



LIFE05 ENV/E/000328

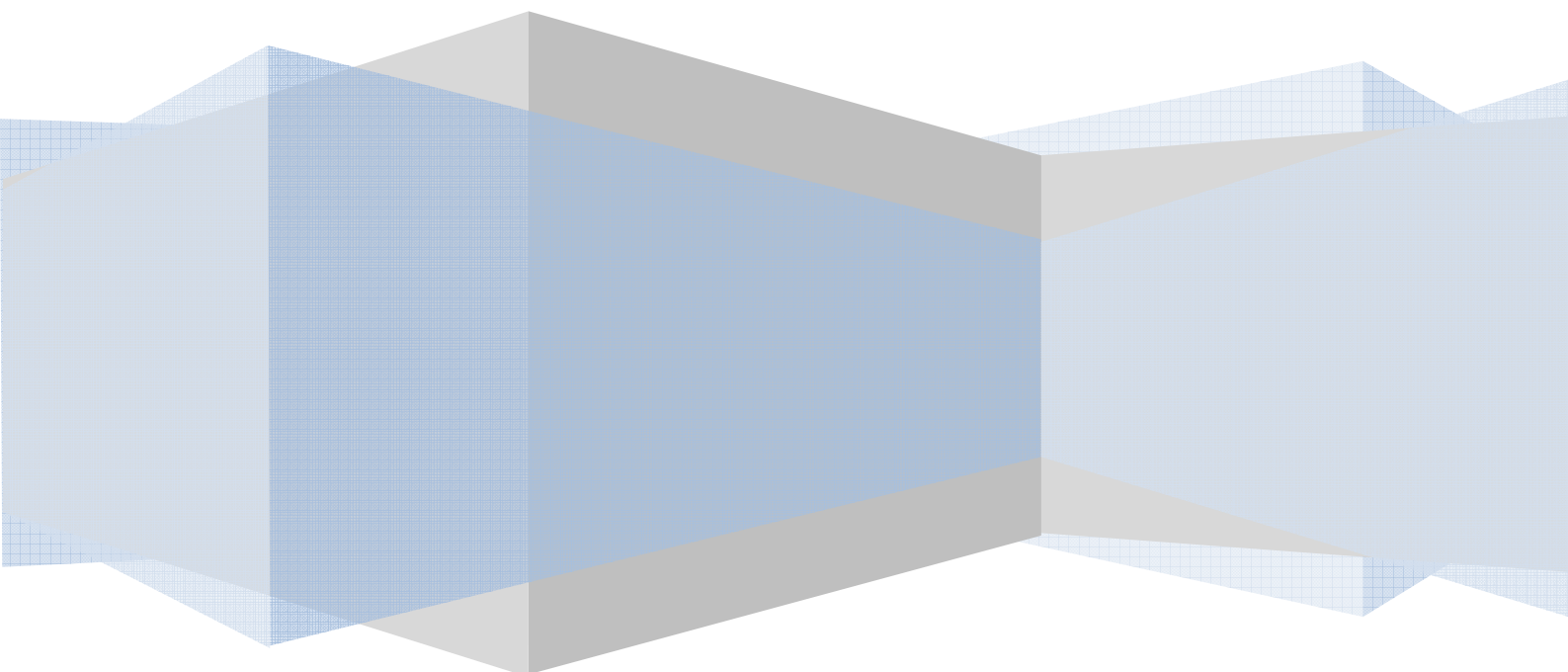
Pilot Demonstration Plant for Reduction of VOC Air Emissions

PREVOC PLAN

LAYMAN REPORT

PROJECT CO-FUNDED BY LIFE ENVIRONMENT PROGRAM

EUROPEAN COMMISSION



BACKGROUND

RENOLIT Ibérica, S.A. is a company that transforms and sells sheets of polyvinyl chloride for the construction of swimming pools, waterproofing infrastructures, both in civil engineering and construction, for cladding wood and for interior coating in the vehicle manufacturing industry.

The manufacturing process of the diverse kinds of PVC sheets depends on the final product to be obtained. In any case, the process begins with the preparation of a mix whose principal component is PVC resin. Other products, such as additives and pigments are also added to the mix.

The techniques used for thermoplastic sheet manufacturing are rolling pressing and extrusion, followed by finishing processes such as printing, lacquering, mechanical engraving and a final verification.

The use of organic solvents on the premises of **RENOLIT** Ibérica, S.A., , causes the emission of volatile organic compounds (VOCs) that contribute to the local and trans-frontier formation of photochemical oxidants on the edge of the troposphere, harming the environment and public health.

RENOLIT Ibérica, S.A, is actively committed to the conservation of the environment. As well as improving quality standards, safety at work and health protection and the profitability of the company, its aim is to achieve a continuous improvement in environmental conservation. For the company, existing laws and regulations represent minimum requirements which are supplemented in many areas by voluntary actions such as carrying out a Life projects consisting on building an innovative plant for VOCs treatment.

OBJETIVES

The objective of this project was to build and fine tune a demonstration pilot plant for the treatment of VOC emissions while, at the same time, validating an innovative process that provided the right answer to the problems of the current treatment systems. The project combines an exclusive filtering technology with a thermal regenerative oxidation system, and is a pioneering process for Europe.

The project has allowed the implementation of an Integrated Emission Reduction Programme that permits the reduction of volatile organic compound emissions from a plant to concentrations of lower than 20 mgC/Nm³ (8,5 mgC/Nm³), a much lower level than the limit of 100 mgC/Nm³ defined in Annex IIA of Directive 1999/13/CEE, transposed to Spanish law by Real Degree 117/2003. (Please see Annex Measurements).

TECHNOLOGY

Conventional technologies for VOC control (active carbon absorption, catalytic oxidation and thermal incineration) are widely accepted and well understood, however, they have practical limitations. At present there is no system that resolves the problem of finding an efficient treatment of a wide range of chemicals products with totally different VOC concentration.

The project consists in the start-up of a pilot demonstration plant for reduction of VOC air emissions. This is accomplished by capturing the emissions and feeding them to a thermal oxidation regenerative unit, after passing the gas through a molecular filter of natural zeolites. This filter is able to adsorb high concentration peaks of VOCs present in the air emissions. The plant treatment capacity is 45,000 m³/h, and the average operating temperature is 45° C.

The molecular filter is totally incombustible, which avoids the disadvantages of other systems such as absorption by active carbon with its fire hazard during the deabsorption phase.

The thermal oxidation regeneration treatment is composed of three towers linked by a transversal chamber placed at the top. Each tower is filled with inert ceramic packing media that allows heat accumulation. This ceramic bed is heated and cooled according to the direction of the gas that passes through it. The temperature can achieve 800 C and the average duration of one full cycle is between 90 and 240 seconds, approximately. The time taken depends on several process parameters such as nature and concentration of the pollutants.



RESULTS

Comparison against the project objectives

The project has been developed according to the objectives, tasks, and deadlines established in the proposal

The environmental balance has been:

- To overcome technical and economical difficulties that limit the implementation of VOCs treatment methodologies.
- A contribution to the compliance with the legislation by validating an emission reduction plan that can be reproduced throughout the European Community.
- A reduction of the environmental impact associated with activities using solvents.
- A practical pilot experience that helps to tackle issues relating to the best techniques available.
- Distribution of the project information to all private and public organisms interested in VOCs environmental issues.

Environmental Benefits

Many industrial sectors use organic solvents for surface treatment in their manufacturing processes. The fact that, until 2003, Spain lacked a regulation that governed VOCs emissions, has accentuated the current problem for adapting plant emissions affected by Section 10.1 of the EU's IPPC Directive to a level below certain thresholds (transposed to Spanish legislation under Act 16/2002 on Integrated Pollution Prevention and Control).

All these considerations are a serious concern for the wide range of industrial sectors affected, which are also under pressure because of Directive of 99/13/CE on VOC emissions (transposed to Spanish legislation under the Royal Decree 117/2003), which affects an even larger number of facilities, including many small companies.

The project implementation establishes an innovative technology that allows compliance with the thresholds defined in the Directive 99/13/CEE, on the limitation of VOCs emissions. Furthermore, it helps to overcome the obstacles of the current technology, since until now there were no systems capable of treating a wide range of chemical products with diverse VOCs concentrations.

Consequently, the industries implementing this technology will have more efficient VOCs treatment systems, both in terms of energy consumption and overall VOCs levels reduction, which is translated into substantially lower operating expenses and significant environmental improvements.

Innovation

RENOLIT presents a demonstration plant that integrates an innovative process in Europe using an exclusive zeolite filtering technology, effectively combined with a regenerative thermal oxidiser.

Reproduction potential

The project reproduction potential is very high, both in the thermoplastics sheeting manufacturing and in other sectors, such as footwear manufacturing, dry cleaning, surface cleaning, coating, lacquers manufacturing and paint production.

Employment implications

The project also has had considerable direct and indirect job creation repercussions related to the engineering, equipment construction, demonstration period and technical assistances.

The technical context of this project is an emerging, innovative sector of the economy where new jobs are constantly being created, and has excellent prospects in the immediate future.

In the future, through the project's demonstrative capacity, many companies in the same sector are expected to become aware of this technology and reduce emissions at their own factories, which will give rise to a large number of direct and indirect jobs.

Dissemination

The project has been disseminated by means of: articles in magazines, CDs, pamphlets in five languages, posters, stands in fairs, website www.renolit.com, and demonstration seminars and lectures.