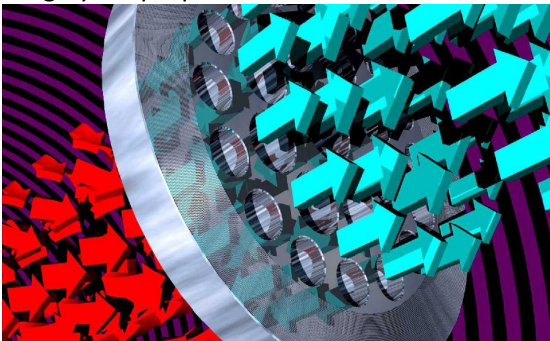


Tech Note: How The CPA 50E Works

The CPA 50E flow conditioner is an isolating flow conditioner, which means that it is relatively insensitive to the upstream conditions in the pipe (such as velocity profile and swirl). The hole pattern is arranged so that the resulting downstream condition is a fully developed profile, the same as would be achieved by a long length of straight, uniform pipe. This is how it works:

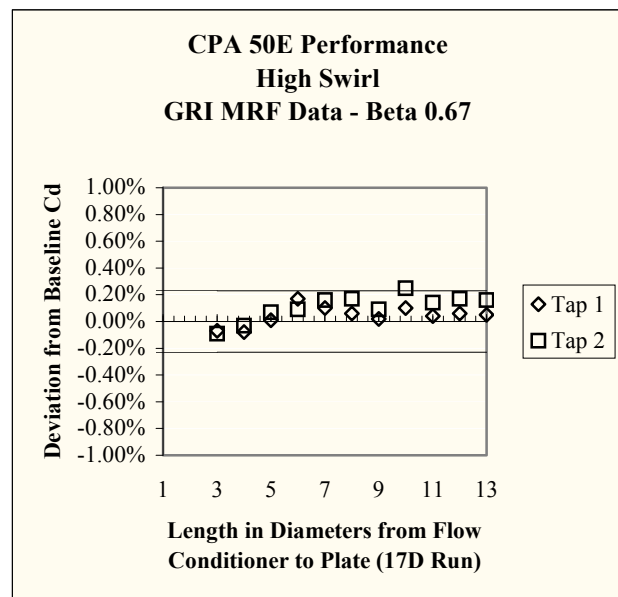
1. As the gas stream approaches the flow conditioner, it is forced towards the holes in the plate (which cover slightly less than half of the total area). This causes the pressure field to even out somewhat across the pipe immediately upstream.
2. As the gas proceeds through the holes in the plate, it accelerates to over twice its initial velocity. Since the pressure is fairly constant across the pipe, the flow through each hole is roughly proportional to its area.



3. If a non-axial component to the flow (such as swirl) is present, this is reduced by the acceleration of the gas, and the thickness of the plate. These two effects effectively eliminate swirl.
4. The size and location of the holes has been developed through high pressure, high

Reynolds Number testing. As the flow-fields of the holes re-combines to one flow-field, this final flow is fully developed. In order to recombine these individual jets effectively, four to five diameters is required.

Testing at Southwest Research Institute (sponsored by GRI) on orifice meters demonstrates this effect. For the high swirl test, very little shift from the baseline was noted.



Complete data for this series of tests is available from GRI.