IMPROVEMENT OF DIAPHRAGM METHOD FOR DRAINAGE CAPILLARY PRESSURE MEASUREMENT WITH MICRO PORE MEMBRANE

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Abstract A procedure is presented for measuring the drainage liquid-liquid capillary pressure curves by the diaphragm method. The customary ceramic porous plate is replaced by a thin micropore membrane that significantly reduces measurement time.

A coreholder with a rubber sleeve allows for confining pressure on the core and is used with a refined oil-brine system at ambient conditions. Eight drainage capillary pressure curves have been measured by the membrane method on Berea sandstone cores with different permeability's. For two of the core samples, the curves were also recorded by the traditional ceramic plate method. There is good agreement between the results of the micropore membrane and the ceramic plate methods.

The main advantage of the new method is the reduction in equilibration time. Plots of produced volumes following a step increase in differential pressure exhibit a considerable decrease in equilibration time when the micropore filter is used. The time ratio between the two methods is typically a factor of 10. A drainage capillary pressure curve measured by the micropore membrane method with e.g. seven data points may take approximately

ten days, compared with about 3 months for the ceramic disk method.