



**Advanced
Cyclone
Systems**

Company Name:

Advanced Cyclone Systems, S. A.

Location / Contacts:

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Foundation:

Start of Activity:

June 2009

Founders:

Romualdo Salcedo (CTO), Professor from the Faculdade de Engenharia da Universidade do Porto (FEUP).

Pedro Ribas Araújo (CEO), Industrial and

Management Engineer from FEUP and MBA from the Universidade Nova de Lisboa.

Other Shareholders:

Armilar Venture Partners SCR

Brief history of the company, activity and products:

ACS was established in May 2008 with the support of the CoHitec program, promoted by Cotec – a Portuguese institutional innovation association. ACS is a company dedicated to the development, commercialization and installation of its own particle filtration systems, based on cyclones. These systems are internationally patented and were developed by Romualdo Salcedo, ACS founder, in partnership with FEUP.

Main commercialized technologies include numerically optimized high efficiency cyclones (**Hurricane**) and cyclones with mechanical or electrostatic recirculation (**ReCyclone®**). This last technology was the winner of the **National Environmental Press Award in 2008**.

The first prototypes tested in the industry by the founder have been working for more than 8 years mainly for particulate emission control in biomass boilers in the cork and wood industries. These good results in the past lead the founders to establish ACS.

With an international focus and diverse application fields, ACS is the only company worldwide exclusively dedicated to cyclone systems and uses this technologic platform to solve particle separation problems in several industries.

ACS has a quality management system under the norm ISO 9001:2008 certified by Bureau Veritas and accredited by the Portuguese Institute of Accreditation (IPAC).



Industrial Hurricanes

Applications:

Emission Control > Companies whose production processes result in **fine particulate emissions to the atmosphere** are obliged, due to more and more restrictive environmental legislation, to control these emissions.

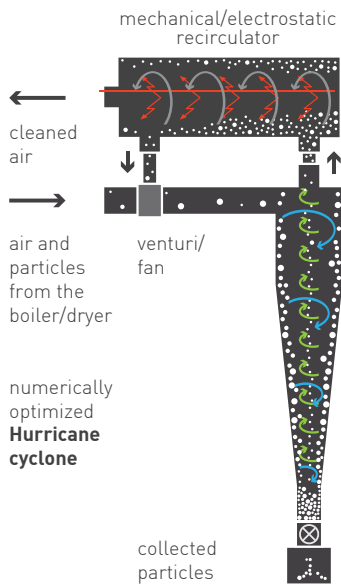
In most industrialized countries, companies are compelled to install efficient dedusters to comply with the legally established emission limits. These equipments are usually based in one of the following three technologies: (i) **cyclones**, (ii) **bag filters (BFs)** or (iii) **electrostatic precipitators (ESPs)**.

Due to its low investment and operation costs, **cyclones** are the preferred technology for particle collection in most industrial processes, but are unable to offer adequate efficiency levels regarding the majority of the gas emissions types. **BFs** are financially affordable and very efficient (> 99.9 %), but can be very maintenance demanding in the presence of high temperature or moisture due to frequent changing and cleaning of filter elements. **ESPs** are robust equipments and are very effective for a given range of dust types. However, ESPs have a limited range of application and, ultimately, the investment and retrofitting costs exceed the budget of small and medium size companies.

Hurricane and **ReCyclone®** systems are based on the same cyclone technological principle, making the difference due to a unique set of geometries and an innovative recirculation system. Due to these technological innovations, these systems show efficiency levels comparable to some bag filters, and present a high efficiency / total cost ratio as its most important competitive advantage.

Emission Control Applications:

- Biomass and Coal Combustion
- Fuel Oil Combustion
- Steel and Ferroalloys
- Clinker Cooler and Pre-Heater Dedusting
- Pyrolysis, Incineration and Gasification
- Calcination Processes
- Glass & Ceramic Furnaces
- Air Capture and Dedusting
- Oil and gas
- High Temperature Separation Processes for Energy Recovery
- Biomass Dryers



ReCyclone® System

Vision and mission:

ACS **vision** is leading the conception and distribution of cyclone systems on a global level, contributing to a healthier environment and to the growth of client's competitiveness, maintaining high standards of service and quality with qualified and motivated human resources. ACS **mission** is maximizing particle capture with cyclones, freeing the client from the costs and problems of bag filters. ACS is **very focused in terms of technology** with a short line of products but **highly dispersed in respect to application and geographical scope**.

Commercialization strategy:

Distribution is ACS' biggest challenge and the strategy is different according to each market segment. Besides working directly with customers or through representatives, ACS has been celebrating commercial agreements with complementary equipment suppliers, such as boilers, dryers, or large engineering companies. It is from Porto that ACS exports its technology to whole Europe. In projects for other continents, part of the production is transferred to the partner manufacturer that is closer to the installation premises. Although having the goal of a global presence, ACS entry territories are the Iberian Peninsula, France, Scandinavia, the UK, Central America, Brasil and Indonesia, countries in which ACS developed commercial agreements for its distribution strategy.

Powder Recovery > These systems can also be used in many other applications involving gas-solid separation, mainly for product recovery in industrial processes. This is particularly relevant in industries that process high-valued products under the form of fine powder (pharmaceutical, food, chemical and milling or drying processes in many other industries). ACS is frequently inquired, from the most remote places, for applications that go from food ingredients to nanoparticles recovery.

Product Recovery Applications:

- Pharmaceutical Ingredients
- Chemicals
- Food Ingredients
- Nanoparticles
- Mineral Processing
- Fertilizers
- Catalysts
- Milling and Drying Processes

Economical information:

In 2009, ACS raised its capital with Armilar Venture Partners SCR. Presently, in 2015, ACS is a company with 16 employees in Portugal, but presenting a strong network of agents and distributors worldwide. After 5 years of operation, ACS fulfilled more than 130 installations in 27 countries over the five continents. ACS secured orders exceeding 4M€ in 2014, the fifth year of operation, and aims growing at a fast pace reaching 30M€ in another 5 years time.



Pharmaceutical Hurricane



Pharmaceutical Hurricane

Global customer base:

