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Domain walls of ferroelectric $BaTiO_3$ within the Ginzburg-Landau-Devonshire model[1] P. MARTON, I. RYCHETSKY, J. HLINKA, Institute of Physics, Academy of Sciences of the Czech Republic — Mechanically compatible and electrically neutral domain walls in tetragonal, orthorhombic, and rhombohedral ferroelectric phases of $BaTiO_3$ are systematically investigated in the framework of the phenomenological Ginzburg-Landau-Devonshire (GLD) model. Domain wall thicknesses, energy densities are derived analytically and evaluated numerically for several temperatures. Apart from simple Ising-type solutions of the model we also discuss more complicated solutions (two-dimensional approximation in polarization - curved polarization path). The calculations indicate that the lowest energy structure of the 109-degree domain wall and few other domain walls in the orthorhombic and rhombohedral phases resemble Bloch-like walls known from magnetism.

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