

Regulator Product Line



Designed for accuracy, dependability and safety, ROOTS Regulators gas pressure reducing regulators are for use in natural gas distribution systems as well as industrial applications (for example, burners and boilers) with most non-corrosive gases, including air, nitrogen, dry carbon dioxide and propane. ROOTS Regulators's regulator product line is based on a building-block approach. The product range uses common components and parts resulting in an extremely versatile and innovative product line that provides an economical solution to the most challenging regulator applications.

Regulator Models

Spring Loaded Service Regulator **B42, B57, B58, B31, B34S, B34, B38**

For lower outlet pressure applications (inches w.c. through 5 PSIG):

- » Residential and light commercial applications
- » Burner
- » Furnaces

Constant Loaded Regulator **CL31, CL231, CL34, CL38**

For higher outlet pressure applications (2 PSIG through 60 PSIG):

- » Fixed factor billing applications
- » Large commercial
- » Industrial

Direct Acting Industrial **RB1700, RB4000**

For commercial and industrial applications requiring fast response and high capacities up to 600,000 SCFH:

- » Ovens
- » Boilers
- » Furnaces

Field Service Regulator **B35, B36, B56**

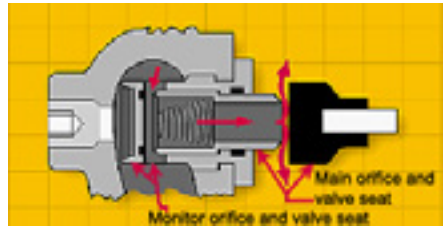
For intermediate and high-pressure applications:

- » First stage regulation
- » Farm taps
- » Suburban taps
- » Compressed air systems

Internal Monitor

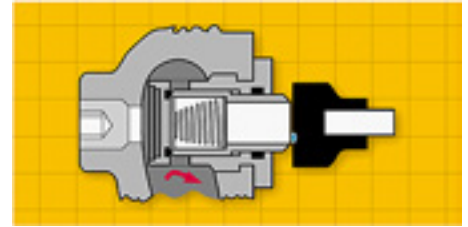
For additional safety, the Internal Monitor (IM) is a unique feature available exclusively in ROOTS Regulators regulators. A secondary orifice and valve seat enables the IM regulator to control the gas flow and lockup in a failure event at the main seat and orifice. The IM prevents large gas amounts from venting into the atmosphere and does not require manual resetting.

The IM regulator design specifically complies with DOT OPS 192.197, paragraph B, which states: "If the gas contains materials that seriously interfere with the operation of a service regulator, there must be suitable protective devices to prevent unsafe overpressuring of the customer's appliance if the service regulator fails." The code lists the devices, including a regulator monitor. The code further states that these devices may be installed as an internal part of the service regulator or as a separate unit.



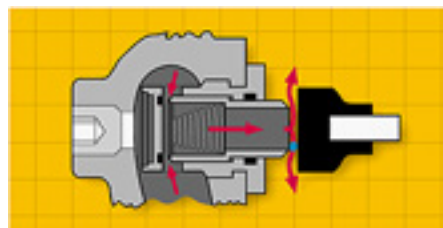
Normal Operation

The IM operates like a standard upstream monitor set; the monitor is wide open under normal conditions. Normal regulation and lockup occur at the main valve seat and orifice. (The closing spring causes CL models to lockup at both seats under normal conditions.)



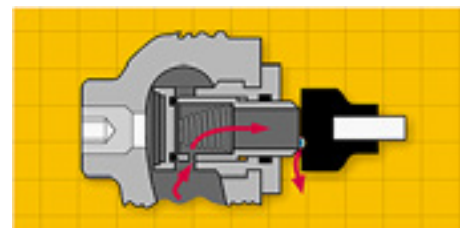
IM Lockup

If the gas demand shuts off during monitor operation, the secondary orifice is formed into the monitor seat to provide bubble tight lockup.



IM Operation

If the regulator fails to control the gas flow due to foreign matter or damage at the main seat and orifice, the secondary orifice automatically takes control at a slightly elevated outlet pressure. The point of regulation moves to the upstream monitor seat and orifice.



Vent Option

In installations where a small gas volume can be safely vented to the atmosphere in the event of a failure, the vent signal option (IMRV) is available. Upon lockup at the monitor seat, a bleed hole allows a controlled amount of gas to bleed past the main seat failure. Outlet pressure builds slowly and the excess gas releases to the atmosphere through the internal relief valve serving as a signal that the main seat failed.

Application	Series	Models	Connection Sizes	Max. Inlet	Outlet Pressure Max.	Flow Range
Residential & Light Commercial	B42	R, H	1/2", 3/4", 1", 1 1/4"	125 PSIG	5 in. w.c. to 5 PSIG	2,000 SCFH
	B31	R, N, IM, IMRV	3/4", 1", 1 1/4"	125 PSIG	4 in. w.c. to 2 PSIG	2,500 SCFH
Commercial & Light Industrial	B34S	R, N, M, D	1 1/4", 1 1/2", 2", 2" FL, 3" FL	125 PSIG	4 in. w.c. to 2 PSIG	3,500 SCFH
	B34	R, N, M, D, IM, IMRV	1 1/4", 1 1/2", 2", 2" FL, 3" FL	125 PSIG	5 in. w.c. to 5 PSIG	10,000 SCFH
	B38	R, N, M, D, IM, IMRV	1 1/2", 2", 2" FL, 3" FL	125 PSIG	5 in. w.c. to 5 PSIG	20,000 SCFH
Industrial (Burner) (Twin Parallel Flow)	RB1700		1 1/2" NPT	275 PSIG	7 in. w.c. to 30 PSIG	120,000 SCFH
	B531	R, N, IM, IMRV	3/4", 1", 1 1/4" IN; 1 1/4", 1 1/2", 1 1/4", 2" OUT	125 PSIG	5 in. w.c. to 2 PSIG	5,000 SCFH
(Twin Parallel Flow)	B838	R, N, M, IM, IMRV, D	2" x 2", 2" x 3" FL, 2" x 4" FL	125 PSIG	5 in. w.c. to 5 PSIG	50,000 SCFH
	RB4000	0, 1, 2	2" x 2" FL, 3" x 3" FL	275 PSIG	5 in. w.c. to 30 PSIG	600,000 SCFH
Industrial & Fixed Factor Billing	CL31	R, N, IM	3/4", 1", 1-1/4"	125 PSIG	1 PSIG to 20 PSIG	4,000 SCFH
	CL231	R, N	1-1/4", 1-1/2", 2", 2" FL, 3" FL	125 PSIG	1 PSIG to 20 PSIG	7,500 SCFH
	CL34	-1, -2, M, IM, D	1-1/4", 1-1/2", 2", 2" FL, 3" FL	150 PSIG	1 PSIG to 60 PSIG	25,000 SCFH
	CL38	-1, -2, M, IM, D	1-1/2", 2", 2" FL, 3" FL	150 PSIG	1 PSIG to 30 PSIG	50,000 SCFH
	CL838	-1, -2, M, IM, D	2" x 2", 2" x 3" FL, 2" x 4" FL	150 PSIG	1 PSIG to 30 PSIG	100,000 SCFH
High Pressure Field Service	B36	R	3/4", 1", 1-1/4"	175 PSIG	1 PSIG to 60 PSIG	2,500 SCFH
	B56	R	3/4", 1"	1000 PSIG	5 PSIG to 60 PSIG	5,000 SCFH
	B35	R, N, M	3/4", 1"	1000 PSIG	10 PSIG to 150 PSIG	5,000 SCFH

Spring Loaded

ROOTS Regulators spring loaded service regulators are simple direct-acting regulators designed for accuracy, safety and dependability. Spring loaded service regulators are used primarily for final stage lower outlet pressure applications (inches w.c. to 2 or 5 PSIG). Typical applications include residential and low outlet pressure commercial and industrial gas supply and all gas-fired equipment types, including furnaces, boilers, dryers, ovens, and heaters. Spring loaded regulators provide extremely fast response to changing downstream flow conditions. ROOTS Regulators spring loaded regulators include the following unique features to offset pressure droop at high flows caused by the spring and diaphragm effect:

» Controlled Boost

All regulators are equipped with boosting devices

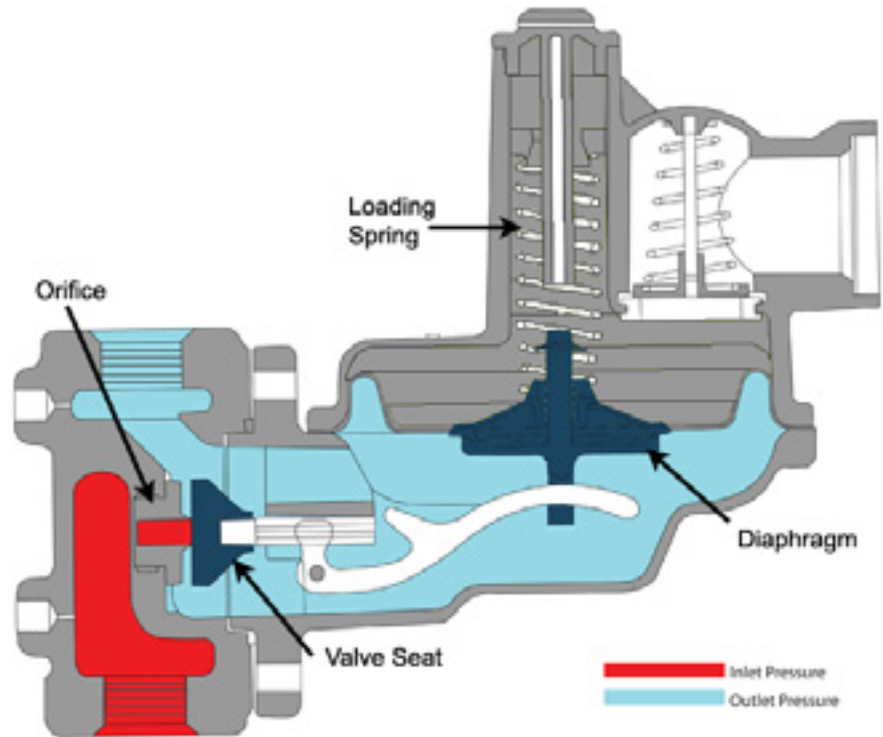
- B42: raised lip on valve seat
- All others: adjustable loading ring

» Controlled Breather Opening

All regulators are equipped with a soft seat vent valve to ensure proper breathing and stability under all conditions

» High Capacity Internal Relief

All spring loaded regulators are equipped with internal relief as standard. Relief flow paths are as large as practical to provide the least resistance to venting gas in the event of an over-pressure situation to minimize pressure buildup



Principle of Operation

Inlet pressure is reduced to a lower outlet pressure by restricting flow through an orifice to match a fluctuating downstream demand.

- » As downstream demand increases, outlet pressure drops slightly and the diaphragm moves downward. The valve seat moves farther away from the orifice face to allow an increased flow to match the increased demand
- » As downstream demand decreases, outlet pressure increases slightly moving the diaphragm upward. The valve seat moves closer to the orifice face to restrict the flow to match the decreased demand
- » When demand is shut off, outlet pressure continues to rise, moving the diaphragm up farther. The valve seat is driven into the orifice face, shutting off the flow of gas bubble tight (lockup)



B42 Series

The B42 service regulator incorporates a molded diaphragm and increased lever ratio into a conventionally designed regulator. The result is a lighter, more compact unit that provides the power, capacity and relief performance of much larger regulators. Reduced weight means easier handling and installation. Reduced size means easier installation in limited spaces and a lower profile meter set. Typical applications include residential services, 2 PSIG systems and small commercial services.



B31 Series

The B31 service regulator is a high-performance regulator with a large effective diaphragm area and powerful lever ratio. The B31 is designed to maintain accurate regulation over a wide range of flows on systems with extreme variations in inlet pressure and to deliver high capacities with very low inlet pressures. Typical applications include demanding residential services and light commercial services.



B34S Series

The B34S service regulator is a compact, cost-effective regulator designed for mid-range commercial applications. The B34S is particularly well suited for quick on/off applications where shock problems can occur.

High Capacity Spring Loaded

ROOTS Regulators spring loaded regulator uses a large 12-inch diameter diaphragm that allows for up to an 1 3/8-inch orifice to be installed. These regulators are appropriate for many commercial and industrial uses such as gas engines, burners, furnaces and boilers. The rapid response of the B34 is particularly well-suited for mid-range applications where quick on/off loads cause shock problems.



B34 Series

The B34 service regulator is designed for versatility with a large diaphragm for commercial and industrial loads. The B34 maintains accurate regulation on applications where frequent sudden load changes can occur. Rugged construction enables the basic B34 model to cover applications with outlet pressures of in. w.c. through 5 PSIG by merely changing adjustment springs.



B38 Series

The B38 service regulator is designed for use on large commercial and industrial loads. Large orifices are available (up to 1 3/8-inch) for high-capacity/low inlet pressure applications. The B38R boasts a massive relief capacity. All choke points in the relief flow path are enlarged to ensure minimum pressure buildup in the event of regulator failure. The B38 eliminates the need for external relief valves for full capacity relief in most applications.

Twin Parallel

ROOTS Regulators Twin Parallel Flow Regulators incorporate two diaphragm actuators and a single valve body into a self-contained regulator. Parallel regulation through dual orifices allows increased capacities. Twin relief valves (spring loaded models) provide double relief capacity. The use of two smaller orifices in place of one large orifice improves lockup, inlet effect performance and relief performance. The internal monitor versions of the twin regulators provide the highest level of safety available in a single regulating device. Twin sliding orifices provide normal dual regulation with secondary monitor regulation and lockup in the event of multiple internal seat failures and/or lever failure.



B531 Series

The B531 is designed for light to medium commercial applications where the added safety of twin sliding orifices and/or dual relief is desirable. The IM version can perform all conventional monitor functions set in a single device. Small diaphragm cases allow the B531 to respond quickly to fast on/off loads. Typical applications include schools, daycare centers, nursing homes and high-traffic areas such as drive-thru restaurants and carwashes.



B838 Series

The B838 is designed for large commercial and industrial applications where the added safety of twin sliding orifices and/or dual relief is desirable. The increased capacity inherent in parallel flow regulators enables the B838 to handle large loads even at delivery pressures of 2 and 5 PSIG. The B838 can thus address fixed factor needs while retaining all of the favorable characteristics of spring loaded regulators such as quick response, low lockup and internal relief. Typical applications include hospitals, apartment buildings, hotels, high-rise apartments and other public buildings.



CL838 Series

The CL838 is designed to provide extremely accurate regulation of gas in high-capacity, elevated outlet pressure applications. The internal monitor version can perform all of the functions of a conventional high-pressure monitor set in a single device. Typical applications include district stations and high-capacity fixed factor installations.

Constant Loaded

ROOTS Regulators Constant Loaded Regulators utilize constant pressure supplied by a pilot regulator as the loading element for the main regulator. This design eliminates the outlet pressure droop at high flows associated with the spring effect in spring loaded regulators. CL regulators can maintain extremely accurate regulation at higher flows and higher outlet pressures than spring loaded regulators. Typical applications include elevated pressure gas supply to commercial and industrial installations, fixed factor metering installations (eliminating the need for expensive instrumentation), and all types of applications requiring accurate PSI-to-PSI regulation at widely varying flow rates. ROOTS Regulators constant loaded regulators feature:

» Accurate Regulation

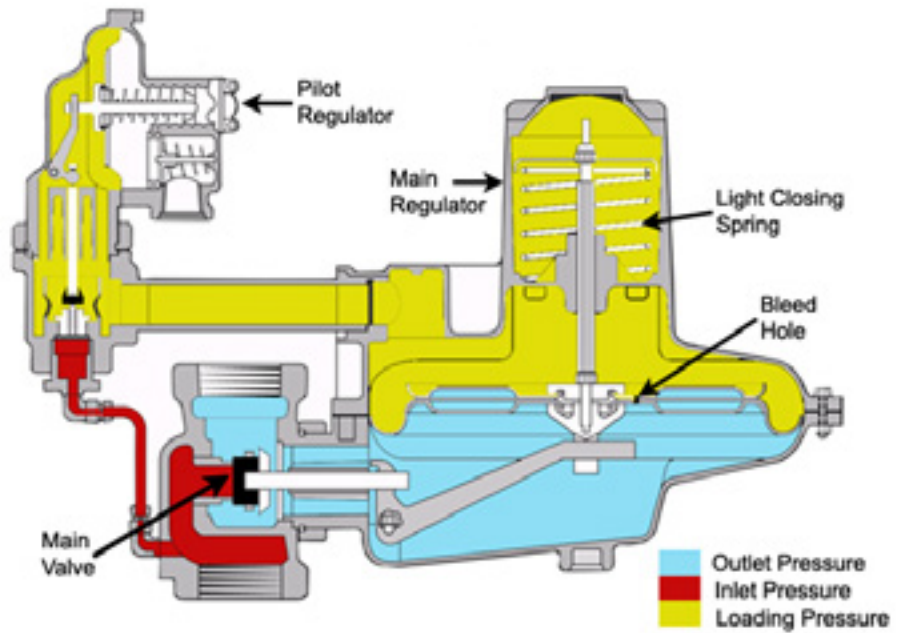
Constant loading pressure is supplied to the main regulator by a pilot regulator enabling straight-line regulation maintenance over a wide range of flows and outlet pressures

» Internal Bleed

Loading pressure bleeds downstream through the main diaphragm. No bleed occurs at lockup

» Low Pressure Differential

CL regulators can operate with as little



as 1/2 PSI differential between inlet and outlet pressure

Principle of Operation

Inlet pressure is piped through external tubing to the pilot regulator. The pilot regulator is adjusted to reduce the inlet pressure to the desired outlet pressure adding enough pressure to overcome the light closing spring (loading pressure). Constant loading pressure is piped to the top of the main regulator diaphragm.

- » When demand is approximately 50 CFH or less, gas is supplied through a bleed hole in the main diaphragm
- » When demand increases above what is supplied through the bleed hole, outlet pressure decreases slightly, causing an increase in pressure differential across the diaphragm. The diaphragm moves downward and the main valve is repositioned to match the increased downstream demand and recover the desired outlet pressure
- » When demand is shut off, outlet pressure continues to rise. The increased pressure



CL31 Series



CL231 Series



CL34 Series



CL38 Series

is transmitted through the bleed hole to the pilot regulator. The pilot regulator locks up bubble tight. The closing spring maintains bubble tight lockup at the main valve

CL31 Series

The CL31 Series is designed to provide extremely accurate regulation for intermediate gas volumes (to 4000 SCFH) at elevated pressures (1 to 20 PSIG). The CL31R features a relief-type pilot regulator to provide token relief and to prevent excess loading pressure from entering the main regulator should the pilot regulator fail. The CL31N features a non-relief pilot regulator and can be used for outlet pressures over the entire range without changing the pilot adjustment spring.

CL231 Series

The CL231 Series is a compact, cost-effective regulator designed for mid-sized commercial applications (to 7500 SCFH) which require accurate regulation at elevated pressures. The CL231R features a relief-type pilot regulator to provide token relief and to prevent excess loading pressure from entering the main

regulator should the pilot regulator fail. The CL231N features a non-relief pilot regulator and can be used for outlet pressures over the entire range without changing the pilot adjustment spring.

CL34 Series

The CL34 Series is designed to provide extremely accurate gas regulation over a wide range of flows and outlet pressures. Typical applications include fixed factor billing on commercial and industrial installations. The CL34-1 features a low pressure relief-type pilot regulator for outlet pressures from in. w.c. to 5 PSIG. The CL34-2 features a high-pressure relief-type pilot for outlet pressures from 1 to 60 PSIG.

CL38 Series

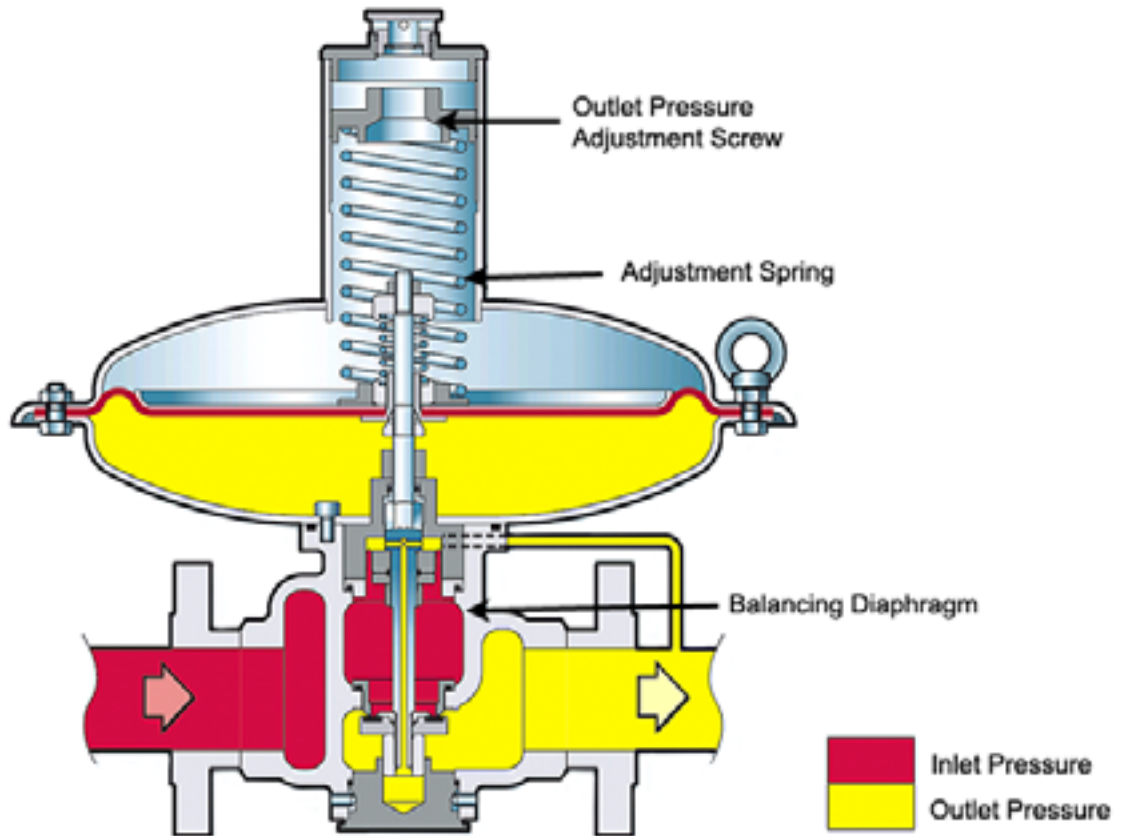
The CL38 Series is designed to provide extremely accurate gas regulation in high capacity applications with outlet pressures up to 30 PSIG. Typical applications include fixed factor billing on large commercial and industrial installations and low-pressure district regulator stations. The CL38-1 features a low pressure relief-type pilot regulator for outlet pressures from in. w.c. to 5 PSIG. The CL38-2 features a high-pressure relief-type pilot for outlet pressures from 1 to 30 PSIG.

Direct-Acting Industrial

ROOTS Regulators Direct-Acting Industrial regulators are specifically designed for fast on/off loads to help prevent pressure swings with sudden load changes for applications including:

- » Large furnaces
- » Large boilers
- » Large ovens

The balanced valve design allows the regulator to hold a constant outlet pressure under any inlet pressure condition.



Principle of Operation



RB1700 Series

The RB1700 Series is designed for commercial and industrial applications (burner, large appliance regulation) requiring fast response times. The balanced valve provides constant outlet pressure under all inlet pressure conditions. The RB1700 operates at inlet pressures up to 175 PSIG and outlet pressure ranges from 7" w.c. to 30 PSIG.



RB4000

The RB4000 Series is designed for industrial service, district station and large appliance regulation applications requiring fast response times. The balanced valve design provides constant outlet pressure under all inlet pressure conditions. The unique built-in pulsation dampener allows for nearly infinite flow rate turn-down. The RB4000 operates at inlet pressures up to 275 PSIG and outlet pressure ranges from 5" w.c. to 30 PSIG.

Limited Warranty

ROOTS Regulators are subject to the terms and conditions of the Natural Gas Solutions North America, LLC General Terms & Conditions For Sale of Products, Parts and Services, and no other terms shall apply, unless agreed upon by the parties in writing. The Natural Gas Solutions North America, LLC General Terms & Conditions For Sale of Products, Parts and Services can be found on the Dresser Utility website: dresserutility.com/forms-questionnaires-and-terms-conditions-sale.

Ordering Information

Specify:

1. Inlet and outlet connection size and type
2. Model number
3. Outlet pressure desired
4. Pilot needed
5. Inlet pressure range
6. Type of gas and maximum capacity required
7. Assembly position number (see chart above)
8. Special requirements such as tagging,^{1/8"} pipe plug tap, seal wire, etc.

ROOTS Regulators

16240 Port Northwest Drive

Houston, TX 77041

T: 1-800-521-1114

F: 1-800-335-5224

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