The Tanning Industry and Climate Change mitigation



Energy consumption in the tanning industry is not high, so greenhouse gas emissions do not constitute the main environmental incidence. However, the industry generates other high environmental impacts. Therefore, in the past few years many companies have gone through ecoefficiency processes to adapt to the levels established by new legislation and the requirements of the market. Within the improvement processes that many tanning companies are carrying out, there are opportunities to reduce greenhouse gas emissions while generating cost savings and improving competitiveness.

Some alternatives are listed below, which when applied, contribute to mitigating climate change in the tanning industry. We can basically differentiate these into two main types: The first relate to fuels, either by means of better production through cogeneration or the use of biomass. The second are alternatives orientated towards improving the rational use of energy in the hides preservation management process or by using more efficient equipment in the process.

Alternatives for reducing greenhouse gas emissions

BETTER USE OF FUELS

- Use of cleaner fossil fuels
 - The fossil fuels most commonly used in the tanning industry are natural gas, butane, propane and diesel
 - The use of natural gas is recommended as it is the fossil fuel with the lowest CO₂ emissions per thermal unit generated
- Use of biomass as fuel
 - From the point of view of greenhouse gas emissions it is always the best alternative
 - Due to its biogenic origin, its emissions are considered neutral.
- Cogeneration
 - When feasible, it optimises the production of electricity and heat and reduces associated emissions
 - The overall thermal efficiency can reach 93%, reducing CO_2 emissions by up to 50%, with respect to traditional systems, with an electric efficiency of up to 38%
 - Factories improve their autonomy with respect to external electricity suppliers.
 - If the factory size is relatively small, this will make cogeneration less feasible than for large factories.

IMPROVEMENTS IN PROCESS EFFICIENCY

- Rational production of cold in the preservation stage
 - The preservation stage is essential in the tanning industry
 - Traditionally, the hides are preserved by contact with pieces of ice, with the use of refrigerating chambers or with tanks full of glycol and cold water, with ice added
 - The FLO-ICE process, when it is feasible with the type of stock management, is an alternative that minimises energy consumption
- The installation of systems to minimise cold leaks in the chambers
 - Refrigeration chambers are critical points due to their high energy demand, and for minimising cold losses we can use:
 - \cdot Closing system controlled by photoelectric cell
 - · A timed closing system
 - · Warning systems
 - \cdot Air curtains
 - · Plastic strips
- Heat recovery from the refrigeration plant
 - If the plant has adequate means we can extract the heat contained in the hides to keep them at a temperature that guarantees their preservation and in addition reuse the heat

- Thermal insulation of cold surfaces
 - It is recommended to thermally insulate any surface, equipment, piping or tank that is kept at high or low temperatures, it is recommended that it is thermally insulated from the outside to prevent energy losses
- Implement a refrigeration management system
- Perform proper monitoring and maintenance
- Energy consumption savings of up to 20% can be obtained
- Implement generic energy efficiency alternatives
 - Regular maintenance and cleaning of the equipment and installations
 - · Control emissions into the atmosphere
 - · Use of high efficiency equipment
 - · Awareness and sensitising of workers
- Hydro-fluorocarbons management in the refrigeration systems
 - They have a high potential for heating up.
 - -Avoid leaks in the refrigeration systems during their useful lives and perform proper disposal management at the end of the useful lives of the equipment



Case study: SICA Company (Italy) (Source: www.sicagroup.com)

SICA is a company dedicated to the manufacture of cowhide leather for upholstery and automobiles. The company manufactures the product in four phases: fur, tanning, dyeing and finishing.

In the fourth phase, done with very low efficiency spray machines, 85% of the product applied ends up as waste. Moreover, worker health could be affected when using highly toxic product. The result was a negative environmental impact, because these residues are easily dispersed polluting the air and wastewater.

Seeing the impact involving the finishing process, the company launched a project called NESS, based upon some "best available techniques" implemented by Project GIADA.

GENERAL MEASURES TO REDUCE EMISSIONS

The NESS project resulted in innovative new spray technology. Rather than being rotational in structure, the new machinery instead consisted of linear bar airbrushes, which are more precise and allow for automation of the spray system.

RESULTS

- Reduction of finishing chemicals required (95% less).
- Reduction of sludge resulting directly from the purification of waste water by 98% due to the use of natural dyes.
- Improved quality of life for workers, by reduced noise and toxicity levels.
- Lower energy consumption (75% less) resulting in reduced greenhouse gas emissions
- 87.5% reduction in noise.
- Reduced water consumption in guns and scrubbers (95% less).
- Reducing VOC emissions.
- Possibility of thermal destruction (95%).

IMPROVEMENTS

- Improved quality of life for workers, by reduced noise and toxicity levels.
- Economic savings from lower energy consumption, lower water consumption and application of thermal destruction of VOCs.
- Decreased manufacture time.













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