



Ceramic Disk Filters

Porous ceramic filters have many applications, but in the oil field they are used as a replacement for filter paper in the HTHP Filter Press. Available in a range of pore throat sizes and permeabilities, ceramic filters enable the operator to perform filtration tests under conditions similar to the formations being drilled. This is a big advantage over the standard paper filters. Also ceramic filters, unlike paper, have depth (usually  $\frac{1}{4}$ " ) so core analysis, invasion and return permeability studies may all be performed. Bridging characteristics of drilling and drill-in fluids may be analyzed.

Porous ceramics consists of closely-sized particles bonded together which result in a uniform permeable material that forms a tortuous path for fluid flow. The most common materials are Alumina and Silica, but there is an almost unlimited variety of materials and shapes available. HTHP filtration cell bodies must be recessed and extra  $\frac{1}{2}$ " on the outlet side of the cell body in order to accommodate the ceramic disk. A  $\frac{1}{4}$ " spacer is provided for usage of filter paper if desired. Different sized ceramic disks to simulate cores and an assortment of other pore throat porosities/permeabilities are available on a special order bases.

These ceramic filters are classified by mean pore throat sizes and/or units of permeability. Mean pore throat is the average minimum pore diameter through the disk and it is measured in microns, or thousandths of a millimeter. Permeability is measure of the volume flow of fluids through a porous or semi porous media when subjected to a differential pressure. It is mathematically equated by Darcy's Permeability Law.

Previously mean pore throat size and permeability were roughly determined using air permeameter technology. Recent research funded by the American Petroleum Institute (API) used the latest Mercury Injection Capillary pressure technology to determine these characteristics. This new procedure found that the manufacturing process does not allow for absolute consistency between ceramic batches, but after numerous tests over several years, the final results was statistically pretty close. Even though the ceramic filters are the same filters that have been provided for years, the new API method for determining mean pore throat size and permeability have resulted in new and improved



specifications as outlined in the chart. All results and all orders should be based upon the information under the “New Mercury” column in the chart.

All ceramic disks must be soaked in the base fluid being tested for at least 30 minutes prior to usage. Failure to do so will result in premature and excessive plugging of the pores within the disks, giving erroneous results. Laboratories often will perpetually soak disks in the base fluid.

Part Number	Mean Pore Throat ( $\mu\text{m}^*$ )		Mean Permeability (Darcy)	
	New (Mercury, Hg)	Old Data (Air)	New (Mercury, Hg)	Old Data (Air)
#170-55	10	3	775 mD	400 mD
#170-53-2	12	5	850 mD	750 mD
#170-53-3	20	10	3 D	2 D
#170-51	40	20	8 D	5 D
#170-53	50	35	15 D	10 D
#170-53-1	55	60	20 D	20 D
#170-53-4	120	90	40 D	100 D
#170-53-5	--	150	--	180 D
#170-53-6	--	190	--	--

\*1 Micron ( $\mu\text{m}$ ) = 1/1,000 mm or 1/25,400 inch