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带扫气蜗壳的整体式惯性粒子分离器仿真

Numerical simulation of inertial particle separator with scavenge scroll

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中文关键词: [扫气蜗壳](#) [整体式惯性粒子分离器](#) [分离效率](#) [隔板](#) [旋涡结构](#)英文关键词: [scavenge scroll](#) [inertial particle separator](#) [separation efficiency](#) [flow divider](#) [vortical structure](#)

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中文摘要:

对一种带有扫气蜗壳的整体式惯性粒子分离器进行了仿真研究, 获得了该粒子分离器的流动及粒子分离特性. 结果表明: 原型方案中粒子分离器扫气通道顶部和底部流动不畅, 使得扫气蜗壳不能周向均匀进气并且局部出现倒流. 当扫气比为19%时, 主流道出口截面总压恢复系数为0.982, AC砂和C砂分离效率较差, 分别为64.8%和76.6%. 而在扫气蜗壳内收集管上游加装隔板后, 其进气特性的周向均匀性及蜗壳内旋涡结构得到改善, 粒子分离效率也得到显著提高: 相同扫气比下, AC砂和C砂的分离效率分别提高了18.1%和20.9%, 且主流道出口截面的总压恢复系数基本不下降.

英文摘要:

An inertial particle separator with scavenge scroll was numerically studied to obtain its flow structure and scavenge efficiency performance characteristics. Results indicate that the flow fields at the top and bottom of the scavenge path are not smooth. Thus, the gas from the circular inlet can not flow into the scavenge scroll equably. When the bypass rate is 19%, the total pressure recovery coefficient of the core flow is 0.982; AC coarse and C-spec separator efficiencies are 64.8% and 76.6%, respectively. The flow structure and performance characteristics of the inertial particle separator are improved, and especially the vortical structures in scavenge scroll are of advantage to sand separating when the flow divider is added to the top of the scavenge scroll. With the same bypass rate, AC coarse and C-spec separation efficiencies increase 18.1% and 20.9%, respectively. Besides, the total pressure recovery coefficient of the core flow does not decrease much.

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