To provide precise information relevant to Martian atmospheric remote sensing, high resolution high signal-to-noise ratio spectra of HDO in mixture with CO$_2$ were recorded in the $\nu_1$, $\nu_2$, and $\nu_3$ fundamental bands between 2.7 and 7 $\mu$m regions. The spectra were obtained with the Bruker IFS-125HR Fourier transform spectrometer at the Jet Propulsion Laboratory along with two specially built coolable absorption cells with path lengths of 0.2038 m$^a$ and 20.941 m$^b$ at various sample gas temperatures ($\sim$220 – 296 K), total sample pressures and volume mixing ratios. A multispectrum nonlinear least squares technique$^c$ was applied to fit simultaneously all the spectra obtained. The measured line parameters include accurate line positions, intensities, self- and CO$_2$-broadened Lorentz halfwidth and pressure-shift coefficients, and temperature dependences of CO$_2$ broadened HDO halfwidth and pressure-shift coefficients. Line mixing coefficients using the relaxation matrix formalism and quadratic speed dependence parameters were also measured where appropriate. Example results for select transitions in each band will be presented and comparisons made to other measured/calculated values$^d$.


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