DRD™ Dual Resolution Syringe DRS™

PATENTED **Pump System for Liquid Handling**

DRS Breakthru

The DRS story -- how the Dual Resolution Syringe **BREAKTHROUGH** came about

In the 1990s, worldwide patents were issued to DRD on its revolutionary concept of Differential Displacement for small volume aspiration and Dual Resolution for high flow and large volume dispensing. This was initially developed for the APEC corporation blood glucose analyzer, sold world-wide, in which the DRD dual resolution displacement technology permitted a single DRD pump to accurately aspirate 10 uL of whole blood samples without clogging or priming problems and to dilute it with 500 uL of reagent.

The concept was attractive to immunochemistry analyzer manufacturers because of their need to handle a wide range of sample and reagent volume with high flow capability and minimal maintenance requirements. The Beckman Coulter Access, DPC Siemens Immulite and J&J/OCD Vitros immunochemistry analyzers have used tens of thousands of DRD pump modules, and over 15,000 pump modules with the DRD logo on them are running in analyzers today. The latest application for the DRD is in cell separation (StemCell RoboSep). ***But the DRD invention required a special pump module to use it.***

Over the past decade, stunning advances in life sciences, genetics and immune diseases increased the need to accurately pick up and transport smaller and smaller samples, using smaller and smaller syringes (the best way to accurately aspirate tiny samples) but always plagued by the fact that syringes small enough to aspirate small samples accurately can't deliver them well. Extremely tiny tips to artificially elevate tip escape velocity became the rage before it was found that this damages certain genetic materials and that viscosity effects compromised accuracy. So a proliferation of creative hybrid systems occured that used small syringes to aspirate (nothing better exists to this day) and combined this with different and often complex technologies to deliver those samples. DRD has now made a **BREAKTHROUGH** in configuring its core technology invention ***to run in conventional syringe modules*** -- ***freed from the need to function only in special pump modules***! This breathes new life into venerable positive piston technology. The elegantly simple Dual Resolution Syringe now enters the field to take on the hybrid melange of whackers, thwackers, pokers and zappers that emerged to try to fill the void that conventional positive displacement syringe module technology seemed helpless to address -- prior to DRD's inventing the DRS, that is.

Why the DRS is more practical and more powerful than syringes.

This new DRS (Dual Resolution Syringe) patented embodiment of the DRD Differential Resolution Displacement principle now replaces a conventional syringe one-on-one, both the standard 6 cm length and the newer 3 cm short ones popularized in compact Tecan/Cavro and Hamilton pump modules used in automated instruments. The DRS invention eliminates completely the need for any small seal or piston, resulting in robustness and freedom from all the priming and bubble problems innate to smaller syringes, while leaving high volume and flow power intact. The DRS seals last for millions of cycles or are readily replaceable. Many instruments try to make do with syringes that are no smaller than 250 uL because of the priming, bubble and delivery problems of smaller syringes, but this leaves the pump system shy of the precision and accuracy it really needs while further compromising the flow delivery capability that is also needed.

The 20/300 model DRS replaces a short (3 cm) syringe and has Differential Displacement as fine as a 100 uL syringe and Single Displacement flow like a 2.5 mL syringe -- a dynamic range and precision & accuracy far better than any syringe. With its fine Differential Displacement and freedom from small seals and leak problems, the DRS can be relied on to handle low microliters and nanoliters with far better P & A than a 250 uL syringe, for example, while having 10 times as much flow power to impart tip escape velocities that give true contact-free delivery. Typical precision in the Differential Displacement mode is a standard deviation of 6 nanoliters (0.006 uL), corresponding to an 0.6% CV at 1 uL and 1.2% CV at 500 nanoliters.

DRD™ Diluter Corporation, 83 Pine Street, West Peabody, Mass 01960 USA
Phone (978) 536-7062 Fax (978) 536-7054 website www.drddiluter.com email drddiluter@drddiluter.com

11/27/07