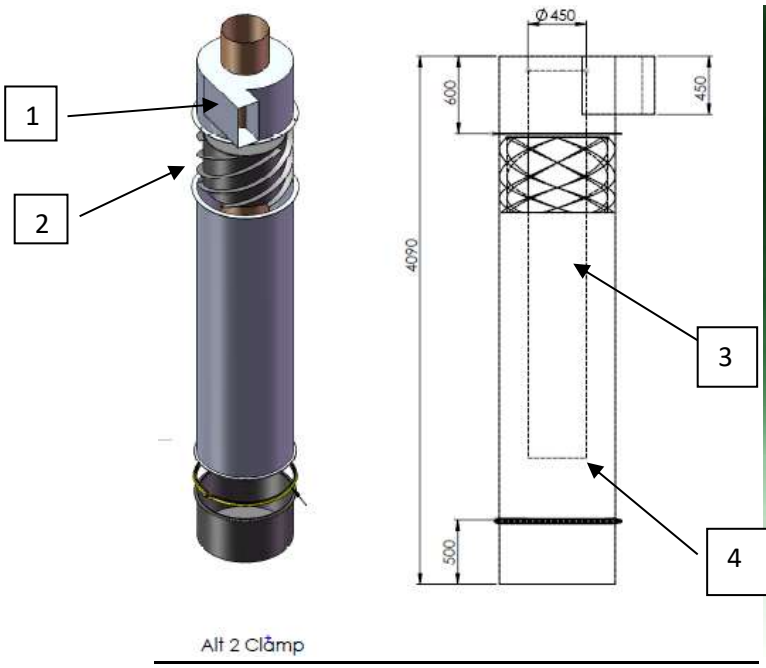
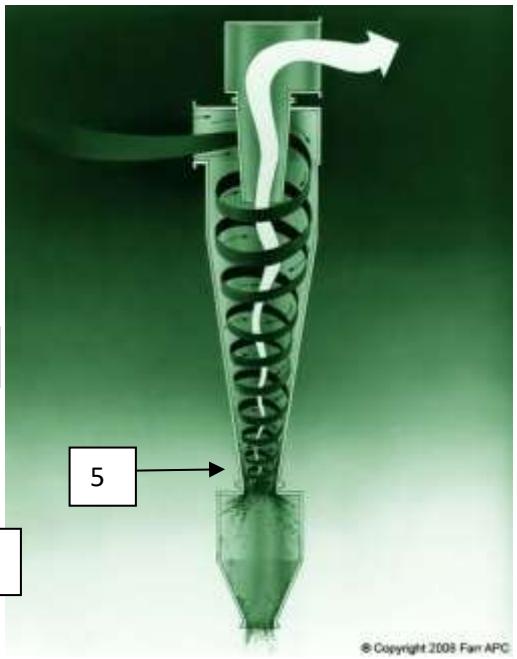
Cyklonteknik, Ingvar Hällgren, CentriClean Systems AB

Working principle of CentriCleans ”PowerSwirl” compared with a traditional cyclone





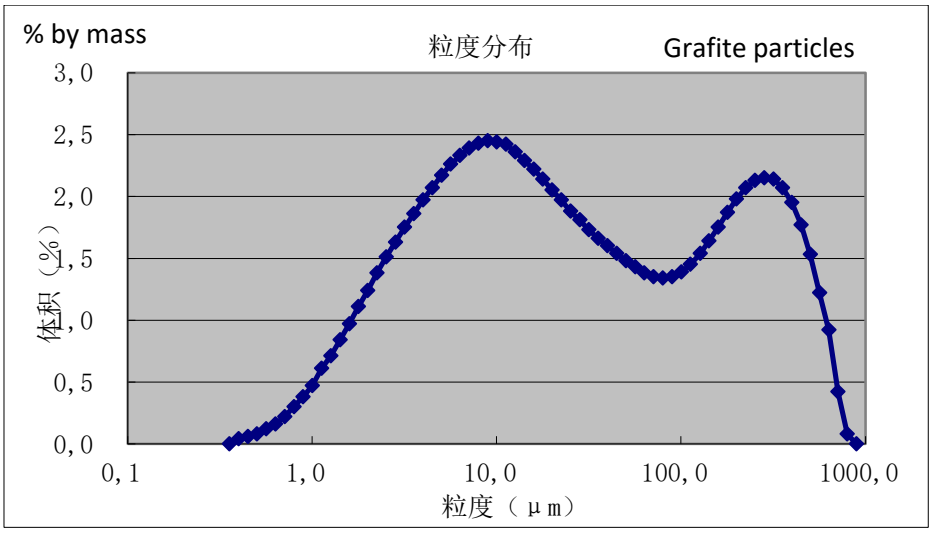
CCS PowerSwirl Traditional Cyclone

a) The efficiency is determined by the air velocity squared over the diameter (V^2/R) in the swirl generator 2), not in the inlet 1), as in a traditional one. (The speed further down is lower)
b) The vortex finder, 3) is long, which gives particles time to agglomerate and separate in the boundary layer close to the wall.
c) Particles do not sneak into the outlet at 4), since they had time to separate before they reach this area.
d) The CCS cyclone has no conical part 5), which in a traditional cyclone, makes that already separated particles are sucked into the upward swirl, due to the narrow space in the bottom.

More about the procedure

Further the efficiency of all cyclone-types is determined by the difference in density between the particles and the fluid medium. This favors air as a fluid medium, but a liquid fluid is practically possible for heavier particles.
A strong influence on the cyclone efficiency is the particle diameter (a), which increase efficiency with the power of 2 (a^2)

In the light of what has been said above, it is of the utmost importance to measure the particle size distribution, as shown below, or at least get an estimate using a microscope.



The distribution above is a favorable one and in a well-dimensioned cyclone we can expect to catch 99% of the particle-mass over 1µm and around half of the mass under 1 µm.