16020MV4F | 16020MV4F | 16036MV4F | 16020MV4F | 16036MV4F | 16036MV4F | 16020MV4F | 16036MV4F | 16052MV5F |
| 7 | 16020MV4F | 16036MV4F | 16052MV5F | 16036MV4F | 16036MV4F | 16052MV5F | 16036MV4F | 16052MV5F | 16086MV5F |
| 10 | 16036MV4F | 16052MV5F | 16086MV5F | 16036MV4F | 16052MV5F | 16086MV5F | 16052MV5F | 16086MV5F | 16086MV5F |
| 12 | 16036MV4F | 16052MV5F | 16086MV5F | 16052MV5F | 16086MV5F | 16086MV5F | 16052MV5F | 16086MV5F | 16096MV5F |
| 15 | 16052MV5F | 16086MV5F | 16086MV5F | 16052MV5F | 16086MV5F | 16119MV5F | 16086MV5F | 16096MV5F | 16119MV5F |
| 20 | 16086MV5F | 16086MV5F | 16119MV5F | 16086MV5F | 16119MV5F | (2)16086MV5F | 16086MV5F | 16119MV5F | (2)16086MV5F |
| 25 | 16086MV5F | 16119MV5F | (2)16086MV5F | 16086MV5F | (2)16086MV5F | (2)16086MV5F | 16096MV5F | (2)16086MV5F | (2)16096MV5F |
| 30 | 16086MV5F | (2)16086MV5F | (2)16086MV5F | 16119MV5F | (2)16086MV5F | (2)16119MV5F | 16119MV5F | (2)16096MV5F | (2)16119MV5F |

Chart 2 | Drawdown Volume Multiplier (Approximate)

| Pump Shut-Off Pressure-PSI | Pump Start-Up Pressure-PSI | | | | | | | |
|----------------------------------|----------------------------|------|------|------|------|------|------|------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 20 | 0.26 | | | | | | | |
| 30 | 0.41 | 0.22 | | | | | | |
| 40 | | 0.37 | 0.18 | | | | | |
| 50 | | 0.46 | 0.31 | 0.15 | | | | |
| 60 | | | 0.40 | 0.27 | 0.13 | | | |
| 70 | | | 0.47 | 0.35 | 0.24 | 0.12 | | |
| 80 | | | | 0.42 | 0.32 | 0.21 | 0.11 | |
| 90 | | | | 0.48 | 0.38 | 0.29 | 0.19 | 0.10 |
| 100 | | | | | 0.44 | 0.35 | 0.26 | 0.17 |

Pressure above those listed, exceed maximum tank acceptance volumes.

If proper tank selection cannot be made using Chart 1, follow this procedure. First, find the “drawdown multiplier” by matching the pump start-up and shut-off pressures on Chart 2. For example, the multiplier for a 30-50 PSI pressure range is .31.

Next, insert the pump GPM capacity and desired minimum run time into this formula:

$$\frac{\text{PUMP GPM} \times \text{Min. Run Time}}{\text{Multiplier}} = \text{Minimum Tank Volume Required}$$

To assume dependable drawdown volumes, and in keeping with present industry practice, drawdowns are based on Boyle's Law.

Chart 3 | Drawdown in Gallons

| Model No. | Vol. in Gals. | 20-40 | 30-50 | 40-60 |
|--------------|---------------------|-------|-------|-------|
| 16002-H3M | 2.0 | 0.7 | 0.6 | - |
| 16005-H3M | 4.6 | 1.7 | 1.4 | - |
| 16007-H3M | 7.3 | 2.7 | 2.3 | - |
| 16020MV4F | 20.0 | 7.4 | 6.2 | 5.4 |
| 16032MV4F | 32.0 | 11.5 | 9.6 | 8.4 |
| 16036MV4F | 36.0 | 13.3 | 11.2 | 9.7 |
| 16052MV5F | 52.0 | 19.2 | 16.1 | 14.0 |
| 16086MV5F | 86.0 | 31.8 | 26.7 | 23.2 |
| 16096MV5F | 96.0 | 35.5 | 29.8 | 25.9 |
| 16119MV5F | 119.5 | 44.2 | 37.0 | 32.3 |

Horizontal Series has the same drawdown as the In-Line Series.

For example, using a 10 GPM pump, a one-minute minimum run time, and a 30-50 PSI pressure range, the formula is as follows:

$$\frac{10 \times 1}{.31} = 32.26 \text{ Minimum Tank Volume}$$

Then, using Chart 3, select the tank that has a minimum volume that meets or exceed your minimum volume requirement, and supplies adequate drawdown at the required pressure range. Minimum drawdown equals Pump GPM X Minimum Run Time. Therefore, in the above example, select the 16036MV4F 36-gallon tank. It provides adequate drawdown at 30-50 PSI.

For questions about proper tank sizing, contact the Factory.

Expansion Tanks - Potable Water

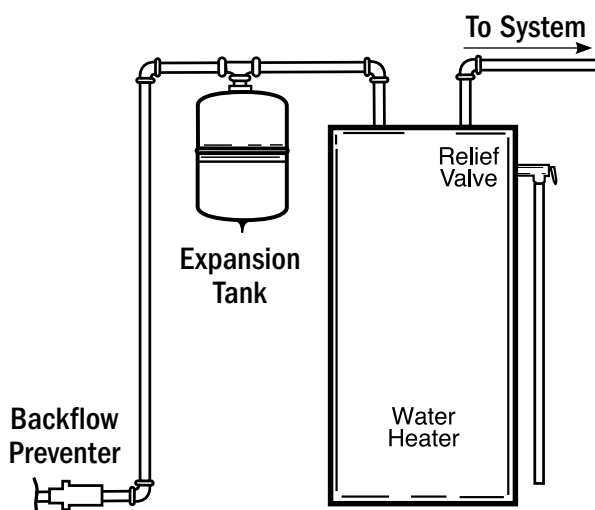
In many of today's potable hot water heating systems, back flow preventers are required by code. Since this seals off the system, an expansion tank is required or the relief valve will discharge on every heating cycle. DuraMAC™ Expansion Tanks eliminate this wasteful and costly practice.

The MPX and MP series has all the features of the MH series, but includes a powder coated liner in the water containing area. This unique bonded surface provides positive protection against rust and corrosion and meets today's sanitation requirements. For other conditions, please contact our Pump Department for assistance.

DuraMAC™ Expansion Tanks must be installed on the cold water supply side of the water heater and placed between the water heater and check valve or back flow prevention device.

Features:

- Drawn Steel Construction
- Butyl Diaphragm
- Maximum Working Pressure 150 PSI
- 40 PSI Air Charge (field adjustable)



TANK MODELS WITH 5-YEAR LIMITED WARRANTY Two-Part Powder Coated Liner



| Model Number | Max (PSIG) Working Pressure | Tank Volume (Gals) | Max. Accept Volume (Gals) | | Conn. MPT Size | Dimensions | | Ship Wt. (Lbs.) |
|--------------|-----------------------------|--------------------|---------------------------|--------|----------------|------------|--------|-----------------|
| | | | 40 PSI | 60 PSI | | Diameter | Height | |
| 16002-V3MPX | 150 | 2 | 1.27 | 1.03 | 3/4 | 8 3/8 | 12 1/2 | 5 |
| 16005-V3MPX | 150 | 5 | 3.05 | 2.19 | 3/4 | 11 3/8 | 14 3/4 | 8 |

TANK MODELS WITH 1-YEAR LIMITED WARRANTY Two-Part Powder Coated Liner



| Model Number | Max (PSIG) Working Pressure | Tank Volume (Gals) | Max. Accept Volume (Gals) 20 PSI | Conn. MPT Size | Diameter (IN) | Height (IN) | Ship Wt. (Lbs.) |
|--------------|-----------------------------|--------------------|----------------------------------|----------------|---------------|-------------|-----------------|
| 16005-V3MP | 150 | 2.1 | 1.03 | 3/4 | 8.0 | 12 1/2 | 5.5 |
| 16012-V3MP | 150 | 4.4 | 2.19 | 3/4 | 11.0 | 14 | 10.0 |

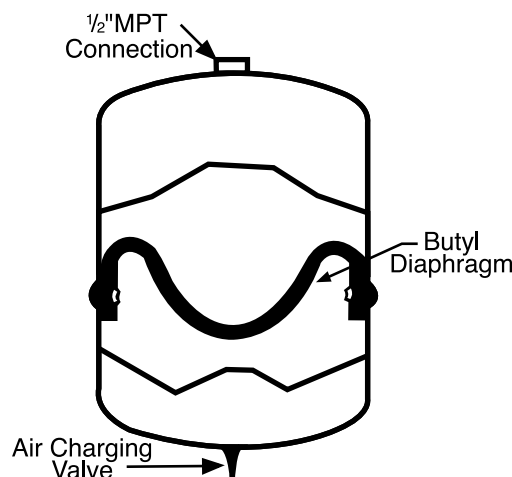


Expansion Tanks - Hydronic Residential Space Water Heating Systems

DuraMAC™ Expansion Tanks are designed for the specific purpose of accommodating the natural expansion of water in a Hydronic Heating System. To eliminate the water logging that is troublesome but normal in a plain steel expansion tank, the air and water within the tank is permanently separated by a butyl diaphragm. The in-line series shown on this page are light in weight, easy to install, and afford many years of trouble-free service.

Features:

- Drawn Steel Construction
- Butyl Diaphragm
- In-line Installation
- Maximum Working Pressure 100 PSI
- Maximum Temperature 240°F
- 12 PSI Air Charge (field adjustable)
- Not for use with Potable Water Heating Systems



TANK MODELS WITH 1-YEAR LIMITED WARRANTY

| Model Number | Max (PSIG) Working Pressure | Tank Volume (Gals) | Max. Accept Volume (Gals) | Conn. MPT Size | Dimensions | | Ship Wt. (Lbs.) |
|--------------|-----------------------------|--------------------|---------------------------|----------------|------------|--------|-----------------|
| | | | 20 PSI | | Diameter | Height | |
| 16002-V2MH | 100 | 2 | 1.53 | 1/2 | 8 3/8 | 12 1/2 | 5 |
| 16005-V2MH | 100 | 5 | 3.75 | 1/2 | 11 3/8 | 14 3/4 | 8 |



A.Y. McDonald Mfg. Co. is a leading manufacturer of Waterworks Brass, Plumbing Valves, Pumps and Water Systems, and High Pressure Gas Valves and Meter Bars. The Company has distinguished itself with a proud tradition of quality and reliability since its founding in 1856.

The mission of A.Y. McDonald Mfg. Co., in the words of our founder, is “to make good products and sell them honestly.” We, the stockholders and employees, accomplish this by extending the McDonald family culture through excellent customer service and by focusing on our customers’ needs.



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More than a brand. We're a family.

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