

SMART MEDICAL TECHNOLOGIES – TRANSITION VALVE

Smart Medical Technologies' Transition Valve – a gel-less method of serum separation.

SOME BENEFITS

- **CHEMICALLY INERT** – won't react with the fluid sample.

The SMT Transition Valve is manufactured from the same materials that are used to produce test tube caps, so they won't in any way interact with the fluid sample.

Implementation of the transition valve eliminates the need for further use of chemical buffers that could potentially alter experimental conditions.

- **JUST DROP IT IN AND GO** – eliminates the technician's sampling overhead.

In use with a blood sample, the separation does not rely on the physical thickening of red blood cells more commonly found with gel methods of serum separation.

The separation proceeds immediately upon centrifugation, and does not alter the chemistry of fluid components before, during, or after separation. This allows the technician to simply load the sample, run the centrifuge, and obtain the separated product without any other hassle.

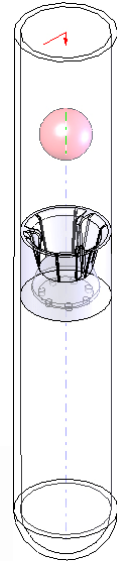


Figure One

HOW IT WORKS

The SMT Transition Valve is comprised of a pre-positioned elastomeric valve, coupled with an elastomeric ball placed on top of the valve, which serves as the flow regulator between the upper and lower compartments of the sample test tube. In its pre-initiated configuration, the elastomeric valve is frictionally sealed with the inner walls of the test tube, and is thus positioned in a static state. The spherical ball that is dropped on top of the valve is able to shift freely throughout the tube's upper compartment, and is only initiated and trapped within the valve orifice upon centrifugation (See Figure One). In accordance with standard medical protocols, the tube is fully evacuated prior to sampling.

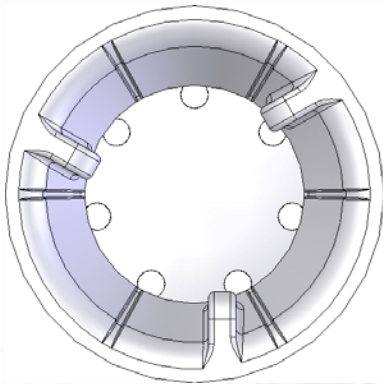


Figure Two

The loaded test tube is subsequently placed inside a centrifuge to activate the separation process.

In the current setting, a sample of serum, commonly blood, is injected into an evacuated test tube for experimental analysis. Here, an identical process is replicated, with fluid loading through the valve and between the upper and lower chambers of the test tube via perforated channels on the bottom face of the valve (See Figure Two). The loaded

The separation of the fluid components and the mechanical regulation of the Transition Valve rely on inherent density considerations associated with centrifugation processes. In large part, regulation is controlled via the ball-valve interplay. Here, the elastomeric ball is manufactured with the highest relative density, and is therefore most compelled to migrate towards the furthest end of the tube during centrifugation. On its path towards the distal end of the test tube, the ball first encounters the ribs of the valve mouth, which bend to the side and back to permit entry into



the valve cavity. Following rib deformation, the ball continues migration down into the valve cavity, aided by transverse channels along the inner wall of the valve that permit movement into the orifice, but that frictionally restrict movement back out. (see *Figure Three*)

From here, the ball continues down until it begins to physically depress against the bottom face of the valve with a piston-like effect, permitting a clear, circular channel of fluid flow between the ball and the valve that unifies the upper and lower compartments for free fluid separation.

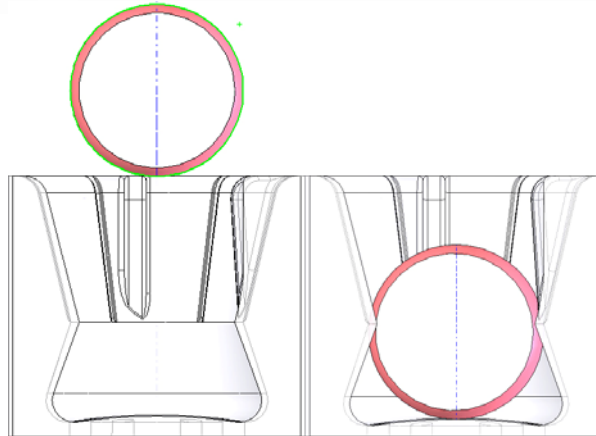


Figure Three

Once separation has fully resolved, the primary fluid components will be isolated on either side of the valve. From here, the centrifugation may be suspended, at which point the elasticity of the valve functions to position the ball inside the valve orifice at a position at which the outer surface of the ball comes into direct contact with the inner face of the valve, physically preventing further fluid flow between the upper and lower chambers of the sample test tube. (See *Figure Four*)

In the stopped and locked position, the upper and lower test tube compartments are physically excluded from further contact, thus allowing the experimenter to begin analytical sampling from either the upper or lower chamber. The contents of the upper chamber may be sampled by inserting the needle into the upper layer of separated serum, and the contents of the lower chamber may be sampled by inserting a needle into and through the valve, and extracting the contents for analysis.

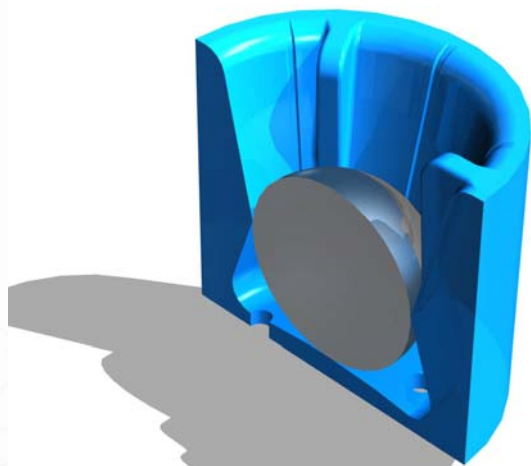


Figure Four

A NEW WAY OF SERUM SEPARATION

Smart Medical Technologies' Transition Valve technology provides a new, efficient, and innovative approach to common serum separation processes, and introduces a wealth of potential benefits for the medical/laboratory setting.

As a gel-less method of serum separation, the transition valve signifies a novel design different from current medical technology, and represents our dedication to providing smart, innovative, and widely applicable products to the laboratory and health services sector.

To learn more about the Transition Valve, please contact Smart Medical Technologies at 949-459-9050, or visit our website at <http://www.smartmedtech.com>.