Locally adaptable mathematical morphology (AMM) uses circular structuring elements whose sizes can vary arbitrarily over the image plane. In this paper, we present an efficient algorithm to implement the dilation, erosion, closing and opening operators in arbitrary dimensions. The core of the method relies on adapting the separable Euclidean distance transformation (DT) introduced by Maurer in [IEEE Trans. PAMI, 25(2):265–270, 2003]. The algorithm is both more accurate and significantly faster than the previously published method.