Abstract: Given a graph $G = (V, E)$, if $e = uv \in E$, then the closed edge-neighborhood of $e$ is denoted by $N[e] = \{u'v' \in E \mid u' = u \text{ or } v' = v\}$. A function $f : E \to \{-1, 0, 1\}$ is called the minus signed edge domination function (MSEDF) of $G$ if $\sum_{e' \in N[e]} f(e') \geq 1$ for every $e \in E$. The minus signed edge domination number $\gamma_{se}^{-}(G) = \min \{f(E) \mid f \text{ is an MSEDF of } G\}$. In this paper, we give the lower bound on the minus signed edge-domination number of graphs. In addition, we characterize all graphs $G$ with $\gamma_{se}^{-}(G) = |E(G)|$. 