We have performed pressure broadening and time resolved double resonance studies on three rotational transitions (2_{212} ← 1_{111}, 2_{111} ← 1_{110}, and 3_{113} ← 2_{212}) of formaldehyde (H_2CO) in collision with helium and hydrogen at low temperatures (T ≤ 16 K). This was achieved by applying the collisional cooling method. The purpose of this study was to compare laboratory measurements with the theory used to explain the anomalous absorption of interstellar formaldehyde against the 2.7 K background.\textsuperscript{a} We can confirm this prediction as far as it constitutes a model based on H_2CO - He collisions. However, we observe significantly different pressure broadening cross sections for H_2CO - H_2 collisions which raises the question as to whether a simple transfer from helium to hydrogen as collision partner can be made.