Calculate the ligand density of a bonded phase of an HPLC column – How To

The ligand density can be calculated using the Berendsen-de Galan equation:

$$\alpha = 10^6 \; \%C/(10^2 \; MW_{carbon} \; nC - \%C \; MW_{ligand}) \; SBET$$

where α is the ligand density (µmol/m^2), %C is the percent carbon (%), MW_{carbon} is the molecular weight of carbon (g/mol), nC is the number of carbon atoms per bonded ligand, MW_{ligand} is the molecular weight of the organic bonded ligand (g/mol), and SBET is the specific surface area of silica material (m^2/g).

For example, the ligand density of the Cogent UDC-Cholesterol™ stationary phase comes out to approximately 1.5 µmol/m^2 using this equation.