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High beta-N experiments at JET[1] CLIVE CHALLIS, Euratom/UKAEA Fusion Association, Culham Science Centre, Abingdon, Oxon OX14 3DB, UK, JET EFDA CONTRIBUTORS TEAM[2] — JET has investigated the performance potential and limitations of highly triangular plasmas relevant to fully non-inductive tokamak operation. The q-profile shape has been varied from cases with highly negative core magnetic shear to low shear with q0 close to 1, allowing the effect on confinement and stability to be studied. Operation with beta-N above the no-wall 'limit' has been demonstrated for durations comparable with the resistive time and direct measurements of the no-wall beta have been developed as a tool for systematic performance optimization. Regimes have been developed with ITBs at reduced plasma current and toroidal field (1.2-1.5MA/2.3-2.7T) to obtain high values of beta-N and beta-P with either impurity seeding or quasi-double-null plasma configurations used to mitigate ELMs. The importance of the q-profile shape for performance optimization has been demonstrated in plasmas without ITBs (1.2MA/1.8T) with low values of minimum q (1-2) providing access to the highest beta-N (above 3).

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[2]see the Appendix of M L Watkins et al., Fusion Energy 2006 (Proc. 21st Int. Conf. Chengdu, 2006) IAEA, (2006).

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