Isothermal vapour-liquid equilibrium data were obtained for the following ten binary systems constituted from components of two homologous series, viz., alcohols and aromatic hydrocarbons:

1. 2-propanol - ethylbenzene at 60°C
2. 2-propanol - ethylbenzene at 75°C
3. 2-propanol - p-xylene at 60°C
4. 2-propanol - p-xylene at 75°C
5. n-butanol - ethylbenzene at 100°C
6. n-butanol - p-xylene at 100°C
7. n-butanol - isopropylbenzene at 100°C
8. 2-methoxyethanol - ethylbenzene at 100°C
9. 2-methoxyethanol - p-xylene at 100°C
10. 2-methoxyethanol - isopropylbenzene at 100°C

Hipkin-Myers still with some modifications was constructed and employed to obtain the equilibrium data for all the systems. Temperature measurements were carried out using thermister probes. Cottrell action on the thermowell of contactor ensured true temperature measurements. Equilibrium liquid and vapour samples were analysed using refractive index method.

2-Propanol - ethylbenzene and 2-propanol - p-xylene binaries were found to be nonazeotropic while the rest formed minimum boiling azeotropes. Thermodynamic and internal consistency of the equilibrium data were verified by applying various tests. Activity coefficients, for all the systems, were determined using P-T-x-y and P-x measurements. Pure component properties were estimated at system temperatures by carefully selected correlations. Vapour phase nonideality for all the systems was taken into account. Activity coefficients for these systems were also calculated from molecular structure using UNIFAC method and compared with those calculated from experimental measurements. van Laar, Margules, Redlich-Kister, Black and Wilson correlations were used to fit the data. The parameters in these correlations were obtained by nonlinear least squares method minimising ln (γ₁/γ₂) function.
Activity coefficient data based on P-T-x-y measurements gave relatively poor fit in the correlations while those based on P-x measurements and Barker's method gave negligible RMSD values. Three parameter equations of Margules, Redlich-Kister and Black are found to give a satisfactory fit of the equilibrium data for the ten alcohol - hydrocarbon binaries investigated in this work.

It could be concluded that the activity coefficient data should be based upon two best measurements instead of on all the four measurements, namely, P-T-x-y and the three parameter equations of Margules, Redlich-Kister and Black describe alcohol - hydrocarbon systems very well.