Title (en)

High efficiency cyclones

Title (de)

Hocheffiziente Zyklone

Title (fr)

Cyclones à haute efficacité

Publication

EP 0972572 A2 20000119 (EN)

Application

EP 99670006 A 19990608

Priority

PT 10216698 A 19980608

Abstract (en)

The present invention concerns high efficiency reverse flow cyclones - with a tangential entry of essentially rectangular section, sides a and b, the first parallel to the cyclone axis; a body of height H, with an upper cylindrical section of diameter D and height h and a lower inverted cone with smaller base of diameter Db: and a cylindrical vortex finder of diameter De and length s - which may be used in laboratory or industrial conditions, whenever dedusting is needed. The inventor could obtain an empirical correlation to estimate particle turbulent diffusivities under cyclone flow, through the use of a finite diffusivity theory which was adjusted to laboratory, pilot-scale and industrial grade efficiency curves. This correlation allows the design of reverse-flow cyclones of arbitrary geometry, as a function of particle size distribution and operating conditions.
A computer program was made to obtain optimum designed reverse-flow cyclones, and two geometries have been obtained, which respectively maximise collection efficiency and one ratio efficiency/costs. The proposed geometries, defined as ratios of the above mentioned dimensions to the cyclone inside diameter, differ from all geometries available in the literature, both being significantly more efficient. For flow rates typical of industrial multicyclones, the emissions should be 30-45% lower for the first family and 20-35% for the second, as compared with emissions from high efficiency cyclones available. Laboratory-scale tests with a similar geometry have confirmed the expected emissions reductions, at similar levels of pressure drop. <IMAGE>

IPC 1-7 (main, further and additional classification)

B04C 5/081

IPC 8 full level (invention and additional information)

B04C 5/081 (2006.01)

CPC (invention and additional information)

B04C 5/081 (2013.01)

Cited by

CN102658244A; ITPD20090139A1; JP2005520685A; KR100916732B1; CN103785550A; JP2016538126A; CN106457266A; US7781544B2; WO03080252A1; WO03080253A1; WO2006050919A1; US7323038B2; US7776278B2; WO2013144484A1; WO2015075702A1; DE202016102385U1; WO2017191242A1

Designated contracting state (EPC)

AT BE CH DE DK ES FI FR GB GR IE IT LI NL PT SE

DOCDB simple family

EP 0972572 A2 20000119; EP 0972572 A3 20010314; EP 0972572 B1 20061206; AT 347448 T 20061215; DE 69934274 D1 20070118; DE 69934274 T2 20070705; ES 2278433 T3 20070801; PT 102166 A 19981231; PT 102166 B 20000331; PT 972572 E 20070330