Abstract: Expansion of cellular polypropylene by the application of increased and consecutively reduced gas pressure was shown to result in samples which can be poled to significantly higher piezoelectric coefficients compared to untreated samples. In the present work, such pressure-treated samples were studied by quasistatic and interferometric methods with respect to the frequency dependence of their $d_{33}$ coefficient. The frequency dependence is characterized by a steady decline from e.g. 1200 pC/N at 0.001 Hz to 350 pC/N at 50 kHz. This decrease is mainly due to an increase of Young's modulus in this frequency range. At higher frequencies a thickness resonance at about 200 kHz was observed. Static pressures up to 10 kPa have little influence on $d_{33}$. Annealing temperatures of 70℃ and higher cause a decay of the $d_{33}$-coefficients.