

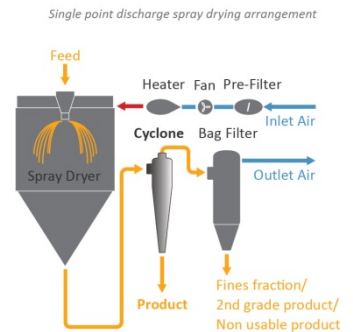
Hurricane Case Study: Pharmaceutical Spray Dryer

Active Pharmaceutical Ingredient (API) recovery

FOREWORD

In 2008 one leading company in API development and manufacturing, approached ACS for improving the yield of powder captured in the cyclone after its 1450 kg/h N₂ pharmaceutical spray dryer.

This company is an international group dedicated to the cGMP development and manufacture of APIs, serving exclusively the pharmaceutical industry. With a 50-year track record, it offers advanced technologies as well as APIs for all drug delivery systems, from oral to injectable and from inhalation to topical applications.



CASE DESCRIPTION AND RESULTS

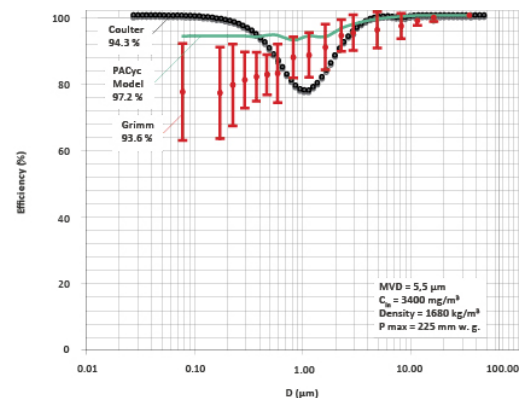
The 530 mm *Hurricane* cyclone, which replaced the cyclone from the spray dryer manufacturer was designed for a very fine and valuable dust (Median Particle Size in Volume (MVD) = 5.5 μm, with 7 % submicrometer, $\rho = 1680 \text{ kg/m}^3$, $C_{in} = 3.4 \text{ g/m}^3$). Losses were reduced from about 16-18 % to 2-4 %. The observed collection efficiency (96-98 %) agreed very well with that predicted by ACS PACyc (Particle Agglomeration Modeling in Cyclones) computer program (97.2 %).



The graph hereunder shows the expected grade-efficiencies for the same API for the proposed 530 mm *Hurricane* operating @ 225 mm w.g..

The predictions from the Coulter laser sizer and online Grimm optical monitor were derived from experimental runs with other powders, on a 450 mm pilot *Hurricane*, and corrected for particle density, concentration and operating conditions (Heumann, 1991). The PACyc predictions (in green) were directly derived for the 530 mm *Hurricane* operating with the particular powder in question.

Although ACS didn't have access to the experimental grade-efficiencies obtained with the *Hurricane* 530 in the clients' facilities, ACS was informed that the global efficiency was between 96 and 98 %, in total agreement with the PACyc model.



OPERATING CONDITIONS AND PERFORMANCE

- Actual flow rate (kg/h N₂) 1 450
- Temperature (°C) 85
- Inlet concentration (kg/h) 5-6
- Median Particle Size (μm) 5.5
- Efficiency (%) > 97

See more about PACyc model in <http://www.acsystems.pt/index.php?id=29>

Advanced Cyclone Systems, SA - Development, Comercialization and Installation of Industrial Filtering Systems

Centro de Empresas NET – Edifício PROMONET • Rua de Salazares, 842 • 4149-002 Porto • Portugal

Tel: +351 225 322 097 • Fax: +351 225 322 096 • www.acsystems.pt • info@acsystems.pt