

**AMER-SIL SA**  
***“not a product supplier  
but...  
a technical partner !!”***



**INDUSTRIAL BATTERY SOLUTIONS**

**MICRO-POROUS POLYMER / SILICA SEPARATORS - WOVEN & NON-WOVEN GAUNTLETS**



**Amer-Sil : since 50 years focus on components for Industrial batteries**

- ✓ **1970 Foundation in Kehlen, Luxembourg:** JV Amerace & Tudor Sweden
- ✓ **1987** Acquisition of Amer-Sil by The Moore Company, textile focus Group
- ✓ **1989** Starting Production of non-woven gauntlets (**1<sup>st</sup> player Worldwide**)
- ✓ **2014 MBO, today AMER-SIL is fully independent with long-term plans and a stable organization, from that date...**
- ✓ **2015** JV Amer-Sil / Ketex → today Amer-Sil Ketex by far the leader in India and Amer-Sil worldwide leader





## ***AMER-SIL : worldwide presence***

- ✓ Focus on Global Presence with **Glo-cal** attitude
- ✓ Globally 750 people
- ✓ 7x local Manufacturing sites :
  - ✓ 1x Luxembourg : HQ
  - ✓ 3x India (delivering domestic & European market)
  - ✓ 1x Bangladesh
  - ✓ 1x China (delivering domestic market)
  - ✓ 1x Brazil (dedicated to Latin America)
- ✓ ONE common know-how
- ✓ Sales in the 5 continents in every country there is an Industrial battery OEM





# AMER-SIL SA, Head Quarter in Luxembourg

- ✓ 120 Employees
- ✓ Since 2014 R&D team from 3 to 15+ people in young/dynamic team with many ongoing research projects in partnership with :
  - ✓ **LAVAL University** in Montreal, Canada
  - ✓ **Fraunhofer Institute**, Germany
  - ✓ **KU Leuven**, Belgium
  - ✓ **CNRS** (National Center of Scientific Research), France
  - ✓ Projects with “ **Luxembourg National Research Fund**” and “**Marie Skłodowska-Curie**” EU program
- ✓ New R&D & test labs
- ✓ The battery supplier strongly involved in battery research :
  - ✓ Electrochemistry lab
  - ✓ Battery testing lab
  - ✓ Member of ALABC
- ✓ Used to work on customised projects with OEM battery manufacturers :

**!! YOU tell us your needs → we define WITH YOU a customised/dedicated solution !!**





# Continuous improvement & LEAN approach

General & Operations current management coming from automotive background

In the last 10 years turnaround scenario with focus on :

- ✓ ***LEAN MANUFACTURING***
- ✓ ***CONTINUOUS IMPROVEMENT***
- ✓ ***KEEPING OUTSTANDING CONSTANT QUALITY***
  
- ✓ Focus on machines automatization to strongly reduce human mistakes and to be able to duplicate our quality into our several locations worldwide
  - quality : machine-dependant and not people-dependant

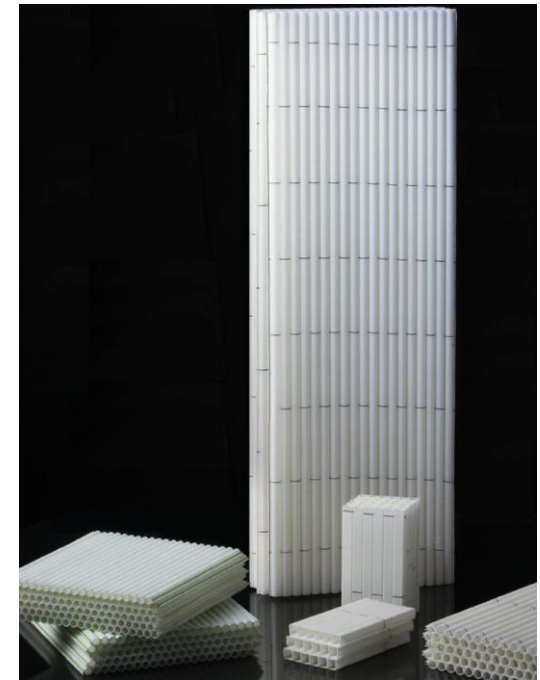




# Components for INDUSTRIAL lead acid batteries

## Gauntlets for tubular plates : Woven & Non-Woven

Amer-Sil + Ketex benefit of 60 years of consolidated experience on this product,  
Today supplying 750+ Millions Lmt

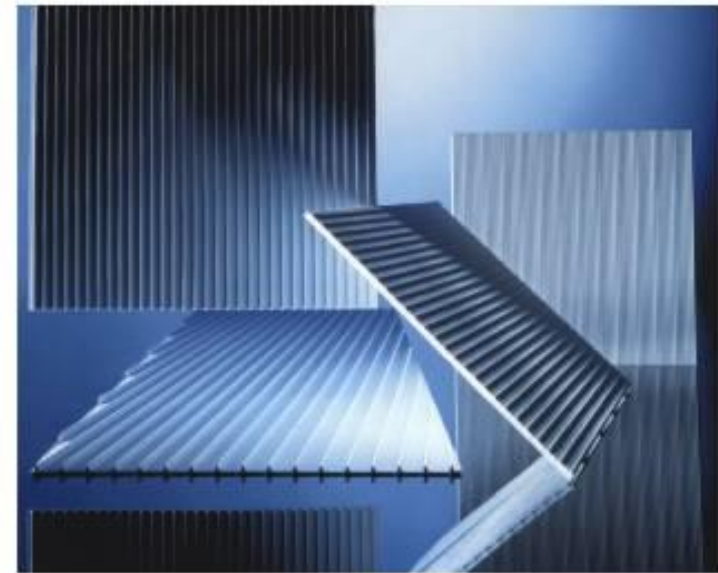




## Components for INDUSTRIAL lead acid batteries

### Microporous PVC / Silica Separators

Amer-Sil benefits of 50 years of  
experience on this product





## Main features of an endless-evolving solution

- ✓ Made of : PVC / Silica / Solvent / Carbon Black / Stabilizers
- ✓ Extruded and calendared with unique process
- ✓ No mineral oil and no resin added
- ✓ Thicknesses ranging from approx. 0,35mm to 5+mm (on demand)
- ✓ It can be laminated with Glass Mat in case of flat positive plates

Not to forget...

- ✓ Thermal stabilizer, no more Chlorine issues **since 2003**
- ✓ Our PVC composition much more flexible than in the past: available in leaf but also in rolls and sleeves (NEW)





## AMER-SIL proposes since 50 years the pure PVC/Silica

- ✓ **Pore volume** : 73%, the **most porous** plastic separator in the market (and we can achieve more...)
- ✓ **Acid displacement** : among lowest value on market
- ✓ **Electrical resistance** : thanks to optimum pore distribution we facilitate ionic movement through a short path way  
→ lowest ER value on market
- ✓ In 2019 our Backweb (today as thin as **0,35mm**) will be further reduced :
  - ✓ **even lower ER !**
  - ✓ **even less acid displacement !**
- ✓ Long life due to excellent **resistance to oxidation**
- ✓ **Wettability** : immediate wetting thank to exposed Silica particles (important parameter during battery acid filling process, especially in Gel)



# Resistance to Oxidation : BCI Method

Procedure : Hydrogen peroxide

**Oxidizing  
solution**



SEPARATOR



Hydrogen Peroxide solution in sulfuric acid



3 hours in solution stabilized at 80°C



Wash in distilled water



Weight loss (%)



# Oxidation resistance : BCI Method

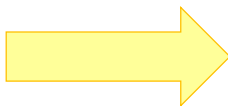
Procedure : Hydrogen peroxide

**Samples before oxidation test**



Amer-Sil Darak PE Flex-Sil Cell force Sintered PVC

BCI  
Procedure  
2  
Hydrogen  
Peroxide



**Samples after oxidation test**



Amer-Sil Darak PE Flex-Sil Cell force Sintered PVC



## To summarize...what AMER-SIL can offer :

- ✓ **Technical partnership** with common development of products following your specific needs.
  - ✓ **Reliable supplier** thanks to our persistent quality
  - ✓ **Customized solutions** in terms of :
    - ✓ For Gauntlets : -material, -diameter (upto 1,2 inches), -size, -design (round, square, elliptical)
    - ✓ For Separators : -thickness, -size, -design
  - ✓ **Very short delivery**
    - ✓ We deliver the Separators from our plant in Bangalore where we increased every year our production capacity by 20%+
    - ✓ Space available at every ASK location for installation of odd machines
- ✓ AMER-SIL is the only truly independent player in Industrial → the only long-term consistent partner !!





# Thanks for your interest !!

**AMER-SIL S.A.**

*“not a product supplier but a technical partner”*

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