



Global Green Chemistry Initiative Case Study

**CHANGE IN THE FORMULATION IN SEVERAL POLIKEM PRODUCTS
ELIMINATING CORROSIVE AND AGGRESSIVE RAW MATERIALS**



Yale

BACKGROUND



POLIKEM is a Company dedicated to the design, manufacture, storage and commercialization of products for the automotive, metalworking, household and I&I cleaning. The company is specialized in Aluminum Anodizing, metal finishing as well as outsourcing and maquila services.

POLIKEM's trajectory and performance has made it worthy of national as well as international awards. In 2014, the UNITED NATIONS, through its division UNIDO (United Nations Industrial Development Organization), granted POLIKEM the "Gold" award among 50 companies that participated in the Global Chemical Leasing 2014, which recognized the performance of the POLIKEM in regards to innovation, economic and environmental impact, and the application of Chemical Leasing in the industrial sector.



STAKEHOLDERS



SUPPLIERS

Reduction of demand for of higher hazardous feedstocks in the processes of manufacture, handling and transport.



WORKERS

Elimination of exposure to hazardous gases and occupational risks.



COMPANY

Greater requirements for process control, leading to higher investment and operational costs.



CUSTOMERS

Reduction of exposure to hazardous gases and occupational risks.



COMMUNITY

Elimination of gas emissions in the habitat where the company is located

CENTRAL PROBLEM I

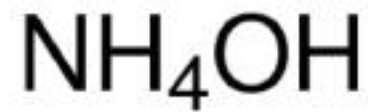


HYDROFLUORIC ACID

The use of hydrofluoric acid represents a risk in the supply chain due to the instability of this chemical, because under normal conditions the substance releases highly corrosive, harmful and toxic gases that require very controlled use and handling.



Effects from exposure may include burns, necrosis, severe and rapid hypocalcemia and severe pulmonary injury.



AMMONIUM HYDROXIDE

The use of ammonium hydroxide, but on a smaller scale, also represent a risk in the supply chain by releasing ammonia gases that are corrosive, toxic by all routes (ie, inhalation, ingestion, and dermal contact) and intensely pungent-smelling liquid.



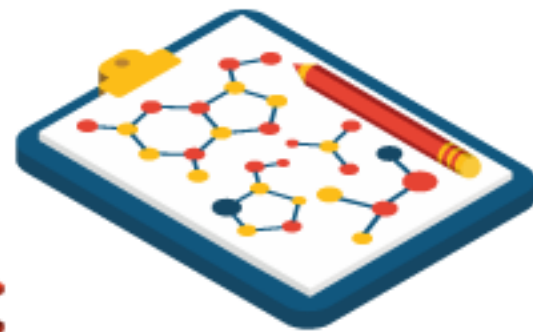
Effects from exposure may include extreme irritation of the eyes and mucous membranes, contact burns to the skin and eyes, and life-threatening pulmonary edema.



The storage of both substances are quite enough restrictive and all activities and situations where over-exposure is possible, it's necessary wear a self-contained breathing apparatus, and protective clothing (including full face protection).

OBJECTIVE

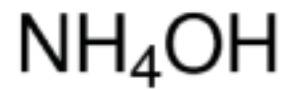
Improve the environmental, safety and health impact at the supply chain, because of previous formulations generated emissions of gases and instability in their manufacture, storage and handling.



Replacement the substances

ACTIONS

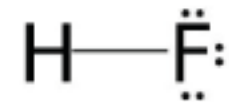
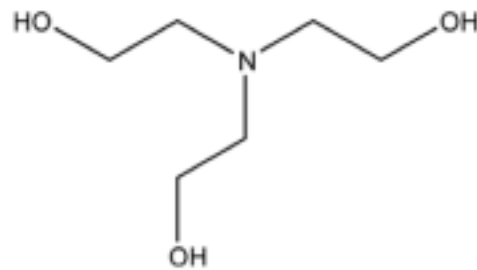
- Search for better alternatives for the replacement.
- APQP and PPAP methodologies for ensuring the reliability of development.
- Analysis and multiple laboratory tests and subsequent performance tests.



Ammonium hydroxide



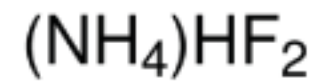
Triethanolamine



Hydrofluoric Acid



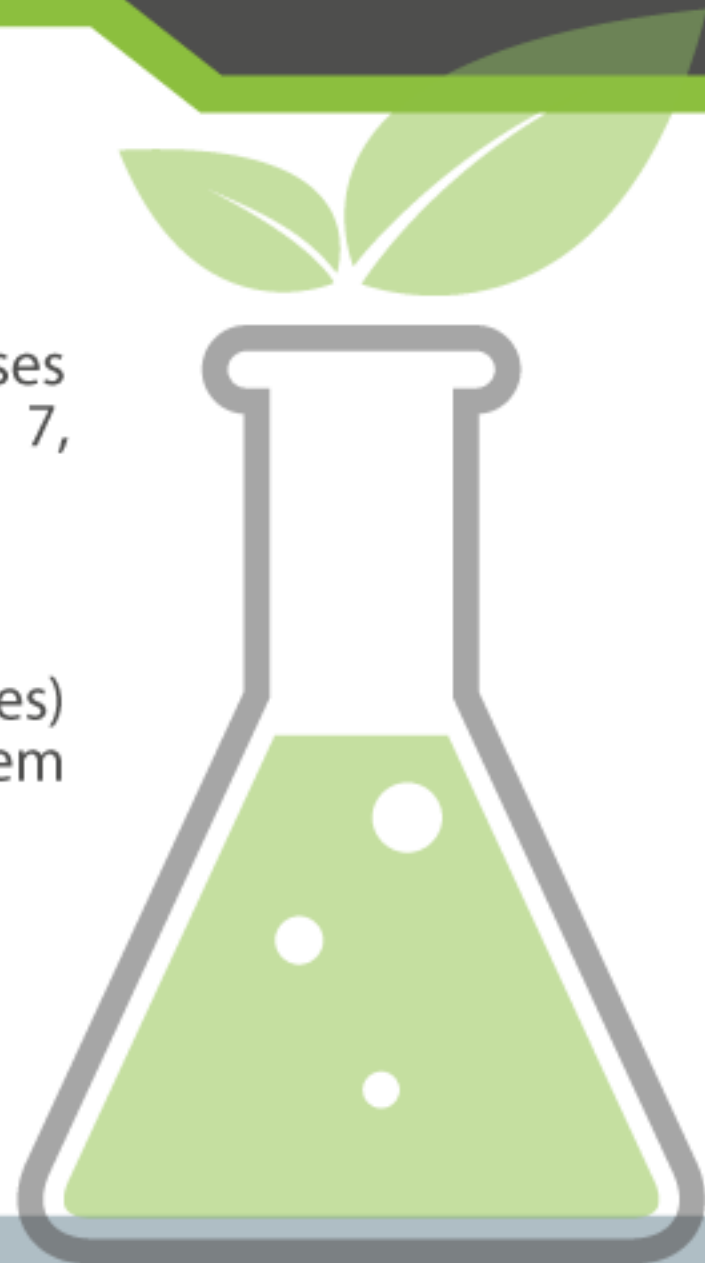
Ammonium Bifluoride



SOLUTIONS/ACTIONS |

■ Elimination of emissions of ammonia and hydrogen fluoride gases during the manufacture of Stripkem 100 and Kemocrom 7, respectively.

■ Reduction of environmental impact (generation of toxic gases) and occupational hazards during the manufacture of Stripkem 100 and Kemocrom 7.



LESSON LEARNED |



We have **contributed to have better processes environmentally** and we have defined a **policy of constant analysis** of all formulations of our products to reduce the impacts throughout the value chain, from our plant to our customers.

We have continued the **search for replacement of surfactants and solvents** petroleum-derived by substitutes from renewable and sustainable sources.

This practice has helped us to **check frequently green substances and more friendly substances database** in order to rethink in more friendly products for our customers and environment.