We analyze minimizers of the Lawrence-Doniach energy for layered superconductors occupying a bounded generalized cylinder. For an applied magnetic field \( \vec{H}_{ex} = h_{ex} \vec{e}_3 \) that is perpendicular to the layers with \( |\ln \epsilon| \ll h_{ex} \ll \epsilon^{-2} \) as \( \epsilon \to 0 \), where \( \epsilon \) is the reciprocal of the Ginzburg-Landau parameter, we prove an asymptotic formula for the minimum Lawrence-Doniach energy as \( \epsilon \) and the interlayer distance \( s \) tend to zero. We establish comparison results between the minimum Lawrence-Doniach energy and the minimum 3D anisotropic Ginzburg-Landau energy. We also discuss some results on the minimum Lawrence-Doniach energy with the applied magnetic field in the regime \( h_{ex} = O(|\ln \epsilon|) \). (Received January 19, 2015)