

We study the near horizon structure of Extremal Vanishing Horizon (EVH) black holes, extremal black holes with vanishing horizon area with a vanishing one-cycle on the horizon. We construct the most general near horizon EVH and near-EVH ansatz for the metric and other fields, like dilaton and gauge fields which may be present in the theory. We prove that (1) the near horizon EVH geometry for generic gravity theory in generic dimension has a three dimensional maximally symmetric subspace; (2) if the matter fields of the theory satisfy strong energy condition either this 3d part is AdS_3 , or the solution is a direct product of a locally 3d flat space and a $d-3$ dimensional part; (3) these results extend to the near horizon geometry of near-EVH black holes, for which the AdS_3 part is replaced with BTZ geometry. We present some specific near horizon EVH geometries in 3, 4 and 5 dimensions for which there is a classification. We also briefly discuss implications of these generic results for generic (gauged) supergravity theories and also for the thermodynamics of near-EVH black holes and the EVH/CFT proposal.