In this work, we report the calculation of a new anharmonic force field up to semi-diagonal quartic terms using a basis set of triple zeta quality. The accuracy of the force field is checked by comparing experimental and ab initio spectroscopic constants. To complete the infrared analysis reported previously, the present work involves also the identification of numerous overtone or combination bands of COFCl, and for this task new low resolution Fourier transform spectra were recorded at Wuppertal. Finally, two independent equilibrium structures are determined: a purely ab initio one and a semi-experimental one.