Global classification of isolated singularities
in dimensions (4,3) and (8,5)

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Abstract. We characterize those closed $2k$-manifolds admitting smooth maps into $(k + 1)$-manifolds with only finitely many critical points, for $k \in \{2, 4\}$. We compute then the minimal number of critical points of such smooth maps for $k = 2$ and, under some fundamental group restrictions, also for $k = 4$. The main ingredients are King's local classification of isolated singularities, decomposition theory, low dimensional cobordisms of spherical fibrations and 3-manifolds topology.