



PRODUCT NOTE

Number 117

TeleFLO™ and Make-Before-Break (MBB™) Flow Passages

TeleFLO

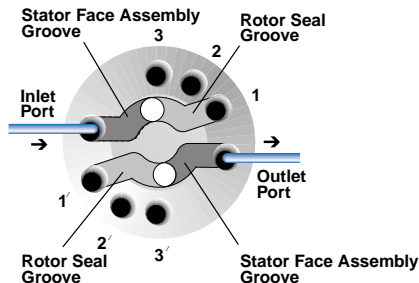
Rheodyne's patented TeleFLO valve architecture allows a single valve to select among several components in a flow stream. The grooves in the rotor seal and stator face assembly overlap as the position of the valve changes, creating a "telescoping" effect of the grooves. The overlapping leaves no dead volume and therefore minimizes dispersion. Rheodyne valves containing the TeleFLO design include the three column selector, six column selector, and two channel selector with by-pass.

Each groove in each surface has two segments: one straight, and one curved. The curved segments of the rotor seal grooves overlap with the curved segments of the stator face assembly grooves to accommodate the change in path distance as the valve rotates to each position. The curved segments never allow any part of the grooves to become a cavity, unswept by the mobile phase. Instead, the overlapping curved segments make only one passage direct from port to port. Therefore, the distance in the flow passages change, but the volume remains constant.

The example shown in Figure 1 is a three-position selection valve. The flow path directs fluid in from the inlet port to Port 1, 2, or 3 (see Figure 1) depending on the position of the rotor seal. Ports 1, 2, and 3 connect to Ports 1', 2', and 3' respectively. For example, Port 1 connects to the inlet of Column 1 and Port 1' connects to the outlet of Column 1. Finally, the fluid flows out the outlet from Ports 1', 2', or 3'.

Position 1

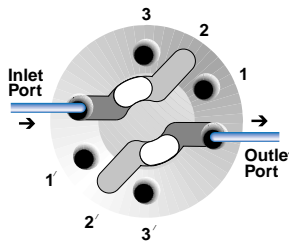
Flow in Inlet Port to Port 1, then Port 1' out to Outlet Port. The curved segments of the stator face assembly grooves (in dark blue) and the rotor seal grooves (in light blue) form the two halves of the flow path. The passage is fully extended with only a slight overlap (in white) of the curved segments.



Position 1

Position 2

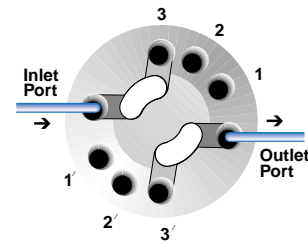
Flow in Inlet Port to Port 2, then Port 2' out to Outlet Port. As the stator face assembly remains stationary, the rotor seal rotates, and the valve changes position. The rotor seal grooves "telescope" into the stator face assembly grooves resulting in a partial overlap of the curved segments of the grooves in each surface.



Position 2

Position 3

Flow in Inlet Port to Port 3, then Port 3' out to Outlet Port. As the rotor seal rotates and the valve changes position, the curved segments completely overlap. As in the other two positions, there is no unswept groove cavity outside the flow path. Thus, the passage channels the flow directly from port to port.



Position 3

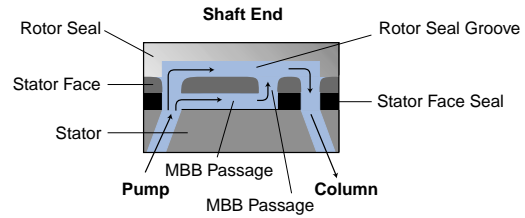
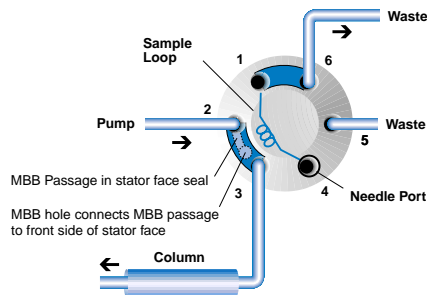
Fig. 1. Superposition of the rotor seal and the stator face assembly.

TeleFLO™ and Make-Before-Break (MBB™) Flow Passages

Make-Before-Break (MBB)

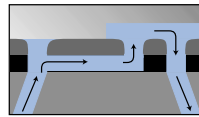
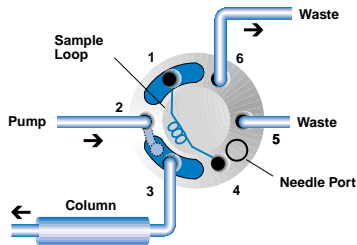
Rheodyne's unique, patented MBB architecture design provides uninterrupted flow when switching between LOAD and INJECT positions. MBB greatly reduces transient pressure shocks and is beneficial for flow-sensitive detectors, fragile columns, and pumps. Models 7725, 9725, 3725, 3710, and "i" versions contain the MBB design.

View from Stator



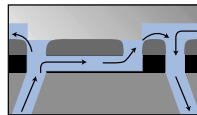
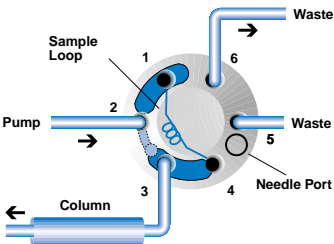
1. LOAD

Flow from pump port to column port is via parallel paths: the rotor seal groove and the MBB passage (dashed line).



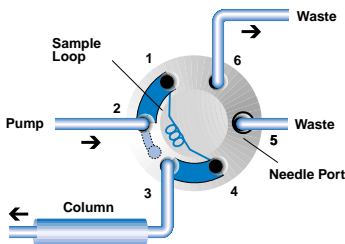
Intermediate 1

Parallel flow stops. Flow is only in the MBB passage, MBB hole, and the leading part of the rotor seal groove. This is the mode during most of the 60° rotation of the valve.



Intermediate 2

Flow starts through the loop just as it stops through the MBB passage. Flow is not interrupted. Back pressure increases slightly (typically less than 10 psi) at the instant of transition because of the small area of overlap between stator face holes and rotor seal grooves.



2. INJECT

All flow is now via the loop. Note that the sample is never exposed to the MBB passage.