



Plastic and Rubber Training and Research Institute, ICIPC Colombia: Knowledge Converted into Wealth

The Rubber and Plastic Institute for Training and Research, known as the ICIPC from its initials in Spanish, is a non-profit technology development center, leader in Colombia, which provides technology solutions to the plastic and rubber industry.

During its 16 years of operation, the Plastic and Rubber Training and Research Institute has conducted various activities for the benefit of enterprises working in the plastic and rubber chains in Colombia. Up to 2008, the Institute had satisfied the needs of 1207 enterprises belonging to the most diverse sectors of the Colombian economy. Of those enterprises, 700 belong to the production chains referred to and are located in the main cities on Colombian territory.

The geographical coverage for the technological services provided by the ICIPC for Colombian enterprises is shown in **Fig. 1**.

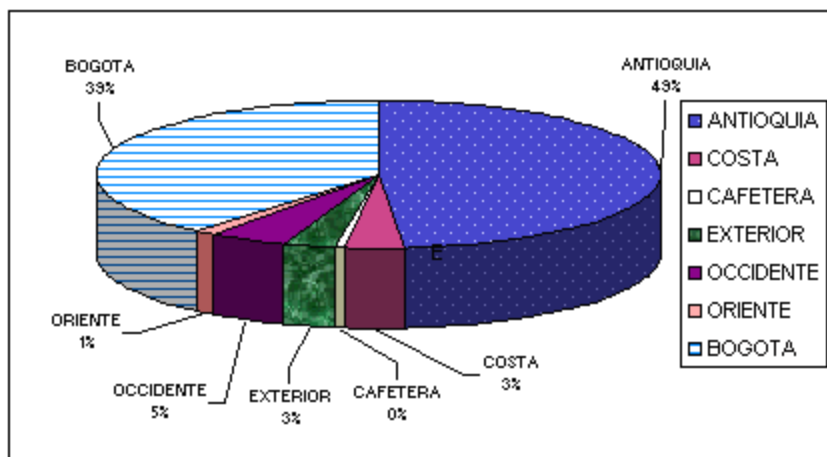


Figure 1: Geographical coverage of the technological services provided by the ICIPC for Colombian enterprises

The structure of the technological services provided by the ICIPC for Colombian enterprises is shown in **Fig. 2**. That corresponding to Research, Development and Design constitutes 67 per cent of the Institute's portfolio, followed by laboratory tests with 12 per cent and training with 10 per cent.

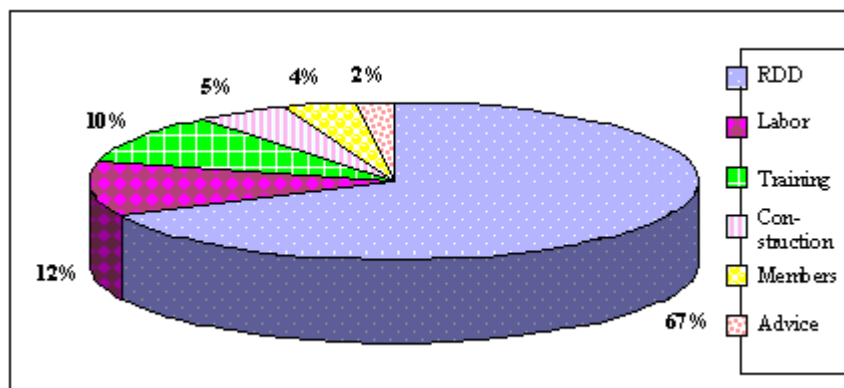


Figure 2: Structure of the technological services provided by the ICIPC for Colombian enterprises

Research, Development and Design Service (RDD)

Since 1998, the ICIPC has jointly carried out projects for enterprises in the plastics and rubber production chains, jointly financed by the National Service of Apprenticeship (SENA), the National Department for Science, Technology and Innovation (COLCIENCIAS) and BANCOLDEX. With these projects, it has been possible to achieve average productivity increases of 12 per cent in enterprises and several innovations in products and processes. In addition, it has guaranteed the appropriation of knowledge by the participants, which actually helps to make the wealth generation cycle a permanent feature.

Formal and Informal Training Service

The Institute designed and conducts with the EAFIT University the “Program of Specialization in Plastic and Rubber Conversion Processes” and the “Masters in Engineering of Polymer Processing”.

In its five cohorts within the specialization program, more than 50 professionals have graduated, the vast majority of whom were linked to enterprises from the plastic and rubber production chains in the cities of Medellín, Bogotá, Cali and Cartagena. Similarly, the ICIPC has developed short-term programs (seminars, congresses, workshops etc.) for the training of some 8,500 people, which represents approximately 140,000 man-hours of training.

It has also designed and carried out more than 70 specialized modules for enterprises, in accordance with their particular needs (type of product, materials, processes and staff profile).

Specialized Laboratory Testing Service

The Institute has carried out more than 40,000 specialized laboratory tests in the area of polymeric materials, the vast majority subject to more than 102 procedures standardized and accredited by the Industry and Trade Superintendence, according to the technical standard NTC-ISO-IE 17025.

The laboratories are accredited in accordance with standard ISO 17025 for the next five years and have ISO 9001:2000 certification for themselves and their whole portfolio of services in the area of plastic and rubber for the next three years.

International Partnerships

The international network of ICIPC has also contributed to fulfill its mission. Fig. 3. shows the international partnerships of ICIPC.

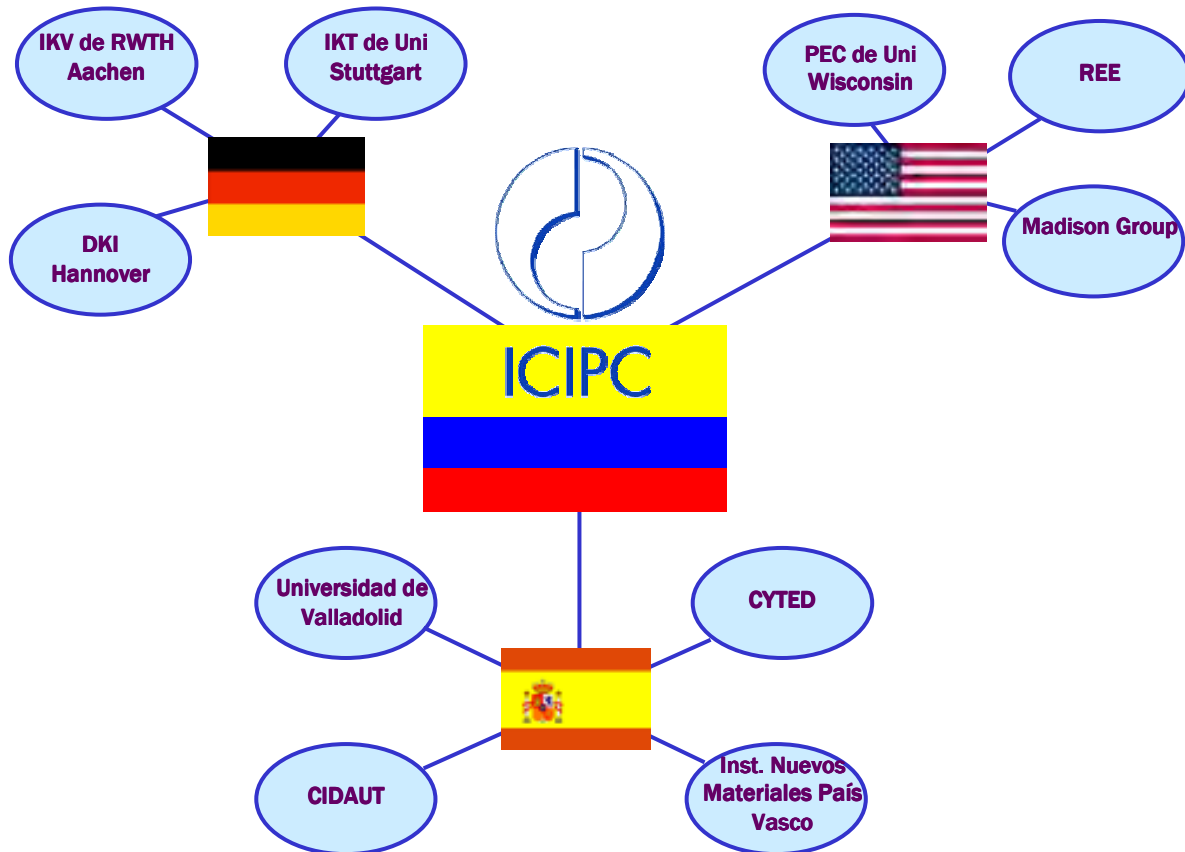


Figure 3: International network of ICIPC

Use of Patent Databases

As part of the research, development and design services, from 2003 onwards the ICIPC began to include prior art searches, in cases in which it considered that such information could contribute to the applied research project. Since 2003, work was done with more than 70 enterprises, both Colombian and from other Latin American countries. Prior art searches are conducted using the patent databases of the United States Patent and Trademark Office (USPTO), *esp@cenet* and Patent Abstracts of Japan (PAJ), as well as paid databases and those accessed through the Internet, such as Dialogue, STN and Science Direct, through major Colombian universities.

This has enabled the following services to be created for enterprises in the plastic, rubber and related industries sector:

- Technological radiography of a sector;
- Prior art of the technology(ies);
- Technology transfer;
- Innovation in methodologies and products.

Intellectual and Industrial Property

The ICIPC has produced more than 100 national and international publications, using indexed means. It has published seven books on technological specializations specific to the area of polymeric materials, some of which have been translated into various other languages (Chinese and Russian).

In addition, the ICIPC possesses the following registered marks and has filed the following applications for marks and patents:

1. Registered marks:

- Permeasoft[®]. Program for the design, calculation and simulation of barrier packaging.
- Extrutools[®]: Computational tools for calculations in the extrusion process.
- Inyectools[®]: Computational tools for calculations in the injection process.
- Matplast DB[®]: Plastic materials database.

2. Patents granted and applied in Colombia:

- Patent No. 030 12620 (*granted*): Method and device for visualizing online and quantifying the fusion of polymers in plastification machines with a screw.
- Patent No. 030 10433 (*granted*): Measuring method and cell for determining the thermal diffusiveness of materials during heat transfer processes.
- Patent No. 050 88703: Bird flight diversion device and subjection system. Applicant: ISA S.A. (E.S.P.) Inventors: ICIPC and ISA S.A. (E.S.P.).
- Patent No 09 063236: Compostable device for hydration of fresh cut flowers.
- Patent No. 09 063237: Oxygen scavenger compound and its manufacturing method thereof.

3. Patents granted in the United States:

- Patent No. 7.104.681, September 12, 2006: Method and device to determine the thermal diffusivity of materials, such as thermoplastic polymers, during non-stationary heat transfer processes. Inventor: Alberto Naranjo C.
- Patent No. 7314363, January 1, 2008: Device to visualize in-line and quantify the polymer melting in plasticating screw machines without significantly affecting its thermal regime. Inventors: María del Pilar Noriega E., Alberto Naranjo C., Tim Andreas Osswald y Nicola Ferrier.

Of the inventions for which patents have been applied for, one is already in the commercialization phase and its production commenced at the beginning of 2006. Two granted patents are under license negotiations.

4. International Books

ICIPC has published its international books on polymer materials and processing with a prestigious German publishing company, Hanser Publishers.

Some of the titles are: Troubleshooting the Extrusion Process, Plastics Testing and Characterization, Industrial Applications, Extrusion Processing Data, Injection Molding Processing Data and Applied Rubber Technology. These last three books were published in pocket format, see Fig. 4.



Figure 4: International books of ICIPC

There are also three papers of ICIPC in the SPE (Society of Plastics Engineers, PDL (Plastics Design Library)), edited book "Metallocene Technology and Modern Catalytic Methods in Commercial Applications".

National and International Recognition

During the 16 years that the ICIPC has existed, it has demonstrated its ability to implement its mission statement of "Converting knowledge into wealth".

Proof of this are the testimonies of bodies such as the World Bank in its October 2002 publication "Closing the Gap in Education and Technology" (Chapter 8) which cites the ICIPC as a successful example of the efforts made by the production sector to find answers to its needs.

Similarly, in its 2002 case study No. 9-703-437, the University of Harvard Business School devotes a large part of the study to the role played by the ICIPC within the success of ACOPLASTICOS (the Colombian Association of Plastic Industries) in its work, for the benefit of production chains in Colombia.

To celebrate the tenth anniversary of the ICIPC and bring to an end the program of German support, the German Society for Technical Cooperation (GTZ) published the bilingual document "The Plastic and Rubber Training and Research Institute. An example of successful cooperation between industry and science", February 2003.

ICIPC has received INNOVA Prize 2006, Special Mention, for the entrepreneurial technological innovation. Given by President Alvaro Uribe at Medal Ceremony. This contest is organized by Ministry of Industry and Commerce of Colombia. ■