



## Putting It All Together: Reducing Size, Retaining Performance.

## Blending parts from different regulators yields a new solution.

The maker of a combined mechanical ventilation/anesthesia device came to Marsh Medical because it required a precise, accurate pressure regulator in a smaller package. The new regulator needed to be nearly half the size of the current one, while retaining the accuracy, flow rate, and pressure capacity of the larger product.

To achieve these results, engineers would end up bringing together ideas from existing Marsh Medical products to create something new.

### Precise guidelines

The guidelines from the customer called for a compact regulator that could deliver 200 liters per minute (LPM) at 1.8 pounds per square inch (PSIG) output under a range of set points (2.2 PSIG, 2.5 PSIG and 3 PSIG) with input pressure ranging anywhere from 15 PSIG to 100 PSIG.

The customer also required a special body design for the regulator to accommodate their specific application. There were specific parameters. It had to be compatible with Marsh's existing T41 pressure regulator's bonnet, range springs, and diaphragm.



MD42 Series  
Direct-Acting  
Spring-Loaded  
Regulator

It had to use the balanced pintle design of a second regulator, the T70, and required a new diaphragm assembly that worked with this balanced pintle design. It also had to have a new baffle plate and seal designed for the new body – and, of course, it all had to fit within the application.

### Bringing everything together

To achieve excellent performance from a more compact design, the majority of the engineering team's work was focused on creating a new pressure regulator body that utilized as many T41 parts as possible, while incorporating the T70 balanced pintle design.



Also, the input and output ports were designed per customer specification, however the casting of the body enables it to also be used with standard port options as well.

Throughout the design process, Marsh Medical's engineering manager had ongoing technical discussions with the customer.

### MD42 is born

Prototyping utilized a mixture of 3-D printing, new components machined in-house, as well as existing components. Engineers devised a new testing fixture to accommodate the specific body design. The flow rates were tested according to the customer's desired specifications at 1.8 PSIG output under 2.2 PSIG, 2.5 PSIG and 3 PSIG set points with input pressure at 15 PSIG and 100 PSIG.

The resulting MD42 regulator provides optimal flow capacity, durability, responsiveness, and minimal supply pressure effect. It is an excellent precision compact regulator with a unique design. The MD42 is 40% smaller than the original regulator, has 80% of the flow capacity, and has the same pressure capacity. This allowed for less weight, less space requirement, and greater flexibility to the customer. **M**



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### About Marsh Medical

Marsh Medical brings nearly a half-century of experience in the design and manufacturing of medical device components into a single access point. Marsh Medical's dedicated team shatters the limitations of the past with new designs, improved performance, unmatched adaptability, and innovative materials. In-house engineers and chemists develop custom solutions to the challenges facing manufacturers of today's medical equipment. Gain greater convenience, faster service, and streamlined procurement from a trusted name. For more information, visit [www.marsh-medical.com](http://www.marsh-medical.com)



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