TECNO PINCH
INTEGRAL SOLUTIONS

# TECNOPINCH INTEGRAL SOLUTIONS

***Tecnopinch Integral Solutions, S.A. de C.V.*** was constituted in December of 1995 with the purpose of offering services in Thermal Process Integration.

From their beginnings, Tecnopinch has been characterized by their capacity to integrate new technologies in the productive processes, and by their creativity to generate profitable solutions in order to make more efficient the use of the energy.

Also, at the present time, Tecnopinch has incorporated to our services the Administration of Quality focused to the energy saving and the use of statistical tools for the optimization and control of processes

## MISSION:

TECNOPINCH INTEGRAL SOLUTIONS S.A de C.V. it is a company integrated by personal with creativity that works in team, committed in developing profitable solutions focused to the optimization and the efficient use of energy in the processes guaranteeing the saving of resources, the protection of the environment and the quality.

## VISION:

To be a company of world class and leaders in the Latin American market

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**POLITICS OF QUALITY:**

To assure the maximum level of our clients' satisfaction and the continuous improvement by means of the execution of the established objectives of Quality for the Company, adopting the commitment of applying the following decisions:

- To endow the Company of the human resources and necessary technicians, to assure the quality in the benefit of the services that we offer to our clients.
- To create a favorable atmosphere for the promotion of the quality in the Company, forming and motivating the personnel in connection with the quality, the work in team and the administration of projects that allow the creativity, initiative and the sense of the responsibility of the whole personnel.
- To get the client's total satisfaction, assuring and getting being confident of them by means of the execution of our obligations in the benefit of the service and the continuous improvement, obtained through the commitment of the Company with the Quality.
- To fulfill all the laws and effective regulations, relative to the environment, as well as those commitments and requirements that the Company subscribes.
- To prevent damages to the public health and the environment, reducing the energy consumptions, water and raw materials.
- To foment the establishment of cooperation relationships with our suppliers guaranteeing that our demands are carefully specified and communicated.
- To implement this politics, in such a way that is understood and completed by the whole personnel in the company, with the purpose of achieving all the established objectives of quality.

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**OUR VALORS**

- Honesty.
- Responsibility.
- Justice, Respect and Dignity.
- I work in team:  Collaboration and work attitude.
- Loyalty.
- Confidentiality
- Ethics
- Excellency

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## OUR SERVICES

- Profitable Solutions to make efficient use of the energy
- Basic engineering of projects.
- Thermal diagnosis of processes.
- Identification of opportunity areas to reduce the energy consumption
- Projects without investment
- Profitable projects
- Elimination of bottle necks in processes of transfer of heat.
- Projects with minimum investment
- Increment of capacity
- Reduction of maintenance costs
- Reduction of energy consumptions
    - ✓ Cooling Water
    - ✓ Steam
    - ✓ Chilled water
    - ✓ Electricity
    - ✓ Natural Gas
- Operative flexibility
- Statistical analysis of processes.

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**OUR CLIENTS**

MONTERREY:

Akra (Chemical fibers - nylon)

COATZACOALCOS:

IDESA Group (Ethilen glycol and aminas plant)

Innophos (Sulfuric acid, Phosphoric acid plant)

Voridian de México (PET- Eastman Chemical)

Tereftalatos Mexicanos (Purified therephtalic acid)

ALTAMIRA:

PRIMEX Group (PVC plant)

POLICYD (PVC plant – CYDSA group)

NHUMO (black carbon – GIRSA group)

PETROCEL (DMT Plant)

QUERETARO:

Arancia Corn Products (Starch, germ and fructose)

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# REPORTS OF PROJECTS

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# OPTIMIZATION OF ENERGY RESOURCES

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| **PLANT** | Dimethil thereftalate (DMT), Altamira, Tamps. |
| **PROJECT** | **Energetic optimization of a turbo compressor of air** |
| **DESCRIPTION** | The process demands compressed air for the reaction system, supplied by a group of compressors that coupled to steam turbines with extraction at different energy levels. |
| **PROBLEM** | One energetic diagnosis allowed to determine that the process is self-sufficient to generate the steam requirements of low pressure. However one steam turbine had an extraction of 100,000 lb/hr of low pressure steam. |
| **SOLUTION** | A methodology was developed to characterize the users of steam thermally, including:<br>• Re-boilers of distillation towers<br>• Heaters<br>• Direct injection of steam to the process<br>The thermal characterization and the energetic diagnosis allow to determine the opportunity areas to reduce the consumption of steam. |
| **IMPLEMENTATIONS** | Optimization of operation conditions of steam users:<br>• Reflux reduction<br>• Reduction of sub-cooling in the reflux.<br>• Modification of the operation pressure in the distillation towers<br>• Elimination of not required super-heating. |
| **BENEFITS** | The extraction of the 100,000 lb/hr of low pressure steam was canceled in the expansion turbines coupled to the compressors which represented a reduction of 50,000 lb/hr in the demand of high pressure steam.<br>The savings were equivalent to reduce the energy costs in 2,000,000 USD/year. |

**Implementation: January 2000**

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# OPTIMIZATION OF HEAT RECOVERY

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| **PLANT** | Sulphuric acid |
| **PROJECT** | **Energetic optimization of the production process** |
| **DESCRIPTION** | In the process of production of sulphuric acid it is carried out a highly exothermic reaction. The reaction heat is used to produce high pressure and superheated steam.<br><br>However in another section of the plant the process demands low pressure steam. |
| **PROBLEM** | An energetic diagnosis of the process allowed to determine the inefficiency in the heat recovery, particularly in the drying area where part of the energetic potential got lost in an expansion process. |
| **SOLUTION** | The integration of a cogeneration system that allows to produce 6 MW of electricity was proposed.<br><br>The remaining heat in the acid was removed with cooling water and the preheating the feeding water to the systems of steam generation was recomended, This project allowed to save 9 ton/hr of low pressure steam. |
| **IMPLEMENTATIONS** | Integration of an expansion turbine in such a way that the high pressure steam once produced electricity, generates the low pressure steam that the other areas of the process demand.<br><br>Use the existing heat exchangers to cool the sulphuric acid with cooling water to preheat the feeding water to boilers, modifying only the number of passes. |
| **BENEFITS** | * Production of 6MW de EE – Savings equivalents to 1,900,000USD/year<br>Investment 700,000 USD/year, payback 8 months<br>* Saving of 9 ton/year of low pressure steam in the system of steam generation, representing 1,500,000 USD/year<br>Investment: 600,000 USD TIR: 150% Payback: 8 months |

**Implementation: January 2000**

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# OPERATIVE FLEXIBILITY OF A PROCESS

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| **PLANT** | Production of black carbon, Altamira Tamps. |
| **PROJECT** | **Optimization of the operative flexibility en the main reactor** |
| **DESCRIPTION** | The process of production of the black carbon consumes oil that should be fed hot to the reactor. The heating of the oil is carried out using the hot stream leaving of the reactor where highly exothermic reaction takes place and It is controlled to maintain constant temperature by adding desmineralized water (turning off the reaction). |
| **PROBLEM** | Considering that the raw materials has a variable composition the stream leaving of the reactor shows considerable variations of temperature, and the heating of the oil is difficult of maintaining constant in the entrance of the reactor so it is required to add cold oil recycling the excess. |
| **SOLUTION** | The energetic diagnosis of the process and the thermal characterization of the heat exchangers network were carried out; the results recommended to recovery the heat using thermal oil (therminol 66) and with this utility preheat the process oil guaranteeing a constant temperature in the feeding of the reactor and eliminating the recirculation of oil. |
| **IMPLEMENTATIONS** | To integrate a circuit of thermal oil integrated for:<br>* Storage tank<br>* Pumping system<br>* Thermal oil (therminol 66)<br>* Pipe and fittings. |
| **BENEFITS** | The stability in the temperature of the fed oil to the reactor allowed to achieve an increment of 1.5% in the raw material yield which represents a benefit of 500,000 USD/year.<br><br>The required investment was 253,000 USD.<br><br>The project presented a TIR of 133% and a payback of 9 months. |

**Operation: October 2001**

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# THERMAL PROCESS INTEGRATION FOR DEBOTTLENECKING

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| **PLANT** | **Productora de PVC, Altamira, Tamps.** |
| **PROJECT** | Increment of production capacity |
| **DESCRIPTION** | **The process of production of PVC is carried out in batch reactors at constant temperature. The heat that produces the polymerization reaction is eliminated using chilled water to maintain constant temperature.**<br><br>**The heat exchanger network is integrated by jackets, baffles and reflux condensers.** |
| **PROBLEM** | **It was required to increase in 25% the capacity of production of the plant and the capacity to remove the heat was the bottlenecking of the process.** |
| **SOLUTION** | **A thermal diagnosis indicated that the installed capacity of refrigeration was 25 bigger% to the one required.**<br><br>**A methodology to characterize the reactors – baffles, jackets and condensers- were developed. This allowed to detect inefficiencies in the use of the refrigeration system. This evaluation helped to conclude that it was possible to increase 25% of capacity without investing in an additional reactor and using the capacity of installed refrigeration more efficiently.** |
| **IMPLEMENTATIONS** | **It was required to change some existent pipes for others of more diameter to make a better redistribution of the flows of chilled water in such a way that the capacity of removal of heating was substantially increased by increasing the heat transfer coefficient of the system. The required investment was 300,000 USD.** |
| **BENEFITS** | **It was possible to increase 25% the production capacity.**<br><br>**More efficient use of refrigeration system.**<br><br>**Increasing of utilities in 3,000,000 USD/year.** |

**Operation: September 1998**